



# FREETOWN WATER

SUSTAINABLE | COMMUNITY-FOCUSED | ACCOUNTABLE

## ENVIRONMENTAL, SOCIAL AND HEALTH IMPACT ASSESSMENT (ESHIA) OF FREETOWN WATER SUPPLY REHABILITATION PROJECT





## Document Control Sheet

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## Acronym

AC	Asbestos Cement
ASI	Adam Smith International
BAM	BAM Nuttall
BTS	Bulk Transfer System
DFID	UK Department for International Development
DRR	Disaster Risks Reduction
EDSA	Electricity Distribution and Supply Authority
EPA	Environmental Protection Agency- Sierra Leone
EIA	Environmental Impact Assessment
EPC	Engineering Procurement Contract
ESHIA	Environmental, Social, Health and Safety Impact Assessment
ESMP	Environmental Social Management Plan
EWRC	Electricity and Water Regulatory Commission
FCC	Freetown City Council
FGD	Focus Group Discussion
FO	Fixed Outlet
GRP	Glass-Reinforced Polymer
GoSL	Government of Sierra Leone
GVWC	Guma Valley Water Company
H&S	Health and Safety
IFC	International Finance Corporation
IMC	IMC Worldwide
KII	Key Informant Interviews
masl	Meters above sea level
MCC	Motor Control Centre
Mld	Megalitres per Day
MIA	Ministry of Internal Affairs
MIC	Ministry of Information and Communications
MLGRD	Ministry of Local Government & Rural Development
MLPE	Ministry of Lands, Planning and Environment
MOHS	Ministry of Health and Sanitation
MWR	Ministry of Water Resources
NCP	National Commission for Privatisation
NET	Njala Environmental Technicians
NGO	Non-Government Organisation
NPAA	National Protected Area Authority
PA	Priority Areas
PAP	Potential Affected Areas
PS	Performance Standards
RAP	Resettlement Action Plan
ROW	Right of Way
SEP	Stakeholder Engagement Plan
SLRA	Sierra Leone Roads Authority



TOR	Terms of Reference
WARD C	Western Area Rural District Council
WAPNP	Western Area Peninsula National Park
WASH	Water, Sanitation and Hygiene
WP	Work Packages
WSR	Water Supply Reservoir
WTP	Water Treatment Plant





# Executive Summary

## Introduction and Purpose

The ESHIA reports on the environmental and social impacts of the Freetown Water Rehabilitation Project with the aim of managing and mitigating its possible impact according to Sierra Leone legislation. The specific objectives of this report are to capture the environmental, social and health characteristics of the site areas and surrounding communities, to describe the engineering works and to provide an assessment of the possible adverse and beneficial impacts that would stem from the works. The report defines the elements for avoiding, mitigating, or compensating for adverse effects and enhancing the beneficial impacts.

## Project Overview

Guma Valley Water Corporation (GVWC) is a national entity responsible for water supply in Freetown. 90% of Freetown's water originates from the Guma Valley Dam. Guma Dam is in the hills to the south east of Freetown (see 'WP1' on Figure 1). From there treated water is piped under gravity flow westwards into the city and then on to the eastern side of the Freetown Peninsula. The dam and the associated WTP was built in 1961 to supply about 800,000 people per day, but now serves significantly more. The dam is replenished annually during the rainy season, approximatively from June to December. GVWC ration the amount of water served to the community to carefully use the water throughout the year. Over-abstraction or low rainfall creates a real risk to the water supply to Freetown, as occurred in 2006<sup>1</sup>.

The current annual cycle sees the water level in May and June at its lowest point (just before the rainy season), with associated severe water shortages across the city.

The demand for water in Freetown is higher than the current supply, and consequently little water reaches the east of the city. This is a growing problem as the city's population is expanding. The supply suffers from uncontrolled leakages from the system, limited investment or maintenance and human encroachment into existing secondary water catchments and new potential catchments, especially in the Orugu valley, which can put the sources at risk.

Extensive use of long individual 'spaghetti' small diameter polyethylene pipe connections has arisen due to the lack of formal water mains, and losses from such pipes are inevitably high given that these pipes are vulnerable to damage and vandalism. Altogether this is estimated to result in losses as high as 50% of the water produced<sup>2</sup>. The inadequate water supply is forcing parts of the population to seek informal sources, seriously increasing the hazards to health and the risk of disease.

The rehabilitation works and improvements will lead to reduced water losses within the system and improving water availability. The network will also be extended into new areas. The Project will contribute to Sierra Leone's progress towards the National Water Policy and the Sustainable Development Goals by increasing the coverage of the water supply and improving access. Water supply has been shown to highly influence other important quality of life aspects such as health, gender equity and education.

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<sup>1</sup> IMC (2017) Engineering Management Services to Rehabilitate Freetown Water Supply - Feasibility Report - Updated

<sup>2</sup> IMC (2017) Engineering Management Services to Rehabilitate Freetown Water Supply - Feasibility Report - Updated

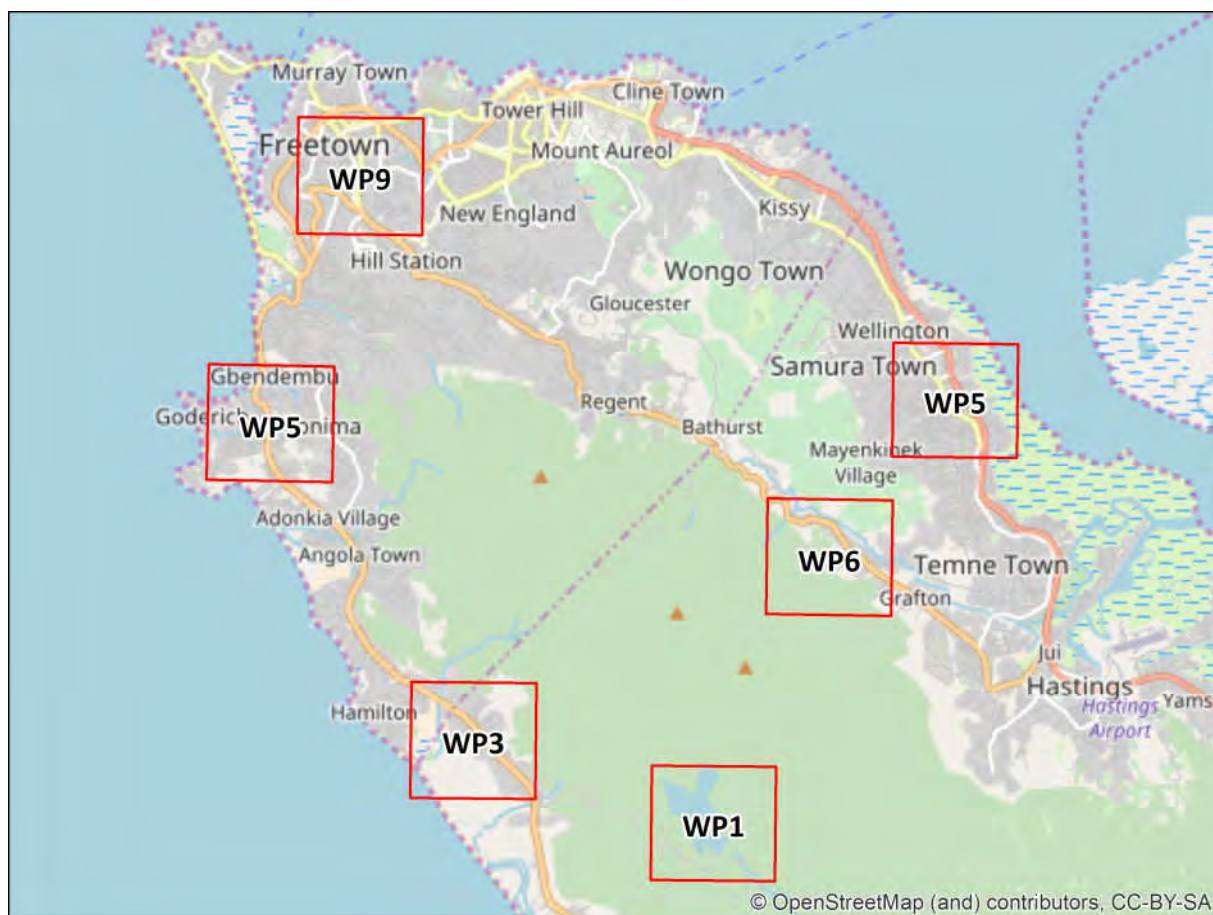


Figure 1: Work Package (WP) Locations including WP 1 the Guma Dam and Reservoir

## Policy, Legal and Institutional Framework

This ESHIA has been carried out in accordance with the Environmental Protection Agency Act (EPA Act, 2008, amended 2010). It summarises the key environmental, social and health legislation framework, the relevance to the project and the key institutional framework required to enforce it. It considers all relevant acts, regulations, policies and strategies including the following:

- Environmental Protection Agency Act, 2008;
- Environmental Protection Agency (Amendment) Act, 2010;
- The Forest Act, 1988;
- Forest Regulations, 1989;
- The Factory Act, 1974;
- Wildlife protection Act, 1972;
- Public Health Act, 1960;
- Electricity and Water Regulation Commission Act 2011;
- Water Company Act, 2001; and;
- National Protected Area Act, 2012.

## Project Description

Freetown, Western Urban Area, is situated at the northern end of the Western Peninsular and is densely populated. This is the main business and industrial area. The remainder of the population has spread up



the hills and into the Orugu valley, which lies south of the city, on a north-west - south east axis. These areas to the centre south and south east are in the Western Area Rural District Council and is generally of a lower density.

At the centre of Western Peninsular comprises of the Western Area National Park (WAPNP), a forested upland area and its buffer zone.

The total project area comprises many parts of Freetown, developed areas in Western Area Rural District Council, and adjacent parts of the WAPNP and its buffer zone. The work is split into six work packages (WPs) based on Priority Areas identified by the GVWC as the focus for rehabilitation of the Freetown water supply system. These six WPs are located across the city of Freetown and have been prioritised from an initial list of nine WPs.

The six works packages are listed and described in the Table 1, below.

**Table 1: Description of Work Packages**

Work Packages	Description	Rational
<b>WP 1 Guma Dam and WTP</b>	Rehabilitation of the dam scour system and repairs and safety works at the intake tower at the Guma Valley Dam, Refurbishment and replacement of leaking structures, valves, filter beds, electrical, control and disinfection systems at the Water Treatment Plant (WTP). For the purposes of this report, this package also includes the Mile 13 laydown area.	<p>The infrastructure within WP1 is old and poorly maintained. As a result, it is leaking a significant amount of water, inefficient and in some cases unsafe. Work is needed to ensure the safety of GVWC staff, improve the efficiency of the water infrastructure and water quality.</p> <p>This system provides the majority of Freetown's water and therefore is arguable the key and most important part of the water network.</p>
<b>WP 3 Rehabilitate the Transmission System</b>	Replacement of 4.4km of transmission pipes, construction two service reservoirs, and rehabilitation or construction of supporting infrastructure.	<p>Within the Western areas, supply can be limited by pressure and quantity to those within Marjay Town and Angola. To increase supply and pressure two reservoirs will be created along with the supporting reservoir.</p> <p>The key pipeline that will supply the reserves and carries on to the rest of the city is prone to leakages and burst. Therefore, replacement of the pipe will increase the reliability of supply, reduce maintenance requirements and more.</p>
<b>WP 5 Distribution Improvements</b>	New networks or improvements to the distribution networks in the east and west of the city, with works to commission an existing bulk transfer system.	<p>The Bulk Transfer System is a vital component in getting water to the East. Therefore, good working order of the system is important.</p> <p>Increasing supply in the east and west will extend the network to new areas and increase the access to water and increase GVWC</p>



		customer numbers. This will bring safer water to areas that do not have it already so can decrease diseases and increase sanitation.
<b>WP 6 Orugu Sources to Allen Town</b>	Construction of two weirs on the Orugu Sources (Mortem and Mongegba), with new pipelines to feed this water to the Charlotte Town Water Treatment Plan. Rehabilitation works to the Charlotte Town Water Treatment plant and distribution mains from that site.	<p>The east needs a new water supply to meet the growing need for water. Two locations have been identified that will help alleviate this deficiency.</p> <p>The new pipeline will bring this further supply to the Allen Town WTP as well as to new areas. This will increase the access to water, increase GVWC customer numbers, bring safer water to areas, decrease diseases and increase sanitation.</p>
<b>WP 9 Pumping Schemes to Wilberforce and other communities</b>	Rehabilitation of the Spur Road pumping station	Spur Road Reservoir and Pumps is another vital part of the network. Currently the pumps are old and inefficient. Rehabilitation of the pumps will increase the amount of water that can be sent to other parts of the city. On top of this the pump is currently depends on the electrical grid within Freetown. This system is unreliable and often the pump cannot function due to the lack of electricity. Therefore, a generator will be installed.

## Methodology

The ESHIA is a systematic process that sets a baseline, examines the impacts and risks of a project and then sets mitigation measures to avoid or reduce the negative impacts. A scoping report was completed and submitted to the EPA on 2 May 2018. The EPA accepted the scoping report on 9 May 2018 at which point the ESHIA team commenced the further works required for the full ESHIA.

The key steps include:

- Project overview and assessment of alternative approaches;
- Identification of a baseline;
- Impact and risk assessment;
- Stakeholder engagement; and;
- Determine mitigation measures.

The steps are not linear, as stakeholder engagement occurs throughout the process, and risk and impacts are revisited as mitigation measures are assessed and assumptions revisited.

The following methods were employed to gather information:

- Desk Review;
- Fieldwork; and;



- Stakeholder Consultation.

The desk based review completed includes a review of available project documentation and previous surveys that have been undertaken. The study area was assessed to examine:

- The current physical, biological and socio-economic and cultural environment in the project area;
- Relevant information about changes to those environments likely to occur during the project's life span; and
- Relevant information on environmental changes that may occur, even if the project were not to happen.

Fieldwork and site visits across the area were undertaken during the following periods:

- Scoping phase of the ESHIA study (13th – 20th April 2018)
- Baseline data collected during the ESHIA study period (5th – 21st June 2018)

This offered an opportunity to connect with key stakeholders in the project area to initiate their participation in the ESHIA process at an early stage and confirm relevant baseline environmental and social issues that are likely to be affected by the implementation of the project.

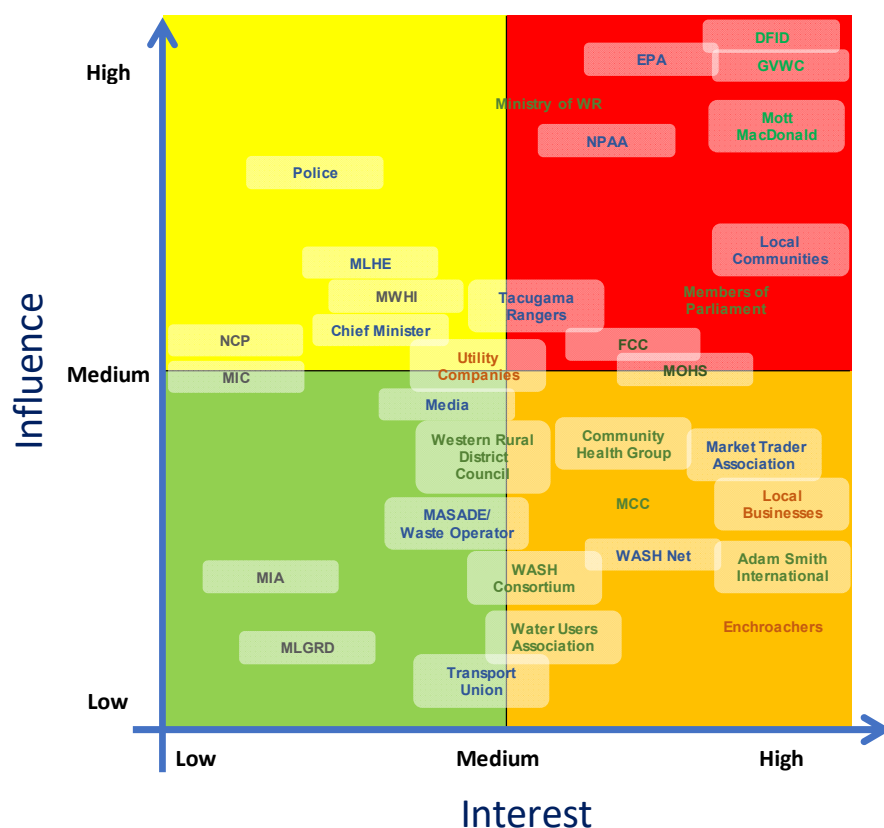
The team of consultants undertook field observations of existing properties along a representative stretch of the proposed additional/rehabilitated network to identify social-economic activities that are likely to be impacted.

A biodiversity assessment was carried out in three different locations and considered at five different *taxas*. These included Mammals, Reptiles and Amphibians, Avifauna, Fish and Plants in the following locations:

- GVWC Water Treatment Plant located in the Western Area Peninsula National Park (WAPNP)
- Mortem weir site areas located in the buffer zone at the edge of WAPNP
- Mongegba weir site areas located in the buffer zone at the edge of WAPNP

The data obtained from the desk and field studies were analysed and are presented in this ESHIA Report.

Finally, stakeholder engagement is a vital part of the ESHIA leading into the social baseline, identification of significant impacts and mitigation measures. Key stakeholders were identified through a stakeholder mapping exercise as described in Section 8.1 and presented in Figure 2 .



**Figure 2: Stakeholder Mapping for Freetown Water project**

Stakeholder of medium to high interest and influence were listed and engagement with those individuals, communities of organisations planned and executed throughout the project. The stakeholder engagement was completed in three formats:

- Community based socio-economic surveys where members of the team met and surveyed 380 respondents across the project area;
- Eight focus group discussions (FGD) took place in seven locations;
- Nine Key Informant Interviews were carried out with key organisations in the city.

The results of the stakeholder engagement are summarised below.

## Baseline Conditions

The baseline of the ESHIA is the actual pre-construction status without project intervention. It covers socio-economics, physical, biological and human environment. Understanding the baseline is important to evaluate the significance of any project-induced impacts. The baseline also provides a way to monitor current impacts, the effectiveness of the mitigation measures suggested and management measures along with demonstrating compliance.

The main scope of this section is to give an overview the characteristics of the different environmental, social and health components present in the rehabilitation of Freetown Water Supply Project. Table 2 shows the baseline data and desk review used for the work packages included in the ESHIA study.





**Table 2: Baseline data and desk review documentation**

<b>Baseline data &amp; desk review</b>	<b>WP1</b>	<b>WP3</b>	<b>WP5</b>	<b>WP6</b>	<b>WP9</b>
<b>EPC Feasibility Study (2017)</b>					
<b>Strategic Water Supply and Sanitation Framework (2008)</b>					
<b>Bat Survey (collected as part of ESHIA)</b>					
<b>Biodiversity Assessment (collected as part of ESHIA)</b>					
<b>Scour Tunnel Weir V-Notch calculation methodology and results (BAM, 2018)</b>					
<b>HVL valve assessment and completion report (2017 &amp; 2018)</b>					
<b>EPC Screening and Scoping report (2017 &amp; 2018)</b>					
<b>EPC Satellite and drone imagery</b>					
<b>Mott McDonald RAP preliminary report (2018)</b>					
<b>Focus Group Discussions (collected as part of ESHIA)</b>					
<b>WASH Data (Ministry of Water Resource Sierra Leone, 2017)</b>					
<b>Key Informant Interviews (collected as part of ESHIA)</b>					
<b>Work Package 5.2 (&amp; 3.2 Mains) – ATKINS Modelling Design Report (2018)</b>					
<b>Socio-Economic Survey (collected as part of ESHIA)</b>					

The baseline review set general baseline conditions that apply to the entire project area. Initial information provided in the Scoping Report was expanded. The Sierra Leone WASH data portal provides baseline information on the availability of water across the city. A modelling report 'Work Package 5.2 (& 3.2 Mains) – Atkins Modelling Design Report provides knowledge and assumption of the extent of the network at the time of production. In addition, information from the stakeholder socio-economic surveys and the key informant interviews allow the baseline water accessibility/socio economic situation to be established.

In addition, specific baseline data were provided:

- Work Package 1 – A bat survey completed in 2017 gives an overview of the baseline bat occupancy characteristics in the Intake Tower access tunnel;
- Work Package 1 and 6 – A biodiversity assessment including baseline data on five taxa has been included.
- Work Package 6 – Drone imagery allows baseline photographs of the Orugu sources to be included prior to works within the WAPNP.





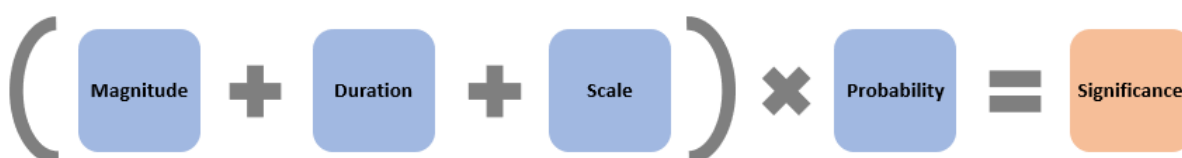
## Impacts and Risks Assessment

Following collection of baseline information, the impacts and risks associated with the project were identified to gauge their significance. Building on the result of the scoping report, direct, indirect and cumulative impacts were identified and assessed.

Every impact is assessed for magnitude, duration and scale in accordance with a set matrix of characteristics.

<b>Magnitude</b> is the extent and severity of how the impact affects the baseline condition	<b>Duration</b> is the length of time the impact will affect the receptor.	<b>Scale</b> is the size of the impact and proportional impacts on the receptor	<b>Probability</b> is the likelihood of the impact occurring.
Positive (-3)	Temporary (1)	Site Only (1)	Improbably (1)
Negative negligible (2)	Short Term (2)	Local (2)	Low Probability (2)
Negative minor (4)	Medium Term (3)	Regional (3)	Medium Probability (3)
Negative Moderate (6)	Long Term (4)	National (4)	High Probability (4)
Negative Major (10)	Permanent (5)	International (5)	Definitely/Unknown (5)

The significance of the impact is calculated in accordance with the below figure:



The following table includes the main aspects associated with the environmental, social and health impacts and risks identified by the ESHIA Team. There are no impacts with a significance over 50 which according to the methodology would be considered to result in a Major Negative Impact.

The ESHIA report provides more detail of the impacts, a summary is provided below.

**Table 3: Summary of impacts and risks (Significance score out of 100)**

WP	Impacts	Receptor	Phase	Magnitude	Duration	Scale	Probability	Significance (-60 to 100)
Mile 13	Access to Vegetation of community importance	Local Community	Construction	Negligible	Short term	Local	High Probability	32 Moderate Negative Impact
All	Air pollutions and dust	Local Environment	Construction	Minor	Temporary	Local	High Probability	28 Minor Negative Impact
All	Anti-Social Behaviour through workers movement	Local Community	Construction	Minor	Temporary	Local	Medium Probability	21 Minor Negative Impact



WP	Impacts	Receptor	Phase	Magnitude	Duration	Scale	Probability	Significance (-60 to 100)
	including sexual misconduct, drugs and theft							
Mile 13, 3.1, 3.2, 3.3, 5.2, 5.5, 5.6, 5.9, 6.5, 6.9, 9.1	Changes in local hydrology e.g. Run off	Local Environment	Construction	Minor	Temporary	Local	Definite/Unknown	35 Moderate Negative Impact
1.5, 1.6	Chlorine leaking into the environment from the old pipes or from construction	Local Environment	Operation	Major	Permanent	Local	Low Probability	34 Moderate Negative Impact
WP 1, 9.1	Clearing overhanging vegetation	Biodiversity	Construction	Negligible	Short term	Site Only	Definite/Unknown	25 Minor Negative Impact
6.5, Mile 13	Clearing vegetation from access paths and work areas	Biodiversity	Construction	Minor	Permanent	Site Only	Low Probability	20 Minor Negative Impact
All	Disruption of Public Utilities	Local Community, Business and Institutes	Construction	Moderate	Temporary	Local	High Probability	36 Moderate Negative Impact
All	Disruption of Social and Cultural Values through worker movements	Local Community and Workers	Construction	Moderate	Temporary	Local	Low Probability	18 Minor Negative Impact
1.1, Mile 13, 6.5	Disturbance on wildlife in the area	Biodiversity	Construction	Negligible	Temporary	Local	High Probability	20 Minor Negative Impact
All	Employment for Work	Local Community	Construction	Positive	Temporary	Local	High Probability	-24 Positive Impact
6.5	Encroachment in National Park	Biodiversity	All	Major	Medium term	Local	Medium Probability	45 Moderate Negative Impact
All	Extend the life of the infrastructure	Water Supply	Operation	Positive	Permanent	Regional	Definite/Unknown	-55 Positive Impact
All	Forest Cover	Forest	Construction	Moderate	Medium term	Site Only	Medium Probability	30 Moderate Negative Impact
All	Greenhouse Gases Emissions	Climate Change	Construction	Minor	Short term	Site Only	Definite/Unknown	35 Moderate Negative Impact
All	Handling and Storage of Construction Materials	Local Environment	Construction	Moderate	Temporary	Local	Medium Probability	27 Minor Negative Impact
5.9	Hazardous Construction Waste	Local Environment	Construction	Major	Short term	Site Only	Medium Probability	39 Moderate Negative Impact



WP	Impacts	Receptor	Phase	Magnitude	Duration	Scale	Probability	Significance (-60 to 100)
All	Improve Efficiency of Infrastructure	Water Supply	Operation	Positive	Permanent	Regional	Definite/Unknown	-55 Positive Impact
1.1	Improve operability of valves	Water Supply	Operation	Positive	Permanent	Site Only	High Probability	-36 Positive Impact
1.1, 1.2, 1.3, 1.5, 1.6	Improve the health, safety and wellbeing of GVWC operational staff.	Workers	Operation	Positive	Permanent	Site Only	Definite/Unknown	-45 Positive Impact
All	Improve Water Security	Water Supply	Operation	Positive	Permanent	Regional	High Probability	-44 Positive Impact
1.5	Improved operation of filters	Water Supply	Operation	Positive	Permanent	Site Only	High Probability	-36 Positive Impact
1.6	Improved plant reliability and resilience	Water Supply	Operation	Positive	Permanent	Regional	High Probability	-44 Positive Impact
All	Increase GVWC capacity	GVWC	Operation	Positive	Permanent	Regional	High Probability	-44 Positive Impact
3.1, 3.2, 3.3, 5.2, 5.9, 6.5, 6.9	Increase of GVWC Customers	GVWC	Operation	Positive	Permanent	Regional	Medium Probability	-33 Positive Impact
All	Increase reliability of Water Supply	Freetown	Operation	Positive	Permanent	Regional	High Probability	-44 Positive Impact
All	Increase Water Network	Freetown	Operation	Positive	Permanent	Regional	High Probability	-44 Positive Impact
All	Increase Water Pressure	Freetown	Operation	Positive	Permanent	Regional	High Probability	-44 Positive Impact
All	Increase Water Quality	Freetown	Operation	Positive	Permanent	Regional	High Probability	-44 Positive Impact
1.5	Increased filter run times	Water Supply	Operation	Positive	Permanent	Regional	High Probability	-44 Positive Impact
Mile 13, 6.5	Landscape changes	Local Environment	Construction	Minor	Temporary	Site Only	Medium Probability	18 Minor Negative Impact
1.2 & 1.3	Light and Noise Disturbance on Bat Colony within Ingress Tunnel	Biodiversity	All	Moderate	Short term	Local	High Probability	40 Moderate Negative Impact
All	Light Disturbance from works	Local Community, Biodiversity	Construction	Minor	Temporary	Site Only	High Probability	24 Minor Negative Impact
Mile 13	Noise at BAM compound	Local Community	Construction	Moderate	Temporary	Local	High Probability	36 Moderate Negative Impact
All	Noise Disturbance from works	Local Community, Biodiversity	Construction	Minor	Temporary	Local	High Probability	28 Minor Negative Impact
9.1	Noise from Generator	Local Community	Operation	Negligible	Permanent	Local	High Probability	36 Moderate Negative Impact
All	Non-Hazardous Construction Waste	Local Environment	Construction	Minor	Temporary	Site Only	Definite/Unknown	30 Moderate Negative Impact



WP	Impacts	Receptor	Phase	Magnitude	Duration	Scale	Probability	Significance (-60 to 100)
3.1, 3.2, 5.2, 5.9, 6.5, 6.9	Potential for Water Pollution	Water Supply	Construction	Moderate	Temporary	Local	High Probability	36 Moderate Negative Impact
All	Reduce leaks and bursts	Water Supply	Operation	Positive	Permanent	Regional	High Probability	-44 Positive Impact
3.1, 3.2, 3.3, 5.2, 5.9, 6.5, 6.9	Reduced access to homes and businesses	Local Community	Construction	Minor	Temporary	Local	Definite/Unknown	35 Moderate Negative Impact
1.5	Reduced downtime for maintenance	Water Supply	Operation	Positive	Permanent	Regional	High Probability	-44 Positive Impact
1.5	Reduced filter media loss	Water Supply	Operation	Positive	Permanent	Site Only	High Probability	-36 Positive Impact
1.4	Reduced flow in drainage channel downstream of the Works	Local Community	Operation	Positive	Permanent	Local	High Probability	-40 Positive Impact
3.1, 3.2, 3.3, 5.2, 5.9, 6.5, 6.9	Reduced water loss to informal supply	Informal Users	Construction	Positive	Permanent	Regional	High Probability	-44 Positive Impact
WP 1	Reduced Water Quantity Discharge at GVWC	Water Supply	Construction	Negligible	Temporary	Local	Low Probability	10 Negligible Impact
1.8	Reduces daily discharges to river	Water Supply	Operation	Positive	Permanent	Local	High Probability	-40 Positive Impact
1.1, 6.5	Reduction of River Flow to downstream water users	Local Community	Operation	Moderate	Permanent	Local	High Probability	52 Major Negative Impact
3.1, 3.2, 3.3, 5.2, 5.9, 6.5, 6.9	Resettlement	Encroachers	Construction	Major	Permanent	Local	Low Probability	34 Moderate Negative Impact
All	Risk of injury on site	Local Community and Workers	Construction	Moderate	Temporary	Site Only	High Probability	32 Minor Negative Impact
All	Road Traffic Accidents	Road Users	Construction	Major	Temporary	Site Only	Low Probability	24 Minor Negative Impact
All	Sales of Local Materials and Goods	Local Community	Construction	Positive	Temporary	Local	High Probability	-24 Positive Impact
1.7	Significant improvement to the control of the treatment process and more efficient use of chemicals	Water Supply	Operation	Positive	Permanent	Local	High Probability	-40 Positive Impact
All	Soil Erosion	Local Environment	Operation	Minor	Short term	Local	Medium Probability	24 Minor Negative Impact



WP	Impacts	Receptor	Phase	Magnitude	Duration	Scale	Probability	Significance (-60 to 100)
Mile 13	Spread of Diseases through worker movements	Local Community and Workers	Construction	Moderate	Temporary	Local	Low Probability	18 Minor Negative Impact
3.1, 3.2, 3.3, 5.2, 5.9, 6.5, 6.9	Traffic Disruption	Road Users	Construction	Moderate	Temporary	Local	High Probability	36 Moderate Negative Impact
1.8	Treatment and disposal of sludge	Local Environment	Operation	Positive	Permanent	Regional	High Probability	-44 Positive Impact
6.5	Water Pollution from construction	Water Supply	Construction	Moderate	Temporary	Local	Low Probability	18 Minor Negative Impact
1.2, 1.3, 1.4, 1.1	Working in Confined Spaces	Workers	Construction	Minor	Temporary	Site Only	Definite/Unknown	20 Moderate Negative Impact
All	Waste Water Increase	Water Supply	Operation	Negligible	Permanent	Regional	Medium Probability	36 Moderate Negative Impact

## Environmental impacts

The project will contribute to minor to moderated and localised ecological impacts with the majority being removal of vegetation in WP6.5 and Mile 13 and potential encroachment. The ecological impacts are particularly important for the works that within the Western Area Peninsula National Park (WAPNP), and the Park's buffer zone. This covers laydown area in Mile 13, the construction of two weirs at Mortem and Mongegba and its corresponding transmission main to Regent Road.

### Conservation at Mortem and Mongegba areas

A potential negative impact could be the damage caused by taking equipment to and from the above-mentioned sites, but this should be minimal as these will only be accessible by foot. This required removal of the undergrowth and a limited number of mature trees. This will occur early in the actual construction. Pipes in the forested area will be shallow buried to provide long term protection to the pipe. This will limit the existing issues where pipework has been shown to be vulnerable to fire and impact damage as well as being vulnerable to tapping. Although the access paths will be maintained for future maintenance; the disturbance of the wildlife will be temporary and restricted to construction and maintenance.

There is a concern that opening pathways to Mortem could encourage encroachment, which could be addressed by closing & re-routing the access for the works after they are complete. This encroachment is already evident and will cause a permanent impact is appropriate enforcement is not in place. It is recommended that GVWC needs to liaise more with the National Protected Area Authority (NPAA) to improve protection of the area. The NPAA is under-funded and therefore does not have all the resources required to guard the necessary areas.

The conservation approach applied at Tacugama catchment is a good example that could be adapted to Mortem and Mongegba catchments. This is due to its location and similarities in terms of risks. The Tacugama rangers are part of NPAA and receive support from the Tacugama Chimpanzee Sanctuary to preserve, among other things, the water catchment of Congo Dam, which faces increasing pressure from illegal human encroachment. The Ministry of Land, Planning and Environment would also need to approve



and register this land use modification. It would be beneficial to put a gate for each weir where the pipeline intersects access road off of the Youyi Highway (also known as the Chinese Highway) as opposed to closer to the weir site.

### **Impact on bats roosting in the intake tunnel**

There is the potential for the disturbance of bats known to be roosting in the intake tunnel of GVWC's water treatment plant during the repair and rehabilitation of the existing tower access platforms and tunnel and tower lighting. The main construction will be undertaken from October to December. The works on tower will be from the tunnel upwards due to worker safety. A rapid assessment carried out in August 2017 showed that the tunnel provided a suitable roosting habitat for a colony of the bat *Hipposideros aff. ruber* (Family: Hipposideridae), comprising 30-50 individuals during the study period; though there was no evidence of roosting in the ingress tower. The taxonomy of *H. aff. ruber* is complex and not yet resolved, and probably represents several cryptic species. *H. aff. ruber* depends at least partially on caves or cave-like structures as day roost, and echo-location recordings indicated that two distinct lineages of *H. aff. ruber* occurred in the tunnel at the time of visit<sup>3</sup>. Generally, though *H. aff. ruber* is listed on the IUCN Red List as one species and ranked as "Least Concern". It is believed that bats are present throughout the WAPNP and this will only directly affect the bats in the immediate vicinity of the tunnel and ingress tower. This disturbance will be temporary, mainly limited to rehabilitation of the tunnel and ingress tower.

Specifically, there was evidence that the bats exhibit seasonal roosting patterns, and that the bat population using the tunnel is larger in the dry season than during this survey in the wet season. The extent of seasonal variation in colony size is not known, but the expert suggests that the colony might comprise several hundreds to thousand individuals during population highs. The bat colony might thus be important for ecosystem functionality as some plants depend partly or wholly on bats to pollinate their flowers or spread their seeds, while other bats also help control pests by eating insects. The following mitigation measures are recommended.

- Turn off lights when the last worker leaves the water intake tunnel and tower
- Tool box training on working around bats
- Carrying out the works where the bat population is at its lowest which is during the rainy season.
- Working at night
- Identifying alternative roosts

Besides assessing potential fluctuations of the bat population and, if appropriate, adapting mitigation measures during the project, a monitoring plan should be put in place to observe the colony after the construction work and evaluate success of the mitigation measures. Colony counts, assessment of species composition, and activity monitoring would constitute suitable methods to this end.

### **Laydown area (Mile 13)**

Mile 13 is a temporary site located just outside the GVWC WTP entrance. Works within the Mile 13 involves the clearing of undergrowth and shrubbery and immature trees. However, given the presence of concrete foundations and immature vegetation it would appear that the site had been cleared previously

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<sup>3</sup> Weber (2017) Rapid assessment of bats in the tunnel and intake tower of the Guma dam, Western Area, Sierra Leone



of vegetation. Therefore, it can be expected that after construction and decommissioning of the Mile 13 site recolonisation of this vegetation will occur.

However, there are mature mango trees which provide a resource of community value and a few trees at the entrance. Cutting of any mature trees will be limited.

## **Water Quality and Quantity impacts**

There is potential risk of downstream contamination from construction materials, oil, fuels, and waste due to general works if waste and hazardous substances are not managed properly. Due to Freetown's topography, run-off is normally directed to the bay which compromises the quality of the receiving waters and affects the coastal slums. However, the potential for the release of materials will be limited to the construction phase and would likely be insignificant in comparison to the other material entering the water (i.e. medical waste and other hazardous materials are already found in the waters of the western urban area). These aspects will be managed particularly in regard to fuels, loose and fine materials and potentially hazardous substances.

It must be considered that the increase of water supply to local communities across the project area will have an impact on wastewater. In the longer term, domestic waste water and industrial waste water can increase in direct response of more water being available for use and the potential for increased GVWC customers. This still likely be waste water from domestic and drinking uses and unlikely to be from faecal sludge. This is more of a secondary (indirect) impact and this project contribution to Freetown's overall issue of waste water is low. Therefore, the impacts are minor to negligible. Freetown does not have system in place to treat wastewater efficiently so it will likely end up being washed into the bay.

Water downstream of Mongegba and Mortem will be decreased. An environmental flow of water will be maintained, however, there is an inevitable reduction of water for biodiversity and local communities using this water. This will be throughout the life of the infrastructure. This water is used to supply the East of Freetown.

## **Health impacts**

The rehabilitation and improvements are intended to lead to more water staying within the system and improving the water availability. The network will also be extended into new areas. It will link the new rehabilitated water supply to established communities, like the major centres of Allen Town and other relevant areas. The increased water supply can lead to improvements in personal sanitation and cleaner homes as well as access to safer water sources.

The project will therefore contribute to Sierra Leone's progress towards the National Water Policy and the Sustainable Development Goals by increasing the coverage of the water supply and improving access to it. Water supply has been shown to highly influence other important quality of life aspects such as health, gender equity and education.

The works within the Water Treatment Plant will also increase the safety and wellbeing of GVWC staff. This will be through improving lighting, replacing of unsafe ladders and rehabilitation of the chlorinated water system and the electrical system.

However, during construction there will be a temporary risk to GVWC staff, construction workers and the general public, but all issues are addressed in the contractor's Health and Safety Management Plan and the ESMP.





## **Waste management**

A review of relevant legislation and policy documents suggested that waste management in Sierra Leone is still in its infancy, with limited legislative guidance and not a single engineered landfill site in the country. This may change in the near future since the former and new government have prioritised the improvement of solid waste management in Freetown.

Consequently, the contractor and GVWC should employ measures to effectively manage the waste generated from the project in order not to contribute further to poor waste management practices locally. It is recommended that waste should be well managed and, at a minimum, according to Sierra Leone legislation. In the absence of national standards available covering specific topics, for hazardous waste or where the waste impact can be deemed unacceptable (i.e. asbestos management) then higher standards will be followed.

Faecal Sludge (FS) and other toilet waste from portable toilets at work sites must be collected safely and ensuring that FS will be disposed appropriately and not illegally dumped after collection.

### **Asbestos cement handling and disposal**

Attention must be given to handling and disposal of asbestos cement pipes; the main mitigation measure is to leave AC pipes underground. However, there is the potential that AC pipes can be removed or disturbed through cutting and breaking pipes. This would release asbestos fibres into the air, posing risks to public health. In this case the contractor will have an asbestos management plan. The final Asbestos Management Plan is still to be defined between the contractor, GVWC and FCC, and other relevant stakeholders.

## **Traffic and transport impacts**

The supply of equipment and materials for the construction phase will require a high amount of deliveries by large multi-axle trucks. Traffic congestion is likely to disturb local populations, increasing the risk of road accidents to pedestrians, cyclists and motorized vehicles, including motorcycles, etc. The project will be using two laydown sites at Africanus Road and at Mile 13 to better manage delivery of materials to the east and west of the city respectively. Early construction works are expected to commence in September 2018 with works ramping up with completion of all construction by December 2019. The majority of material delivery is likely to be concentrated in the first six months of construction and the majority of the road to be used during the project construction are described as being in average or good condition. The condition of the unpaved routes may be worse than described during the rainy season.

## **Social and economic impacts**

Nearby access to safe drinking water can alleviate adverse health effects and can reduce the time spent fetching water by mostly women, girls and boys. This time is better spent in attending schools for children or in economic activities for women. Therefore, implementing improved water supply interventions in Freetown can have a positive impact, particularly on low-income communities. Improving sanitation and hygiene facilities and practices would also be an important action supporting improved water supply.

The improvements of the infrastructure, the reliability, efficiency and life span of the infrastructure. These will lead to improvements in terms of maintenance and customer numbers as such increase the capacity and customer service of GVWC.



## **Labour**

The majority of the construction will be undertaken by local labour; which increases the employment within the local communities and the community income. The influx of labour into different areas of the city will also encourage money to be spent locally and as such will again increase the community income.

However, such influxes of labour are well noted for also bring the potential for conflict and disease. This can be through anti-social behaviour, disturbance of social and cultural values, sexual misconduct and HIV transmission. These are impacts that can occur with any construction and will only temporary affect the areas surrounding the sites.

## **Social unrest and vandalism**

Lack of communication and community engagement is perceived as a major risk for this project. Issues like resettlement, willingness to pay for water service as well as water cuts are hot topics that if managed inappropriately can increase community dissatisfaction and thus can be a potential source of social unrest and vandalism to water infrastructure. It is therefore important that the EPC, GVWC, the contractor and other relevant stakeholders participate actively in a common community engagement approach.

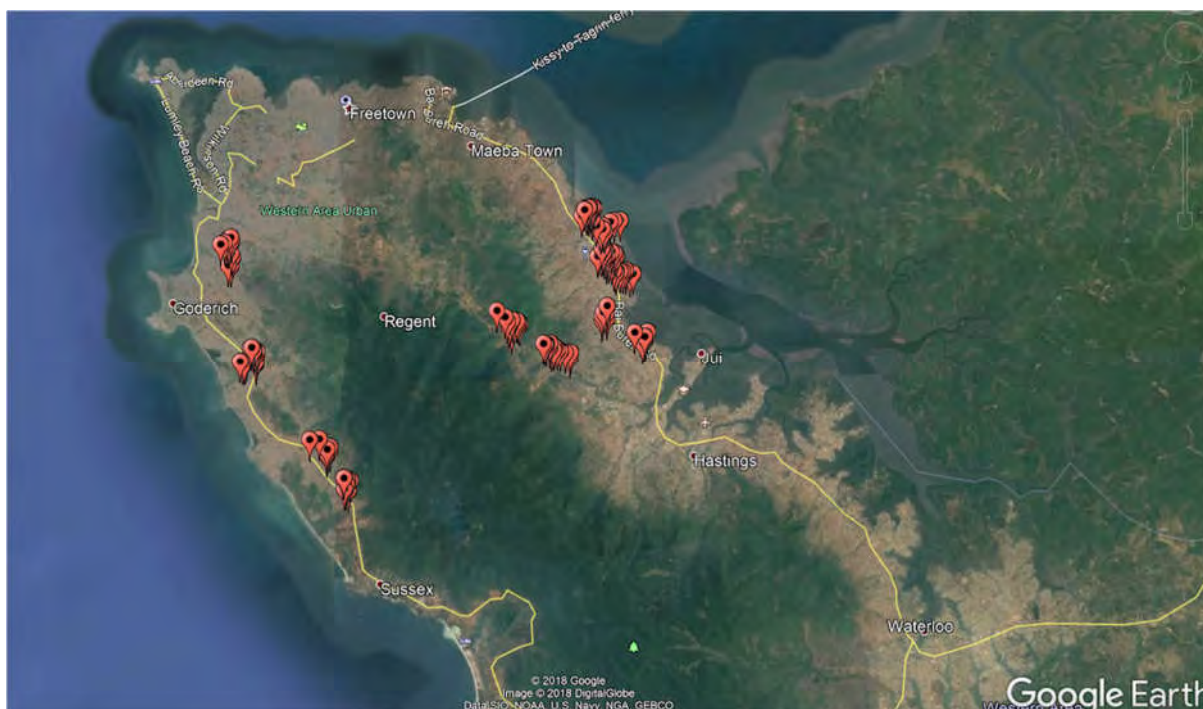
## **Resettlement**

Resettlement will occur during construction which will be managed by Mott MacDonald. The Resettlement Action Plan was not finalised at the time of producing the ESHIA. The potential PAPs have been identified and currently a full Resettlement Action Plan is being produced. Efforts to avoid resettlement will be prioritised; however, in cases where this is unavoidable compensation should be considered.

## **Stakeholders Consultation and Public Disclosure**

The Public Consultation process included in the study is an on-going process that spans the life of the project. Consultations with the affected local communities and with officials of Government Ministries, Departments, and Agencies local government, civil society and other representatives of the affected population were undertaken to gain a comprehensive understanding of the types and degrees of adverse effects the project is likely to have on the environment, people and society. Three forms of consultation have taken place: socio-economic surveys, focus group discussions and key information interviews.

The ESHIA team carried out **380 socio-economic surveys** with respondents from different locations approximately as shown in Figure 3 . The surveys captured information on household characteristics, water sources and quality of water available to the household, potential project impact and mitigation measure suggestions.



**Figure 3: Area surveyed by the socio-economic assessment**

**Focus group discussions** were held within seven local communities to introduce the project and gauge the opinions on the project. Each focus session was divided in three groupings (women and children, community leaders/chiefs and businesses). The focus group discussions had four objectives:

- Understanding the existing water issues in the community;
- Introducing and informing on the project;
- Collecting stakeholder opinions on the positive and negative impacts of the project; and;
- Discussing mitigation measures.

Finally, the list of institutions that participated in the **key informant interviews** is listed below:

- Ministry of Water Resources;
- Ministry of Health;
- Ministry of Lands, Planning and Environment;
- National Protected Areas Authority;
- WASH Net;
- Tacugama Rangers;
- Sierra Leone Electricity and Water Regulatory Commission;
- MASADA;
- Citizen's Protection Agency;
- Police;
- Western Rural District Council
- Ministry of Works and Public Assets; and;
- Freetown City Council.

**Public Disclosure** was undertaken at the four following locations:

- Mongegba & Mortem



- Calaba Town
- British Council; and
- Angola Town & Adonkia

These invited local communities, organisations and government ministries to express their opinion on the project and 261 people attended these 4 sessions. The ESHIA and the overall project were presented to the participants before the session was opened up to questions and answers.

Generally, stakeholders were found to be largely positive about the project. In most case stakeholders, both key informant organisations and local communities requested to remain informed.

## **Environmental and Social Management Plan**

An Environmental and Social Management Plan forms the final phase of the ESHIA and produces a document that will assist in the project implementation confirming to the requirements of the ESHIA. The objectives are:

- Reduce the impacts on the environment, socio-economics, community and works health through well thought out mitigation measures;
- Providing monitoring measures that will ensure that the impacts are being limited and the mitigation measures enforced;
- Provide a framework for the implementation of the mitigation and monitoring measures.

This is a stand-alone document that builds on the impact and risks findings from the ESHIA to create a document that can be implemented in the field. This is written for the project's key actors, those involved in constructing and operating the water supply, so that the Environmental and Social Management Plan (ESMP) objectives can be achieved.

The ESMP is provided in Appendix 1. It includes 11 general mitigation measures that apply across all work packages and specific additional measures to apply to work packages 1, 5 and 6.

## **Conclusion**

The project will have an overwhelmingly positive impact on Freetown as water supply networks are improved, and water is served via pipelines to greater portion of the population. In general, the majority of the proposed works are expected to have minor to moderate environmental and social impacts, especially if they are designed and constructed in a manner that minimises and mitigates impacts. Examples of this include minimising the extent of above-ground pipelines, installing pipes where possible such that residents are not subject to resettlement and ensuring continuous engagement with the community.

Temporary impacts may be significant in some areas though, especially in densely populated, congested, and highly trafficked areas which will be mitigated through traffic and construction management planning.

Works that have some significant permanent environmental impacts are associated works in the Western Forest National Park or its buffer zone as well as work requiring handling and disposal of hazardous materials. This is the case of works related to the constructions of two weirs at Mortem and Mongegba, disturbance of bat colonies in the intake tunnel at GVWC WTPs and a potential handling of asbestos cements pipes associated with pipe decommissioning and replacement. It is recommended that GVWC and NPAA designate the Mortem and Mongegba areas as a protected area such that they can be



protected in future. Methods to deal with Asbestos pipes should be agreed with EPA/FCC. Finally, mitigation measures have been proposed for the bat population.

Lack of adequate community engagement is a risk that has consistently been highlighted during focus group discussions and key informant interviews. It is therefore a must that GVWC and the EPC manage communication effectively to avoid community dissatisfaction.

Inter-governmental collaboration, including parastatals is considered as being beneficial for an improved water catchment conservation and water service provision in Freetown.



## Section 1: Introduction and Purpose

### 1.1 Project Overview

#### 1.1.1 Rehabilitation of Freetown Water Supply

The Freetown water supply is in a critical situation. It relies principally on a single source, the Guma Dam. This supplies over 90% of the water for Freetown. The Guma Dam and the associated Water Treatment centre was built in the early 1960s and is sized to provide water reliably to around 800,000 people. The current population of Freetown is significantly higher than this, in the 2015 1,055,964 people lived within Freetown<sup>4</sup>. Inadequate water from municipal systems forces the population to seek informal sources, seriously increasing the hazards to health and the risk of disease.

The Guma Reservoir is vulnerable to climate change. Low rainfall, over abstraction and poor infrastructure creates a risk of emptying the reservoir and leaving Freetown without any supply - as occurred in 2006, with severe consequences<sup>5</sup>.

The supply suffers from uncontrolled leakages from the system, limited investment and maintenance, encroachment into existing secondary water catchments and new potential catchments. The eastern end of Freetown, home to a large percentage of the city's citizens, has particularly poor supply. High consumption and leakage in the western area city, creates shortages that affect the rest of network. This is a growing problem as the city's population is expanding.

Between 2017 and 2019, Freetown Water, a consortium of IMC Worldwide, BAM Nuttall and Atkins will design and implement the rehabilitation of the water network of Freetown. The work will improve public service delivery of water across Freetown. The impact of this will be to increase sustainable access to water in Freetown, reduce the risk of climate-related events and to reduce morbidity and mortality rates linked to water-borne and vector-linked diseases.

The programme will provide a complete service from feasibility and design to construction, commissioning and handover. National contractors will be employed, where appropriate, in order to improve the sustainability of the programme. An office in Freetown has been opened with Guma Valley Water Company (GVWC) and work closely together to oversee the project and to build local capacity. Over the next 18 months construction will begin with works to be handed over to the GVWC by December 2019.

#### 1.1.2 Location

Sierra Leone consists of five provinces; Western Peninsula, the Northern Province, North West Province, Eastern Province and Southern Province. The Western Peninsula is in the West on the Atlantic Coast and separated from the Provinces through the Sierra Leone River and Estuary. At the centre of the Western Peninsula is the Western Area National Park (WAPNP), a chain of densely forested hills that is rich in biodiversity. The WAPNP is surrounded by a buffer zone, the

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<sup>4</sup> SSL (2016) 2015 Population and Housing Census – Summary of Final Results [https://www.statistics.sl/images/StatisticsSL/Documents/final-results\\_-2015\\_population\\_and\\_housing\\_census.pdf](https://www.statistics.sl/images/StatisticsSL/Documents/final-results_-2015_population_and_housing_census.pdf)

<sup>5</sup> EPC (2017) Engineering Management Services to Rehabilitate Freetown Water Supply - Feasibility Report - Updated



width of which varies due to historic and recent encroachments as the city has grown to the south and the west.

The Northern end of the peninsular is Western Urban Area, the city of Freetown, and is densely developed. This is also where the main business and industrial areas are located. The remainder of the population has spread up the hills and into the Orugu valley, which lies south of the city, on a north-west - south east axis. These areas to the centre south and south east are in the Western Area Rural District Council. These areas are generally less densely developed.

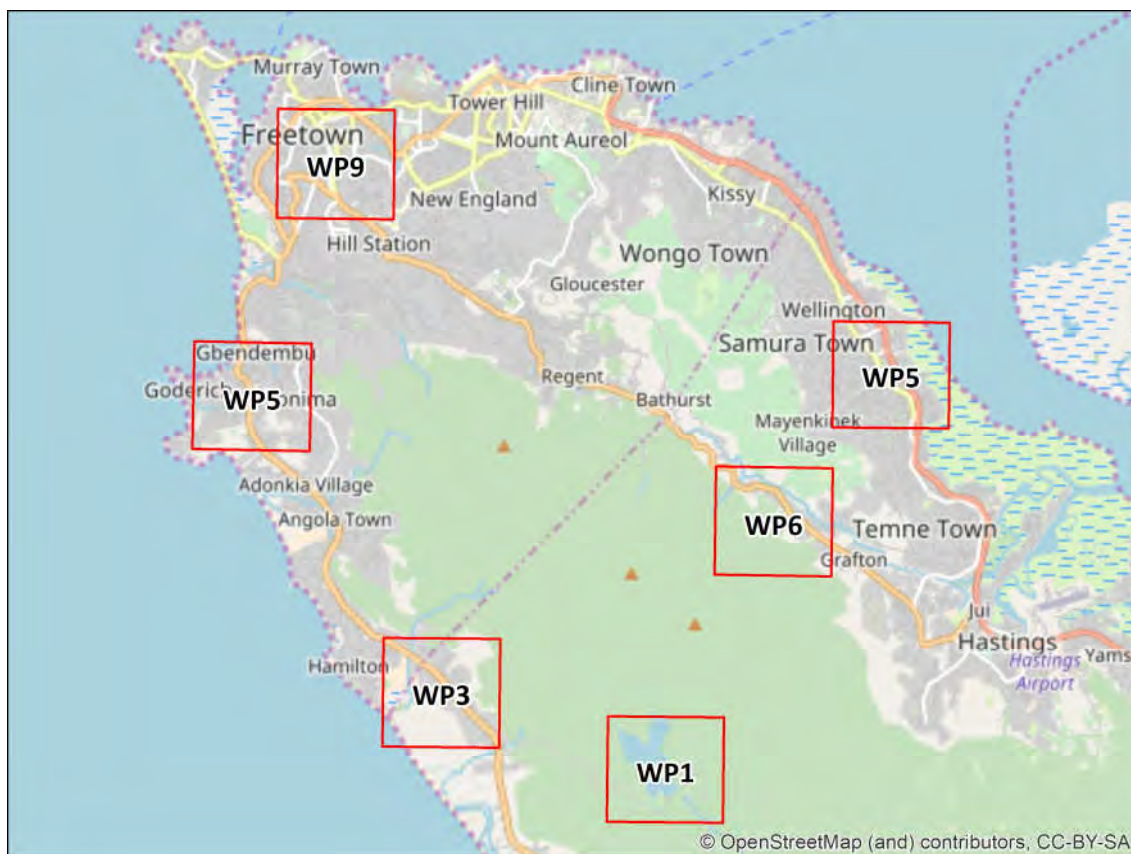
### 1.1.3 Work Packages

The work is split into six work packages (WPs) based on Priority Areas identified by the GVWC as the focus for rehabilitation of the Freetown water supply system. These six WPs are located across the city of Freetown and have been prioritized from an initial list of nine WPs.

- **WP 1 Guma Dam and WTP-** Rehabilitation works at the Guma Valley Dam and Water Treatment Plant (WTP). This package also includes the Mile 13 laydown area.
- **WP 3 Rehabilitate the Transmission System-** Replacement of the transmission pipes and construction two service reservoirs and supporting infrastructure.
- **WP 5 Distribution Improvements-** New networks or improvements to the distribution networks in the east and west of the city.
- **WP 6 Orugu Sources to Allen Town-** Construction of two weirs on the Orugu Sources, with new pipelines to feed this water to the Charlotte Town WTP.
- **WP 9 Pumping Schemes to Wilberforce and other communities-** Rehabilitation of the Spur Road pumping station

Figure 4 shows the locations of the work packages; these are spread throughout the city- in the West and East of Freetown.





**Figure 4: Work Package Locations**

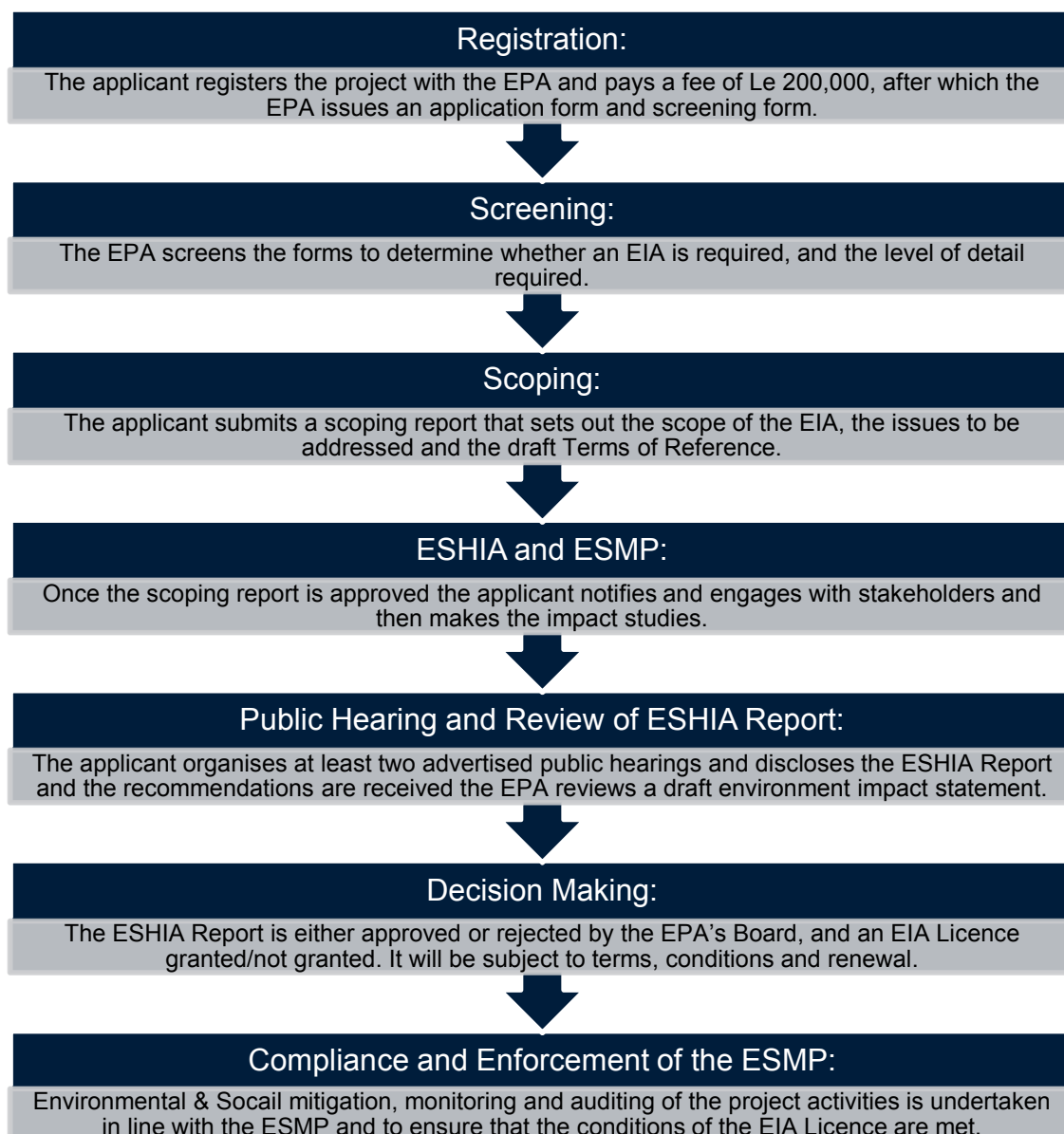
## 1.2 Environmental, Social and Health Impact Assessment

The Environmental, Social and Health Impact Assessment (ESHIA) is a tool to identify and assess the effects on the environmental, social and health components and manage potential direct and indirect impacts resulting from the project activities. The process occurs in conjunction with the other elements of this project; with environmental and social considerations being incorporated into everything from the feasibility stage onwards.

Undertaking an ESHIA is part of the best practice international for any project that can impact the environment and social components such as the World Bank IFC's Performance Standards. In Sierra Leone it is also a legal requirement:

- Environmental Protection Agency Act 2008 stipulates that a full ESHIA for projects that fall under certain Categories are required.
- Environmental Protection Agency Regulations, 2010, set out the process for obtaining an EIA License.

There are seven stages that form the ESHIA process, based on the legal requirements, shown in Figure 5. Registration, Screening and Scoping have already been completed and this report meets the ESHIA and Environmental and Social Management Plan (ESMP).



**Figure 5: The ESHIA Process**

## **1.3 Status to Date**

### **1.3.1 Registration**

GVWC, supported by IMC, applied for three EIA Licences in November 2017. The three licenses were submitted to cover elements of the Main Project as follows:

- Work Package 1 – Guma Dam and Water Treatment Plant (WTP).
- Work Package 3, 5, 9 – Transmission and Distribution Mains at locations across the city.
- Work Package 6 – Transmission and Distribution Mains Rehabilitation from Orugu Sources to Allen Town



### **1.3.2 Screening**

Under the Environmental Protection Agency Act 2008, the Freetown Water Supply project requires a license before work can be undertaken. The screening response came on the 24 January 2018. The response requested that an Environmental, Social, Health Impact Assessment (ESHIA) be completed. This is due to the potential scale of the social and environmental impacts.

### **1.3.3 Scoping**

Three separate applications were submitted with the view that variation in processing any one of the licenses would not impact on the overall project delivery. Consequently, it was decided that it would be more efficient to submit one Scoping Report and ESHIA, as EPA requested in its letter of 24 January 2018.

IMC Worldwide Ltd (IMC) and Njala Environmental Technicians (NET) undertook the Scoping Study on behalf of GVWC, supported by the other consortium members. The purpose of the scoping was to define the spatial and temporal boundaries of the ESHIA and define the specific studies and methodologies to be conducted in support of the assessment. This was submitted to EPA 2 May 2018. EPA responded on 9 May 2018 approving the Scoping Report and requesting the completion of the ESHIA.

### **1.3.4 ESHIA Assessment and Public Disclosure**

The current phase is this ESHIA report. This includes the establishment of the baseline and the assessment of the significance impacts so that these impacts can be appropriately managed. To this extensive stakeholder consultation and site visits are being undertaking.

This phase is managed by IMC Worldwide Ltd with NET as local sub-consultants and working in close partnership with GVWC. Works include field works, focus group discussions, interviews with key stakeholders, desktop studies and completion of the final report. From these activities the Draft ESHIA was produced.

After the EPA review the draft ESHIA, Public Disclosure was undertaken at four locations. The public disclosure was advertised on the radio and in newspapers. The four sessions presented the ESHIA to local communities and key stakeholders and the held a questions and answers session. From this the transcripts and final ESHIA has been produced.

## **1.4 Structure**

Based on the EPA Act 2008 the ESHIA report shall include the following key sections:

1. Executive Summary;
2. Introduction and Purpose;
3. Policies, Legislative and Institutional Framework;
4. Assessment of Alternative;
5. Methodologies;
6. Baseline Conditions;
7. Impacts and Risk Assessment
8. Stakeholder Consultation and Public Disclosure;
9. Environmental and Social Management Plan;
10. Summary and Conclusions;
11. References; and



12. Annexes- Full ESMP, questionnaire forms, consultation transcripts and more.

## **1.5 Objective**

The aim of this report is to provide EPA with a good understanding of the environmental, social and health impacts of the activities carried out by the programme and how the Project proposes to mitigate and manage them according to local legislation. The study will include:

- Identification and assessment of the significance of all impacts including environmental, social, health and biodiversity.
- Appropriate mitigation and management measures
- An Environmental and Social Management Plan, including monitoring measures.



## Section 2: Policy, Legal and Institutional Framework

All relevant acts, regulations, policies and strategies need to be considered when undertaking the project. The ESHIA summarises the key environmental, social and health legislation framework, the relevance to the project and the key institutional framework required to enforce it.

### 2.1 Relevant Environmental, Social and Health Legislation and Policy<sup>6</sup>

#### 2.1.1 National Acts and Regulations

National legislation governing project delineations and footprints are stated below:

##### *The Environmental Protection Agency Act 2008/2010*

The Act which was signed as a legal document in September 2008 and amended in July 2010 established the Agency. The Environmental Protection Agency of Sierra Leone was established with the overall responsibility for the effective protection of the environment and facilitates coordination, cooperation and collaboration among Government Ministries, local authorities and other governmental agencies, in all areas relating to environmental protection. The Department subject to the Act, also coordinates environmentally related activities and acts as the focal point of national and international environmental matters, relating to Sierra Leone.

Environmental Licenses are through these Acts. It states that- “Except as otherwise provided in this Act and notwithstanding the provisions of any enactment, no person shall undertake or cause to be undertaken any of the projects set out in the First Schedule unless he holds a valid licence in respect of such project.”

The [Environmental Protection Agency Regulations 2010](#) builds on the Environmental Protection Agency Act 2008 to detail how the application for a license is undertaken and the requirements for mitigate, monitor and manage of the identified impacts.

Summary of key aspects of the Acts	Project links	Responsible stakeholders
Large infrastructure projects require an EIA	<ul style="list-style-type: none"> <li>• ESHIA submitted to the EPA</li> <li>• Impacts identified and mitigated</li> <li>• Stakeholders consulted</li> </ul>	<ul style="list-style-type: none"> <li>• GVWC</li> <li>• EPA</li> <li>• Freetown Consortium (IMC, BAM and Atkins)</li> </ul>
Key auditors of any environmental projects	<ul style="list-style-type: none"> <li>• ESHIA approval</li> <li>• Environmental Management Reporting</li> <li>• Access to site &amp; project data</li> </ul>	<ul style="list-style-type: none"> <li>• EPA</li> <li>• GVWC</li> <li>• Freetown Consortium</li> </ul>

<sup>6</sup> Unless otherwise linked all legislation was found through <http://www.parliament.gov.sl/ParliamentaryBusiness/Acts.aspx> or from the Scoping Report submitted in May 2018.



### **Constitution of Sierra Leone 1991**

The Constitution sets out provision for the protection of the rights of individuals to private property, and principles under which land can be acquired for the public interest. Provision for the prompt payment of adequate compensation and access to the court or other authority for the determination of the land owner's interest or right, and the amount of any compensation.		
Summary of key aspects of the Act	Project links	Responsible stakeholders
Compensation of affected persons	<ul style="list-style-type: none"> <li>Acquiring of land for the project work</li> </ul>	<ul style="list-style-type: none"> <li>Ministry of Lands, Planning and Environment</li> <li>GWWC</li> <li>SLRA</li> <li>Mott MacDonald</li> </ul>

### **Draft Resettlement Act 2011**

<p>A draft Bill was drawn up in October 2011 to legislate resettlement. This is known as The Resettlement Act 2011 and was supported by a draft Resettlement Policy for Sierra Leone. Neither the Resettlement Act nor the draft Resettlement Policy have been adopted as of the date of writing this report. The intention behind the Bill and supporting Policy is to present an integrated legal mechanism that will describe how resettlement shall be undertaken.</p> <p>The bill is guided by the World Bank Operational Procedures 4.12 and the IFC PS 5. Although not stated explicitly, it is understood that the Bill is a response to what is seen as fragmented and ad hoc approaches by entities in the extractive sector regarding resettlement. When it is enacted the Bill will make the Ministry of Lands, Country Planning and Environment the central government authority responsible for oversight of resettlement. The policy refers to the fact that the Bill was intended to apply to the mining sector only, but it was subsequently revised to be more inclusive of all business (private sector) activities that will result in resettlement. It is not clear if public sector developments will be required to conform with the intentions of the Policy or the requirements of the Bill when promulgated.</p>		
Summary of key aspects of the Act	Project links	Responsible stakeholders
Compensatory Payments to those effected by resettlement of business or residents	<ul style="list-style-type: none"> <li>Acquisition of land to run new pipelines and construction of dams</li> </ul>	<ul style="list-style-type: none"> <li>Ministry of Lands, Planning and Environment</li> <li>GWWC</li> <li>SLRA</li> <li>Mott MacDonald</li> </ul>



### ***Factories Act 1974 [No. 3 of 1974]***

This Act became effective on the 30<sup>th</sup> May 1974 and applies where people are employed for manual labour to making, altering, adapting, finishing, demolition, etc. This therefore also covers construction.

It outlines health and safety measures to (factory) workers; to ensure machine safety, safe working conditions, sanitary amenities, periodic inspections, factory registration, and guidelines for reporting injuries, accidents and industrial diseases.

<b>Summary of key aspects of the Acts</b>	<b>Project links</b>	<b>Responsible stakeholders</b>
Enforcing workers welfare on safety, accidents and emergency policies	<ul style="list-style-type: none"> <li>• Work specifics and safety management processes</li> <li>• Work assignment and Hazard Risk Management</li> </ul>	<ul style="list-style-type: none"> <li>• Freetown City Council</li> <li>• Ministry of Labour Factory Inspectorate Division</li> <li>• Freetown Consortium</li> </ul>

### ***The Forestry Act 1988 [No. 27 of 1983]<sup>7</sup>***

This Act came into operation in 1988 and the chief conservator of Forestry, with the directives of the Minister, is responsible for the implementation of its regulations. This law focuses on the management and use of forests. Under the act there are two types of people national forests and community forests.

<b>Summary of key aspects of the Acts</b>	<b>Project links</b>	<b>Responsible stakeholders</b>
Conservation for Forest ecology and landscape	<ul style="list-style-type: none"> <li>• Excavation and trenching for pipelines installation</li> <li>• Bush clearing and machinery movement</li> </ul>	<ul style="list-style-type: none"> <li>• EPA</li> <li>• Forestry Division</li> <li>• Freetown Consortium</li> </ul>

### ***The Forestry Regulations 1989<sup>8</sup>***

The Forestry Regulation implement the Forestry Act 1988. It focuses on concessions and licensing permits but also contain specific directives for Community Forests, Offences and Penalties, and the conditions for the Reforestation Fund.

<sup>7</sup> REDD (n/a) Forestry Act 1988. <https://theredddesk.org/countries/laws/forestry-act-1988-sierra-leone>

<sup>8</sup> REDD (n/a) Forestry Regulations 1989. <https://theredddesk.org/countries/laws/forestry-regulations-1989>  
[https://theredddesk.org/sites/default/files/forestryregulations1989\\_1.pdf](https://theredddesk.org/sites/default/files/forestryregulations1989_1.pdf)



It states that no protected forest shall be tampered with in any way as stated in section 21, subsection (2) of the Forestry Act-1988 without written permission from the chief conservator of the forest.

Summary of key aspects of the Acts	Project links	Responsible stakeholders
Enforcing and upholding the cultural links of forest in Sierra Leone	<ul style="list-style-type: none"> <li>Pipeline and weir installation</li> </ul>	<ul style="list-style-type: none"> <li>EPA</li> <li>NPAA</li> <li>Chief Conservator of the Forest</li> <li>Freetown Consortium</li> <li>GVWC</li> </ul>

#### ***The Guma Valley Water Company Act 2017 [No.6 of 2017]***

The Act sets out the continuance existence of the Guma Valley Water Company, to provide for the sustainable supply of water for public and private purposes and to provide for other related matters.

Summary of key aspects of the Act	Project links	Responsible stakeholders
Commitment to Water Supply & Quality Assurance	<ul style="list-style-type: none"> <li>Extension and rehabilitation of the network</li> </ul>	<ul style="list-style-type: none"> <li>GVWC</li> </ul>

#### ***Local Content Agency Act 2016 [No.3 of 2016]***

The Act to establish the Sierra Leone Local Content Agency to provide for the development of Sierra Leone local content in a range of sectors of the economy such as industrial, manufacturing, mining, petroleum, marine resources, agriculture, transportation, maritime, aviation, hotel and tourism, procurement of goods and services; public works, construction and energy sectors; to promote the ownership and control of productive sectors in the economy by citizens of Sierra Leone; and to provide for other related matters.

Summary of key aspects of the Act	Project links	Responsible stakeholders
Enforced national youth and labour involvement in works and construction where possible and appropriate	<ul style="list-style-type: none"> <li>Recruitment of laborers into the project</li> </ul>	<ul style="list-style-type: none"> <li>Freetown Consortium</li> <li>Community Leadership</li> <li>GVWC</li> <li>Ministry of Labour</li> </ul>
Use of Sierra Leone business and produce	<ul style="list-style-type: none"> <li>Use of material and equipment</li> </ul>	<ul style="list-style-type: none"> <li>Freetown Consortium</li> </ul>





when available and appropriate		<ul style="list-style-type: none"> <li>• GVWC</li> </ul>
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***The National Protected Area Authority and Conservation Trust Fund Act 2012 [No.11 of 2012]<sup>9</sup>***

<p>This Act establishes the National Protected Area Authority and Conservation Trust Fund and sets out the requirements to manage and maintain the National Protected Areas. This also promotes biodiversity conservation, wildlife management, research, sales of ecosystem service and other matters.</p> <p>This includes promotion of co-management of natural resources within and outside national protected areas with local communities.</p> <p>Under the Act no activities that conflict with the objectives of the Act are allowed within the protected area without the approval of NPAA and compliance with the conditions it specifies.</p>		
Summary of key aspects of the Act	Project links	Responsible stakeholders
Protect the use of natural resources especially in protected areas	<ul style="list-style-type: none"> <li>• Process of bush clearing and excavation within and nearby protected areas</li> <li>• Presence of human at the time of work</li> </ul>	<ul style="list-style-type: none"> <li>• Freetown Consortium</li> <li>• GVWC</li> <li>• NPAA</li> </ul>

***The Natural Water Resources Management Agency Act 2017 [No. 5 of 2017]***

<p>This Act provides for:</p> <ul style="list-style-type: none"> <li>• the equitable, beneficial, efficient, and sustainable use and management of the country's water resources;</li> <li>• establishes the National Water Resources Management Agency; and</li> <li>• creates Water Basin Management Board and Water Catchment Area Management Committees for the management of the water resources and for other related matters.</li> </ul>		
Summary of key aspects of the Act	Project links	Responsible stakeholders
Equitable distribution of drinking water	<ul style="list-style-type: none"> <li>• Extension to the water supply</li> <li>• Temporary disruptions</li> </ul>	<ul style="list-style-type: none"> <li>• Community Leadership</li> <li>• GVWC</li> <li>• Freetown Consortium</li> </ul>

<sup>9</sup> REDD (n/a) National Protected Areas Authority and Conservation Trust Fund Act 2012 <https://theredddesk.org/countries/laws/national-protection-area-authority-and-conservation-trust-fund-act-2012>



Water resources quality management and control	<ul style="list-style-type: none"> <li>Contamination management during construction</li> </ul>	<ul style="list-style-type: none"> <li>Freetown Consortium</li> <li>GVWC</li> <li>EPA</li> </ul>
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### ***Proposed Water (Consumer Service) Regulations***

If the customer is to be disconnected, then they should be notified at least 5 days in advance. The notification of the disconnection should contain the reason, dates, times, contact details and how the water be reconnected.

Summary of key aspects of the Act	Project links	Responsible stakeholders
Notification of disconnection 5 days in advanced with timeframe, reason and reconnection plan.	<ul style="list-style-type: none"> <li>Temporary Disconnection of Consumers</li> <li>Disconnection of Illegal Consumers</li> </ul>	<ul style="list-style-type: none"> <li>GVWC</li> <li>Freetown Consortium</li> </ul>

### ***The Public Health Amendment Act 2014 [No.10 of 2014]***

Amends the [Public Health Act, 1960](#). This looks at disease control and prevention through waste management, sanitation and water quality.

Summary of key aspects of the Act	Project links	Responsible stakeholders
Waste management	<ul style="list-style-type: none"> <li>Production of waste during project works</li> <li>Use of fossil fuel and oil- risk of spilt</li> </ul>	<ul style="list-style-type: none"> <li>GVWC</li> <li>EPA</li> <li>Freetown Consortium</li> </ul>
Sanitation and hygiene facility management at work place	<ul style="list-style-type: none"> <li>Sanitation requirements by workers during project activities</li> <li>Congestions at project accommodation and littering</li> </ul>	<ul style="list-style-type: none"> <li>GVWC</li> <li>EPA</li> <li>Freetown Consortium</li> </ul>

### ***Public Lands Act 1986***

Public Lands Act, Cap 116, set out the acquisition of land for public purposes and that the acquisition should be compensated.

Summary of key aspects of the Act	Project links	Responsible stakeholders



Compensation of affected persons	<ul style="list-style-type: none"> <li>• Acquiring of land for the project work</li> </ul>	<ul style="list-style-type: none"> <li>• Ministry of Lands, Planning and Environment</li> <li>• GVWC</li> <li>• SLRA</li> <li>• Mott MacDonald</li> </ul>
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### ***Regulation of Wages and Industrial Relations Act 1971 [No.18 of 1971]***

Regulation of Wages and Industrial Relation Act outlines the framework for regulating employment and makes several provisions for establishment of a number of statutory bodies for the improvement of employment conditions and for ensuring social justice in the world of work. It set out Government having the statutory responsibility for the fixation of national employment standards for Sierra Leone which include but not limited to the setting up of the national minimum wage and hours of work.

National Minimum wage was set at Le480,000 within the [Appropriation Act](#)

<b>Summary of key aspects of the Act</b>	<b>Project links</b>	<b>Responsible stakeholders</b>
Contracting staff employed on the project	<ul style="list-style-type: none"> <li>• Employing workers for construction</li> </ul>	<ul style="list-style-type: none"> <li>• Ministry of Labour</li> <li>• Freetown Consortium</li> </ul>
Ensuring contract enforces the national standards	<ul style="list-style-type: none"> <li>• Employing workers for construction</li> </ul>	<ul style="list-style-type: none"> <li>• Ministry of Labour</li> <li>• Freetown Consortium</li> </ul>

### ***The Sierra Leone Electricity and Water Regulatory Commission Act 2011***

This act establishes the Electrical and Water Regulatory Commission. Anyone supplying, providing or arranging water services; construction of water services and similar require a license from the EWRC.

<b>Summary of key aspects of the Act</b>	<b>Project links</b>	<b>Responsible stakeholders</b>
Collaboration with the EWRC	<ul style="list-style-type: none"> <li>• Rehabilitation of Water Supply</li> </ul>	<ul style="list-style-type: none"> <li>• GVWC</li> <li>• EWRC</li> </ul>



### ***Statutes Relating to Land Law in Sierra Leone 1963***

Sets out the requirement for compensation when land is acquired for public purposes. The compensation shall be up to the market value of the lands and property. Compensation should also be paid in cases where land and property are damaged.		
Summary of key aspects of the Act	Project links	Responsible stakeholders
Power of antonym by state council through Ministry of Lands, Planning and Environment	<ul style="list-style-type: none"> <li>Acquisition of land to run new pipelines and construction of dams</li> <li>Building of project campsites</li> </ul>	<ul style="list-style-type: none"> <li>Ministry of Lands, Planning and Environment</li> <li>GVWC</li> </ul>

### ***Wildlife Conservation Act 1972 [No. 27 of 1972]***

The Wildlife Conservation Act provides for the protection of wildlife and conservation management and includes the establishment and operation and protection of National Parks.		
Summary of key aspects of the Act	Project links	Responsible stakeholders
Minimise the disturbance and prevent degradation of the National Park.	<ul style="list-style-type: none"> <li>Works being undertaken in or around the National Park</li> </ul>	<ul style="list-style-type: none"> <li>NPAA</li> <li>GVWC</li> <li>Freetown Consortium</li> </ul>

#### **2.1.2 National Policy and Strategy**

National policy and strategy sets out the overall direction and aims of the ministries and government. It is just as important to understand so we can align with their vision and maximise the benefits. These are summarised below:

#### ***The National Water and Sanitation Policy 2010***

<p>The National Water and Sanitation Policy aims to:</p> <ul style="list-style-type: none"> <li>improve the financing, management, and delivery of sustainable water services; and</li> <li>enable communities to adopt safe hygiene and sanitation practices and consume safe water.</li> </ul> <p>The Policy has several key themes:</p> <p>Key Theme 1 – Water Resources Management – To promote the optimal, sustainable and equitable development and use of water resources. This includes equal access and use of water resources; effective water resource use; promote water management and quality; water management systems that protect the environment; sustainable procedures and plans for the resource development; and more.</p>
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Key Theme 2 – Urban Water Supply and Sewerage – This is to improve urban water supply coverage to 74% by 2015; improve sanitation coverage, prevent wasteful water use, improve participation, capacity and accountability.

Key Theme 3 – Rural Water Supply – To improve health and alleviate poverty of the rural population through improved access safe water, community participation, investment and other activities.

Key Theme 4 – Hygiene and Sanitation – To improve the health of communities and ensure that the majority of the population (66%) has access to sanitation services by 2015.

Key Theme 5 – Institutional, Legal and Regulatory Framework – Sustainable water resources management, water supply services and improvement of sanitation and hygiene require an effective institutional setup and legal framework which addresses the growing challenges in the sector.

Summary of key aspects of the Act	Project links	Responsible stakeholders
Improve water supply coverage in urban areas	<ul style="list-style-type: none"> <li>Extends and improves the network</li> </ul>	<ul style="list-style-type: none"> <li>Freetown Consortium</li> <li>GVWC</li> </ul>

### **National Lands Policy 2015**

The scope of the National Land Policy involves moving towards a more sustainable land tenure system by creating ways to recognise informal settlement, resolve land conflicts and deal with resettlement and land acquisition.

Land acquisition in the public interest is only implied within the Constitution. The 2015 National Land Policy specifically sets out that in the public interest relates to public safety, defence, public health, public morality, public benefit and planning. It also goes on to confirm that compensatory measures should be undertaken.

Compensation to be paid for lands acquired through compulsory government acquisition will be fair, adequate and in line with the open market value. The compensation should be prompt, transparent and centralised as this reduces the chances of corruption. The compensation should be developed through negotiations that take into consideration government investment in the area.

Summary of key aspects of the Act	Project links	Responsible stakeholders
Compensation of affected persons	<ul style="list-style-type: none"> <li>Acquiring of land for the project work</li> </ul>	<ul style="list-style-type: none"> <li>Ministry of Lands, Planning and Environment</li> <li>GVWC</li> <li>SLRA</li> <li>Mott MacDonald</li> </ul>



### **Conservation and Wildlife Policy 2010**

The policy was developed as part of a national review of existing forestry sector policies, laws and regulations which resulted in the Forestry Policy (2010) and the Wildlife and Conservation Policy (2010).

The policy aims to achieve an “integrated wildlife sector that achieves sustainable, rights-based management of wildlife resources for biodiversity conservation inside and outside wildlife conservation areas which benefits present and future generations of Sierra Leone and humankind in general”.

The policy statements below relate to the project:

- Policy Statement 5: Establish a Wildlife Conservation Area network representative of Sierra Leone’s ecosystem diversity of land and aquatic environments.
- Policy Statement 6: Manage Wildlife Conservation Areas according to international best practice.

This looks at ways to prevent damage to the Protected Areas by protecting biodiversity, its underlying ecological structure, supporting the environmental processes, and to promote education and recreation. The policy also highlights the importance of buffer zones to be used towards sustainable land use planning.

Summary of key aspects of the Act	Project links	Responsible stakeholders
Minimise and prevents impacts on protected areas	<ul style="list-style-type: none"> <li>• Works within or near the National Park and Protected Area</li> </ul>	<ul style="list-style-type: none"> <li>• Freetown Consortium</li> <li>• NPAA</li> <li>• GVWC</li> </ul>

### **The National Environmental Policy 1990**

The National Environmental Policy objectives are to:

- Ensure adequate quantity and acceptable water quality to meet domestic, industrial, transportation, agricultural and fisheries
- Sustainable use of forest resources
- Secure a quality of environment adequate for health and well-being;
- Conserve and use the environment and natural resources for the benefit of present and future generation;
- Preservation of Biological Diversity through the development of long-term strategies for sustainable utilization to promote economic, social and cultural development
- Raise awareness and promote understanding of the essential linkages between the environment and development.

Summary of key aspects of the Act	Project links	Responsible stakeholders



Conserve the environment	<ul style="list-style-type: none"> <li>• Works to be undertaken in the natural environment</li> </ul>	<ul style="list-style-type: none"> <li>• Freetown Consortium</li> <li>• NPAA</li> <li>• GVWC</li> </ul>
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***The Agenda for Prosperity: Sierra Leone's Third Generation Poverty Reduction Strategy Paper 2013***

Poverty Reduction Strategy Papers were prepared by IMF member countries through a participatory process involving Sierra Leone stakeholders as well as external development partners and updated every three years with annual progress reports. The Paper considers a number of short term to medium term challenges that impact the living conditions of people and lead to foundations for addressing the longer term causes of poverty. These are to do with employment, equal opportunity, education, health care, housing, well developed infrastructure, environmental management and more.

Summary of key aspects of the Act	Project links	Responsible stakeholders
Pillar 2- Managing natural resources- increasing access to water, protect land ownership and sustainable manage forests	<ul style="list-style-type: none"> <li>• Improve access to water</li> <li>• Some of the work packages are undertaken in forested areas</li> <li>• Land acquisition will occur</li> </ul>	<ul style="list-style-type: none"> <li>• Freetown Consortium</li> <li>• GVWC</li> <li>• Ministry of Lands, Planning and Environment</li> </ul>
Pillar 5 – Labour and Employment: Equal Opportunities and employment.	<ul style="list-style-type: none"> <li>• The project will employ construction workers</li> </ul>	<ul style="list-style-type: none"> <li>• Freetown Consortium</li> <li>• GVWC</li> </ul>

***National Biodiversity Strategy and Action Plan 2017***

The National Biodiversity Strategy and Action Plan was first produced in response to Sierra Leone's ratification of the Convention of Biological Diversity 1992. The latest action plan was completed in 2017 and with the vision that- "Sierra Leone's biodiversity, natural ecosystems and habitats are well preserved, protected and sustainably managed for the benefit, development and perpetual prosperity of its present and future generations." The key objectives are:

1. Biodiversity is conserved through sound and holistic national legislation and policy;
2. Methods and mechanisms enhanced and functioning to safeguard biodiversity;
3. Conservation actions are enhancing the status of species, habitats, sites and ecosystems.
4. Improved living standards, ecosystem services and opportunities provided to people;





5. Improved sectoral and public involvement, and enhanced capacities and awareness.

Summary of key aspects of the Act	Project links	Responsible stakeholders
Ensure compliance with legislation and policy	<ul style="list-style-type: none"> <li>Project is aligned and follows several environmental laws.</li> </ul>	<ul style="list-style-type: none"> <li>Freetown Consortium</li> <li>GVWC</li> </ul>
Conserve the natural environment where possible	<ul style="list-style-type: none"> <li>Project will have an effect on the natural environment</li> </ul>	<ul style="list-style-type: none"> <li>Freetown Consortium</li> <li>GVWC</li> </ul>

### ***National Policy Roadmap on Integrated Waste Management 2015***

This Policy roadmap is set up with the aim to: “to create a clean and healthy environment that is free from biological, chemical and physical hazards posed by waste generated from communities, health facilities, industries and other sources.”

Waste generators have the responsibility to manage waste in line with the waste hierarchy, ensure safe storage and engage with responsible waste collection and handling entities.

Summary of key aspects of the Act	Project links	Responsible stakeholders
Minimise, reuse and recycle waste	<ul style="list-style-type: none"> <li>Waste will be produced throughout the project</li> </ul>	<ul style="list-style-type: none"> <li>Freetown Consortium</li> <li>GVWC</li> </ul>
Ensure safe storage and collection	<ul style="list-style-type: none"> <li>Waste will be produced throughout the project</li> </ul>	<ul style="list-style-type: none"> <li>Freetown Consortium</li> <li>GVWC</li> </ul>

### ***Forestry Policy 2010***

The policy was developed as part of a national review of existing forestry sector policies, laws and regulations which resulted in the Forestry Policy (2010) and the Wildlife and Conservation Policy (2010).

The Forestry Policy highlights critical challenges in the forestry sector and sets out the vision of: “An integrated forest sector that achieves sustainable, rights-based management of forests for economic, social, cultural, aesthetic, and environmental benefits for the present and future generations of Sierra Leone, and for humankind in general”.

The Policy promotes planning in the forestry sector (e.g. land-use planning and forest inventory and assessments) and promotes greater inclusion and collaboration with non-governmental stakeholders in the forestry sector. It also looks at the economic benefits derived from sustainably managed forests.



Summary of key aspects of the Act	Project links	Responsible stakeholders
Conserve the environment and protect the economic benefits of the forest	<ul style="list-style-type: none"> <li>• Works to be undertaken in the natural environment</li> </ul>	<ul style="list-style-type: none"> <li>• Freetown Consortium</li> <li>• NPAA</li> <li>• GVWC</li> <li>• Tacugama Chimpanzee Sanctuary</li> </ul>
Follow Appropriate planning procedures	<ul style="list-style-type: none"> <li>• Project is undertaking this ESHIA</li> </ul>	<ul style="list-style-type: none"> <li>• Freetown Consortium</li> <li>• GVWC</li> <li>• EPA</li> </ul>

### **Connection Policy (being approved)**

Announcements should be made by GVWC, to alert Consumers to possible disruptions to service. Active Customer Account Holders should be reconnected; Inactive Customer Account Holders where there are no outstanding obligations are reactivated and reconnected; Inactive Customer Account Holders settle outstanding obligations before being reconnected; or Illegal Consumers can register as a customer and apply for a connection.

Summary of key aspects of the Act	Project links	Responsible stakeholders
Announcement of Works	<ul style="list-style-type: none"> <li>• Disconnection and Reconnection will occur</li> </ul>	<ul style="list-style-type: none"> <li>• GVWC</li> <li>• Freetown Consortium</li> </ul>
Reconnection of consumers	<ul style="list-style-type: none"> <li>• Disconnection and Reconnection will occur</li> </ul>	<ul style="list-style-type: none"> <li>• GVWC</li> <li>• Freetown Consortium</li> </ul>

## **2.2 Institutional framework**

These are the enforcers of the relevant legislation and policy and therefore their responsibilities need to be understood.

**Environmental Protection Agency (EPA):** is responsible for the monitoring and enforcing all environmental regulations in Sierra Leone. The main functions of the Agency as described by legislation is:

- Environmental policy making and legislation.;
- Pollution control;
- Overall coordination of all environmental management;
- Education and Awareness raising on the Environment;
- Enforcement and Compliance with environmental procedures in the planning and execution of projects;
- Environmental Impact Licensing- reviews and approves environmental impact assessments;



- Environmental Integration;
- Environmental Research
- Mobilize, expedite and monitor resources for environmental management; and
- Strengthen private sector involvement in Environmental Management.

**National Protected Area Authority (NPAA):** is responsible for the management, coordination and enforcement of operations and activities relating to protected areas. The NPAA is also responsible for the identification of potential areas for protection.

**Ministry of Water Resources (MWR):** responsibilities are to coordinate, fulfil policy and sector leadership functions. The Ministry of Water Resources provides effective technical support to local councils and the water and sanitation sectors. The MWR sets the policy framework within which all sector actors must operate. They are also responsible for the WASH Information Management Unit which has the functions in water point mapping and WASH data.

**Sierra Leone Roads Authority (SLRA):** responsibility include the administration, control, development and maintenance of all roads and related structures in Sierra Leone. This also covers maintaining the rights of way.

**Guma Valley Water Company (GVWC):** are responsible for the provision of water within Freetown. The GVWC was set up in 1961 and manages and maintains the Guma Dam and other water infrastructure in Freetown.

**Ministry of Local Government and Rural Development:** responsibilities include decentralisation and other local governance reforms, specifying functions to be assigned to local councils, and coordination and implementation of national programmes.

**Ministry of Lands, Planning and Environment (MLPE):** responsible for conserving and managing the natural environment, land acquisition, national development in a planning capacity, management of the forestry resources, disaster risk reduction and other land, planning and environmental responsibilities.

**Ministry of Labour:** responsible for the management and enforcement of labour, health and safety legislation.



## Section 3: Project Description

### 3.1 Project Location

The five work packages (WPs) based on Priority Areas identified by the GVWC as the focus for rehabilitation of the Freetown water supply system are located across the city of Freetown (Figure 6). The five works packages including in this project are listed as follows:

- WP 1. Guma and WTP
- WP 3. Rehabilitate the Transmission System
- WP 5. Distribution Improvements
- WP 6. Orugu Sources to Allen Town
- WP 9. Pumping Schemes to Wilberforce and other communities

Each Work Package is outlined in further detail in the sub-sections below.

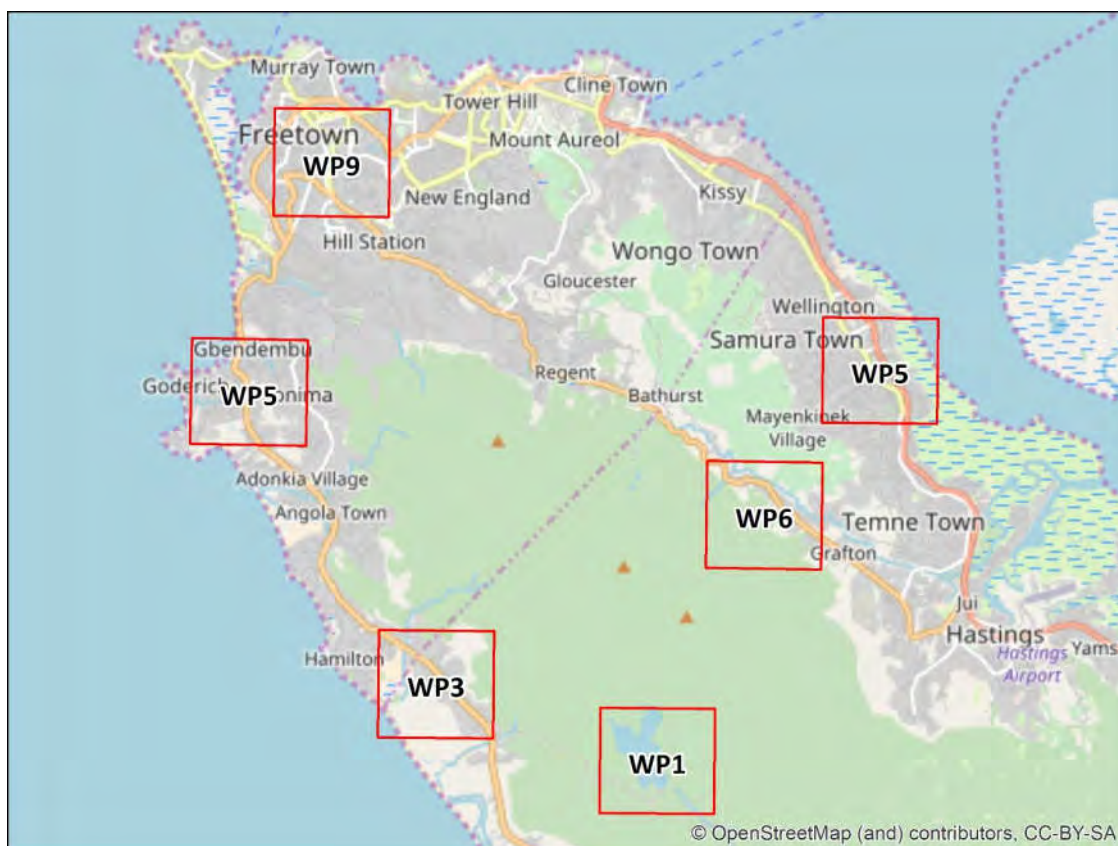


Figure 6: Work Package Locations

### 3.2 Work Package 1 - Guma Dam and WTP

The works relating to Work Package 1 are located in the west of Freetown at the Guma Reservoir in the WAPNP. Access to the site is via the main road up into the WAPNP park area and through unpaved roads through the GVWC property. Guma Reservoir Dam was construction in the 1960s. It is fed from sources in the WAPNP and from the dam feeds River No. 2 which flows to Beach No.2.



Below the dam structure is a tunnel which extends approximately 700m. The tunnel includes the scour systems, a series of valves which when opened allow the sediments from the reservoir to be scoured. An intake structure has been built adjacent to the reservoir with six intake levels which feed water into the water treatment plant depending on the level of water in the reservoir. GVWC technicians access six intake valves from within the intake structure in order to control the flow of water to the plant. The intake structure ladders and platforms that allow safe working access are in a deteriorated condition and shall be improved as part of the works. In addition, leakage within the intake tower will be addressed. Waters from the intake structure reach the water treatment plant via a pipeline through a 600m long connecting tunnel. This tunnel is home to bat species as will be addressed in this report.

The remainder of the works take place at the Water Treatment Plant which is in a cleared area within the WAPNP.

In order to facilitate these works and works in the West of Freetown, the Contractor intends to establish a Contractor's Laydown area outside the fenced boundary of the Guma WTP on GVWC land. This area is adjacent to and within the WAPNP. The area will be cleared of vegetation and trees to allow a laydown area for construction to be prepared.

The items in this package are intended to improve the reliability, quantity and quality of the water produce by Guma Water Treatment Plant (WTP). Essential maintenance and rehabilitation works plan to reduce water loss and improve the intake structure at the dam. At the WTP works include whilst extensive refurbishment work of water treatment filter beds, improvements to the disinfections systems, electrical and control systems, and reduction of leakages from deteriorated structures. The WP has been divided into seven Work Packages as detailed in Table 4 below.

Removal and disposal of old plant will occur including the filter beds, valves and replaced electrical equipment. Items will be removed to an appropriate waste disposal facility.

**Table 4: Work Package 1 Activities**

	<b>Work item</b>	<b>Description</b>	<b>Envisaged works</b>
1.1	Replace Guard Valve and Larter-Johnson needle valve on dam scour system	Reduce leakage from dam and improve operational efficiency by replacing the existing scour and guard valves which is situated under the dam	<ul style="list-style-type: none"><li>• Clearing overgrown vegetation along the access route from the top of dam to the entrance of the scour system tunnel</li><li>• Levelling access road for equipment and trucks</li><li>• Clearing work area and laydown area foot dam (welfare, storage)</li><li>• Placing safety equipment outside and inside the tunnel</li><li>• Install lighting and electricity</li><li>• Removing thrust blocks around existing pipes at the entrance</li><li>• Removing first sections of existing pipes</li><li>• Clearing and cleaning access whole tunnel</li><li>• Clean and prepare valves for the works.</li><li>• Refurbish scour valve</li><li>• Reinstall pipes outside</li></ul>



			<ul style="list-style-type: none"><li>• Concrete works thrust blocks</li><li>• Install entrance gate and steps</li><li>• Demobilisation and reinstallation</li></ul>
1.2	Prevent water ingress into intake tower	Seal existing intake tower structure to prevent or at least reduce the amount of water penetrating the tower during high reservoir water levels	<ul style="list-style-type: none"><li>• Establish Site welfare outside the entrance to the 600m access tunnel between WTP and Intake Tower to allow safe access</li><li>• Clear vegetation around the entrance to the access tunnel</li><li>• Improve the ground conditions along the access tunnel by installing a 150mm thick, 20mm aggregate pathway and lighting.</li><li>• A secondary access point will be established at the top of the intake tower by removing the roof of the intake tower, installing concrete footings and installing a gantry to allow safe access of labour, equipment and materials from the top of the tower.</li><li>• Air blowers may be used to improve air circulation in the 600m tunnel and base of intake tower if gas monitors suggest this is required.</li><li>• Improvements to access platforms and ladders shall be completed as part of work package 1.3.</li><li>• Install crack gauges on leaking cracks to monitor cracks for a period of 3 months and confirm repair technique</li><li>• Repairs to crack shall either be resin injection, tape or mortar repair.</li></ul>
1.3	Improve access to intake tower	Replace corroded platforms, ladders and handrailing as required to facilitate safe operation of the tower valves	<ul style="list-style-type: none"><li>• Complete items 1 through 5 above</li><li>• Starting at the bottom of the leaking tower work upwards by installing an access tower, removing deteriorated steel flooring, manually cleaning steel beams using needle gun for inspection by Structural Engineer.</li><li>• Paint steel beams</li><li>• Install Glass Reinforced Polymer (GRP) flooring on rehabilitated steel beams and new ladders between floors.</li><li>• Move equipment to first rehabilitated floor and recommence sequence until all floors have been completed.</li></ul>



1.4	Repair leaking structures	all	Reduce losses through leak from the existing treatment works structures and rehabilitate other defective structures	<ul style="list-style-type: none"><li>• Isolate the weirs</li><li>• Pressure wash and prepare construction joints</li><li>• Apply repair materials</li><li>• Gain access with scaffold or towers</li><li>• All loose/cracked concrete to be removed</li><li>• Treat the rebar with Nitoprime Zincrich or similar</li><li>• Apply sand and cement works</li><li>• Clean and jet wash the roof</li><li>• Apply two coats of Rubber Roof Protection Liquid</li><li>• Test the roof for leaks</li></ul>
1.5	Refurbish filter beds	filter	Replace problematic suspended concrete floors in 14 Aquazur-T filters with composite type media support	<p>Air blowers:</p> <ul style="list-style-type: none"><li>• Place a new Motor Control Cabinet with connections to the control panel and power supply</li><li>• Create a doorway in the wall</li><li>• Remove old defective air pumps out through the doorway</li></ul> <p>Slabs:</p> <ul style="list-style-type: none"><li>• Replace damaged slabs with repaired ones.</li><li>• Replace damaged nozzles with new ones.</li><li>• Place them with appropriate joint sealing.</li><li>• Backfill with correct materials (gravel and correct grain size sand).</li><li>• Repair removed slabs for next replacement</li></ul> <p>Appendages:</p> <ul style="list-style-type: none"><li>• Drain water from filter bed and replace items</li></ul> <p>Actuators:</p> <ul style="list-style-type: none"><li>• Replace the defective compressed air operated actuators with electrical ones. The new actuators can be operated manually till they are connected to the control system.</li></ul>
1.6	Rehabilitate electrical and control installations	and	Essential replacement and rehabilitation of plant and equipment at	<ul style="list-style-type: none"><li>• Replace Booster pumps.</li><li>• Replace the old chlorine injection system by a new containerised system.</li><li>• Convert old chlorine injection area into storage space.</li></ul>





	the treatment works	
Construction of laydown area in Mile 13	Area outside Guma WTP access gate where some project workers will stay overnight, and materials, vehicles and machinery will be stored.	<ul style="list-style-type: none"><li>• Clear vegetation</li><li>• foundations for offices and containers</li><li>• Access road over an existing pipeline</li><li>• Set up parking and surface water drainage</li></ul>

An overview map of the area relating to Work Package 1 is included in Figure 7.



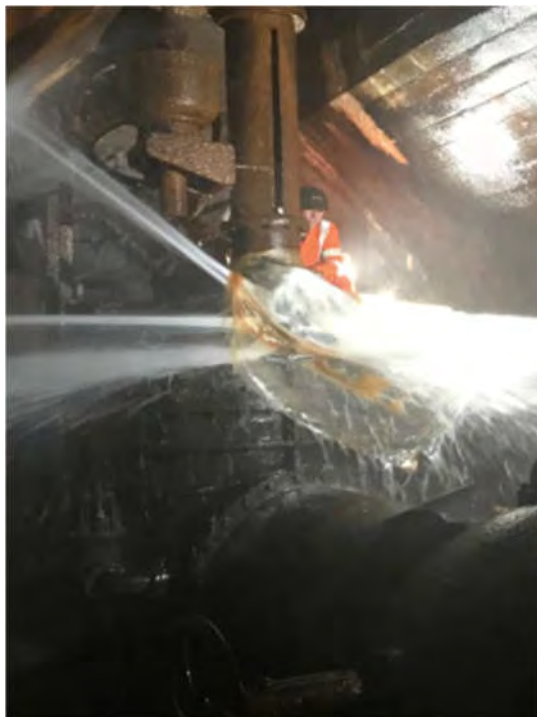
**Figure 7: Work Package 1 Area**

### **3.2.1 Work Package 1.1 Replace Guard Valve & Larner-Johnson needle valve on dam scour system**

Work Package 1.1 includes a two-step process 1) reduce the existing leakage on the Guard valve to create safe working conditions 2) install a new Guard and Larner-Johnson valve downstream of the existing to replace the two older valves.



Between May and June 2018, a specialist valve repair company HVL Solutions visited Freetown to repair the leaking Guard Valve. Figure 8 shows the extent of leakage measured to approximately 2 Megalitres per Day (Mld). HVL Solutions successfully completed the under-pressure valve repacking, repaired T bolts and completed full corrosion cleaning. The result of that first rehabilitation effort is shown in Figure 9 where a minor leak remained. In June 2018, the contractor returned and repaired the remaining T bolt repairs to completely repair the leak. Following valve maintenance and servicing the contractor ensured the valve continued to seal and allow them to function correctly when required. The valves were then tested. The works have reduced water leaking from the dam. The works area was extremely remote and had little to no impact on the surrounding area.



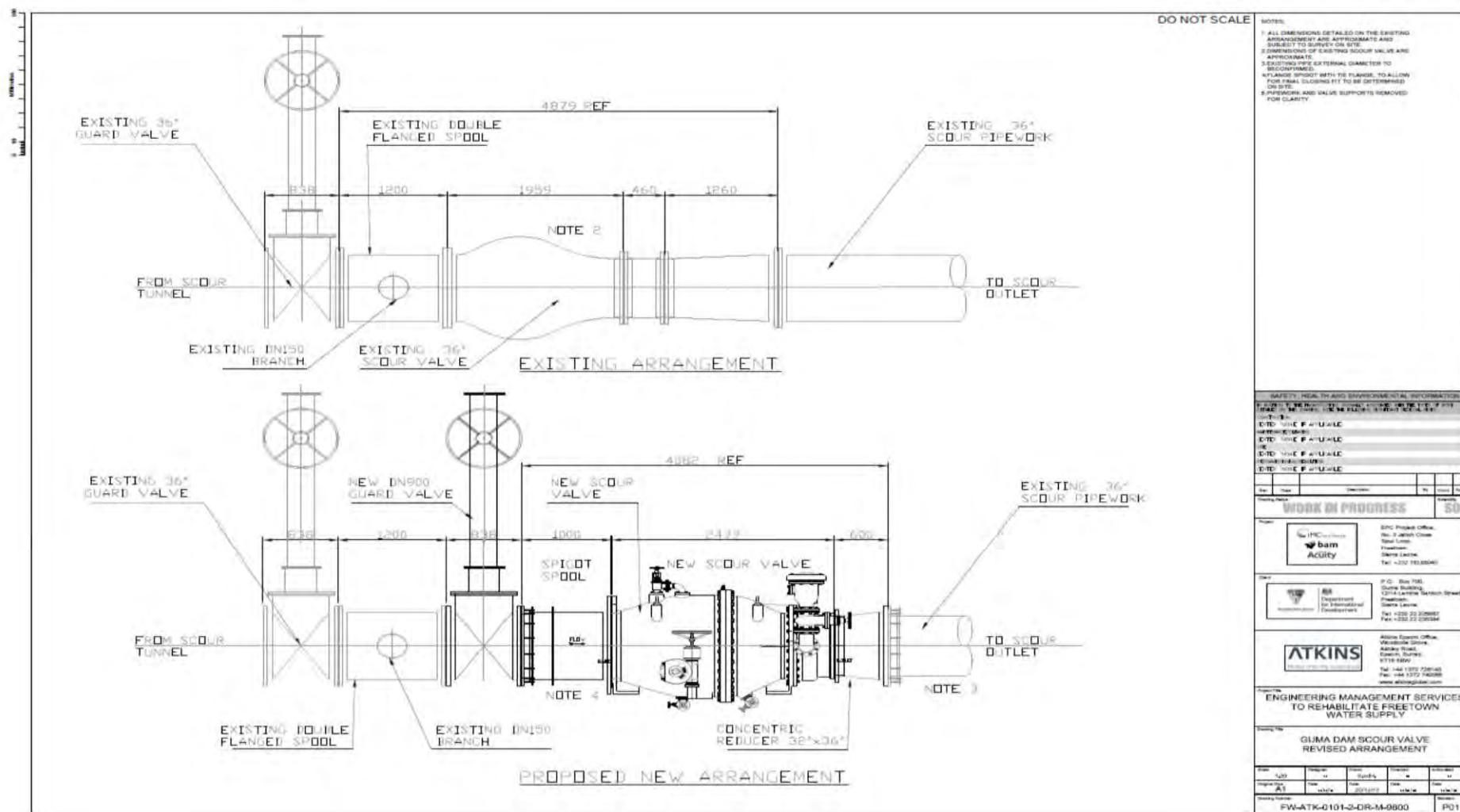
**Figure 8: Leaking Guard Valve (HVL, 2018)**



**Figure 9: Guard Valve after partial repair (BAM, 2018)**

Step 2 of the process will involve replacing the Guard valve and Larner-Johnson valve with a new set downstream of the existing. The 700m long tunnel is approximately 3.5m wide and 4m high although varies due to natural rock conditions. The existing 36" scour pipeline runs through the centre of the tunnel. Concrete thrust blocks outside the scour system tunnel will be removed temporarily to allow temporary works to be constructed for the movement of the new valves and associated materials into the tunnel. A gantry will be installed to bring materials up the 700m long access tunnel. Lighting and ventilation will be installed, and improvements to the ground conditions if required.

The existing pipe will be cut at the existing double flange spool and removed to allow the placement of the new valves. The arrangement of the new valves is presented in Figure 10. The works will take place immediately inside and outside the tunnel and are expected to have no impact on local communities in the form of noise or other emissions. Waste is anticipated to be limited to deteriorated steel pipeline which will be reused or disposed of in accordance with best practice.

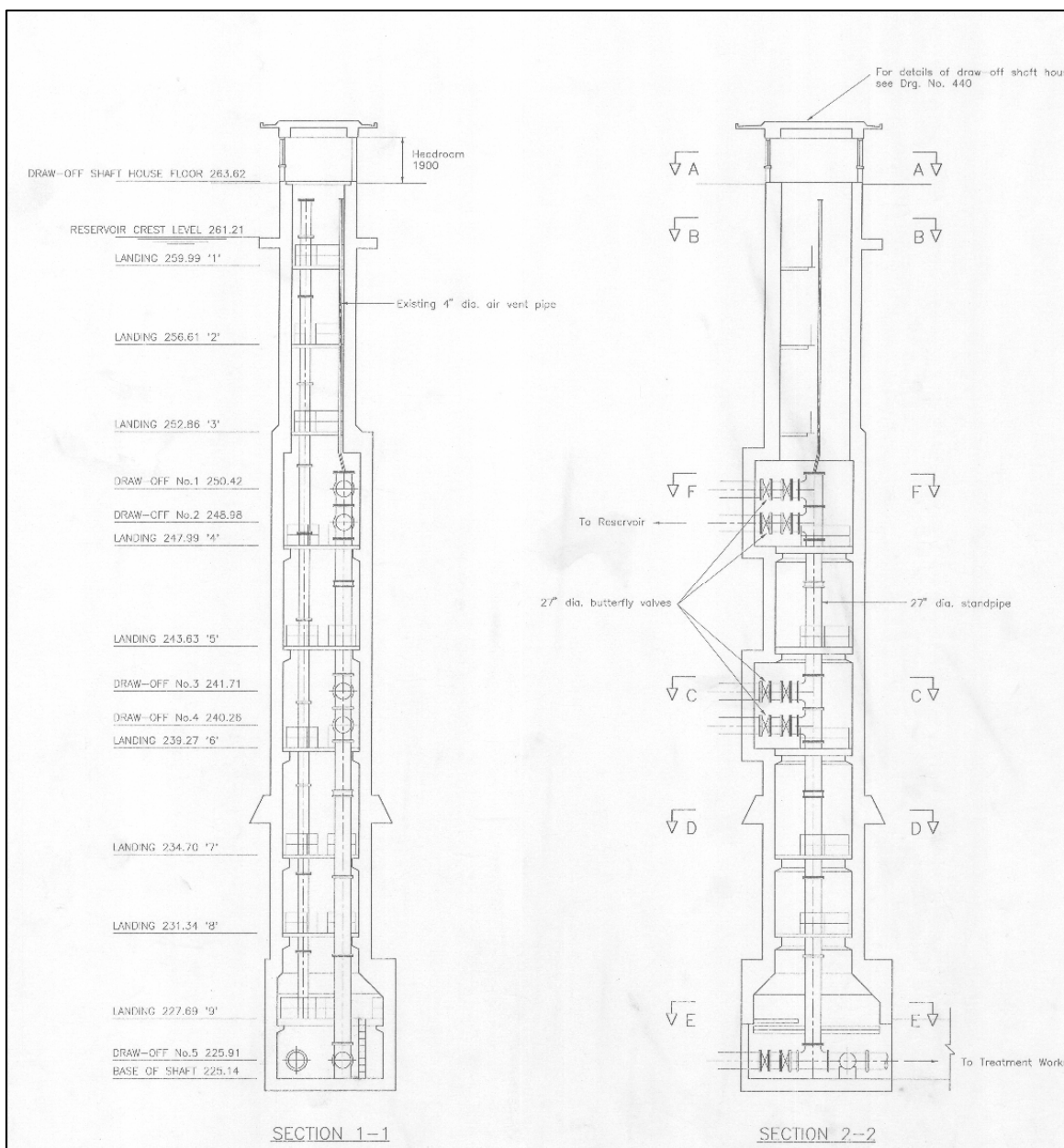


Environmental, Social and Health Impact Assessment (ESHIA) of Freetown Water Supply Rehabilitation Project



### 3.2.2 Work item 1.2 Prevent water ingress into intake tower

The Intake tower is located adjacent to the Guma Reservoir. It is an approximately 40m tall tower which receives intake water from five levels in the reservoir. GVWC are able to select the level at which to draw water, as the level in the reservoir reduces between rainy seasons by operating valves in the intake tower. Cracks in the concrete shaft have appeared allowing groundwater to leak into the tunnel. The exact extent of the leaks is at present unknown as access to the ladders and platforms is unsafe due to their deteriorated condition. It is proposed to replace the access floors, ladders and where required steel beams as part of Work Package 1.3 (see Section 3.2.3). After these works are complete safe access will allow the cracks to be repair.



**Figure 11: Intake Tower Cross Section showing 5 draw off locations and the pipe that transfers to WTP**

Access/egress to and from the tower for the works will be both from the draw-off shaft house at the top of the intake tower, and from the tunnel that connects the bottom of the intake tower and the Guma WTP. At the top of the intake tower, concrete foundations will be laid either side of the

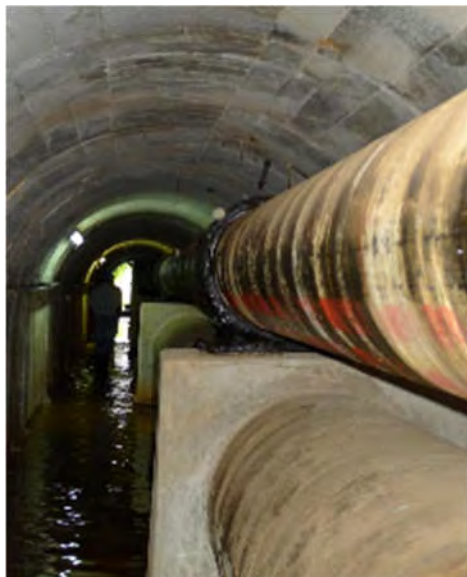




house to allow a gantry to be installed. The roof of the house will then be removed. This will allow equipment, materials and labour to access from the top of the tower.

The tunnel (see Figure 12) that connects the base of the intake tower and the Guma WTP has poor floor conditions. Vegetation around the entrance will be cleared. A 150mm thick layer of 20mm aggregate will be laid at the base of the 600m long tunnel to even out the floor for construction workers. Lighting and if necessary ventilation will be installed.

The Contractor will then work from the bottom of the tower, upwards platform by platform to rehabilitate the access platforms, ladders and structural steel in accordance with Work Package 1.3 (see Section 3.2.3).



**Figure 12: Intake tunnel between WTP and Intake Tower**

Crack monitors will be installed on cracks and monitored for a period of 3 months. When the type of cracking is understood one of three repair techniques will be used to repair the cracks:

- 1) Resin injection;
- 2) Tape; or;
- 3) Cement Mortar repair.

There is not expected any waste produced or emissions except from construction materials to be disposed of in accordance with best practice in Sierra Leone. Access to the tower is through the 600m tunnel in which known bat populations reside.

### **3.2.3 Work item 1.3 Improve access to intake tower**

Work Package 1.3, as indicated above, includes for survey, testing, design, refurbishment, replacement, fabrication and installation of steel beams, glass-reinforced polymer (GRP) platforms and ladders, to facilitate safe access to the Intake Tower at Guma Dam, including removal and disposal of all deteriorated steel.

The following are the principal items of work;

- Initial access/egress works as described in Work Package 1.2 (see Section 3.2.2);
- The Contractor will work from the bottom of the tower upwards, removing deteriorated steel platforms and ladders. Needle cleaning will be used to clean the structural steel beams (where their condition is deemed acceptable by a structural engineer) otherwise the beams shall be replaced;
- Steel that can be rehabilitated will be mechanically cleaned and painted;
- Replacement of ladders with new GRP ladders and fall arrest system;
- Supply and installation of self-closing GRP gates to new and existing ladder access at each platform;
- Replacement of all chequer plate landing decking with new Open Mesh GRP decking to the same layout as the existing and in accordance with this specification;
- Repair to lighting in the tower; and;
- Minor concrete repair to areas where Structural steelwork, ladders, handrailing and other ancillaries are supported by or fixed to the concrete.



There is not expected any waste produced or emissions except from construction materials to be disposed of in accordance with best practice in Sierra Leone. Access to the tower is through the 600m tunnel in which known bat populations reside.

### 3.2.4 Work item 1.4 Repair all leaking structures

This work package aims at reducing losses through leak from the existing treatment works structures and rehabilitate other defective structures. There is water leaking from many of the joints of various water retaining structures throughout the WTP. In most cases leakage is due to subsequent modifications made to the original structures. The works should reduce water losses through the treatment process, increase plant output and reduce waste consumables (water, power and chemicals).

Works include:

- Leakage repair to filter beds, clarified units, inlet dividing chamber, dividing walls to sediment tanks using a mixture of taping and resin injection;
- General site repairs including repair to treatment building walls, treatment of reinforcement and repair of mortar, repair of suspended ceiling, repair of roofs and provision of protection against rain.

The works are confined to the WTP buildings and structures and are not due to impact surrounding vegetation. There may be waste in the form of all roofing panels that will be disposed of in accordance with Sierra Leone best practice.



Figure 13: Leakage at WTP (approx. 380m<sup>3</sup>/d)

### 3.2.5 Work item 1.5 Refurbish filter beds

There are 14 sand filters at Guma WTP for the treatment of raw water from the Guma reservoir. They have been operational for many years and reached the end of their working life and as such are proposed for refurbishment.

These works will require the involvement of a specialist manufacturer of such technology. This work package covers the following activities:

- Replace air blowers to restore backwash capabilities to specified volumes.
- Design, manufacture, and shipping to site of inlet clack valves, partialisation boxes, nozzles and moulds.
- Restore functionality of filter beds to original state by replacing damaged slabs with repaired slabs, replacing damaged nozzles, placing appropriate joint sealing, backfilling the beds with appropriate materials (sand and gravel) and repair removed slabs for future use if required.
- Replace inlet clack valves and partialisation boxes.
- Replace the defective compressed air operated actuators with electrical actuators.

Works are restricted to the Guma WTP area and are not anticipated to require any disruption to vegetation. There will be limited waste materials from replaced assets.



**Figure 14: Existing Sand Filter Beds at Guma WTP (Atkins, 2018)**



**Figure 15: Filter Bed panels – existing condition (BAM, 2018)**



**Figure 16: Existing partialisation box to be replaced (BAM, 2018)**



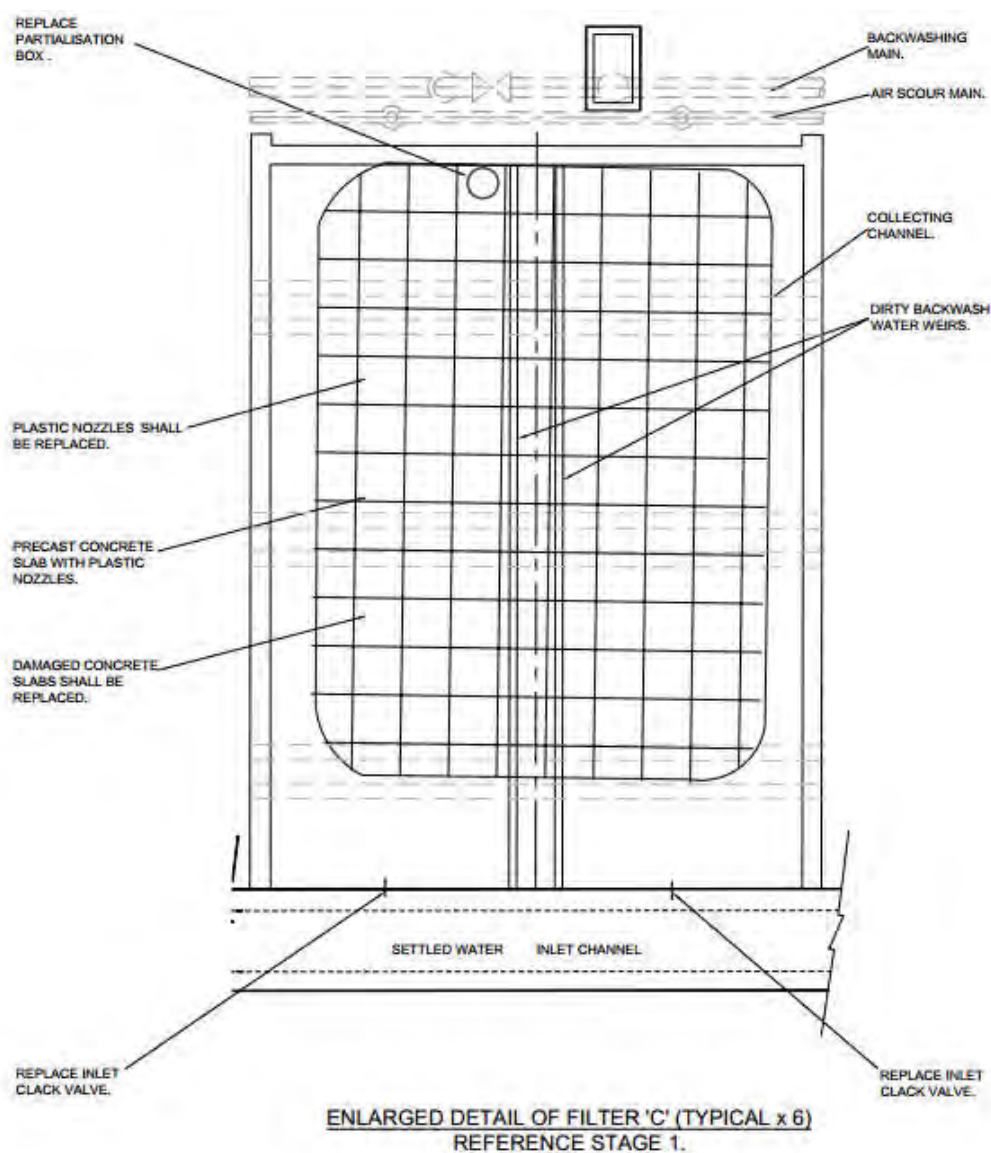


Figure 17: Typical Filter Bed refurbishment detail (FW-ATK-0105-2-DR-M-9810, Atkins 2018)

### 3.2.6 Work item 1.6 Rehabilitate electrical and control installations

This work packages covers electrical and control installations that need essential replacement and rehabilitation of plant and equipment at the treatment works. The Motor Control Centre (MCC) that controls the electrical operation of plant at the WTP has become severely corroded and will required complete replacement.

Chlorine dosing systems are in a poor condition and require rehabilitation. In addition, electric pumps and motors related to chemical dosing to disinfect water are in poor condition, not functioning or in some cases absent. All dosing equipment shall be replaced. This will include a new chlorine drum replacement system for the safe changeover of chlorine gas drums., and chlorine gas detection integrated with ventilation and safety shutdown systems.

Extensive works to cabling will also be completed included new site wide earthing system to support the new systems. The works include replacement of defective installations including:

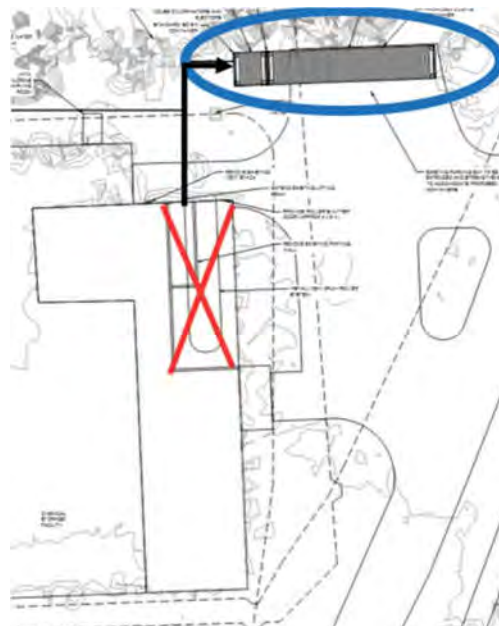


- Turbine Switchgear;
- Turbine Governor System;
- MCC – including new MCC kiosk to house the new MCC;
- Generator Panel;
- Power Generation
- Wash water Pumps;
- Service Water Pumps;
- Chemical dosing System;
- Extractor Fans;
- Distribution Boards;
- Lighting and small power services within the existing building;
- Chlorination booster pumps;
- Chlorination booster pipework;
- Aluminium Sulphate Dosing Pumps;
- Aluminium Sulphate Mixers;
- Lime Dosing Pumps;
- Lime Stirrers

In relation to electrical and control refurbishment, existing control panels will be modified to work with the new actuators. New actuators will be connected by removing compressed air tubing connections and systems, and connecting new cabling into the new actuators, and then to the modified control panel. The Aluminium Sulfate dosing pumps and lime dosing pumps will be replaced with any improvements as required to piping connections – the existing pumps are shown in Figure 18.



**Figure 18: Existing Aluminium Sulfate dosing pumps and lime dosing pumps to be replaced**



**Figure 19: New location for chlorine injection containers – outside the plant**

In relation to the new chlorine injection system – the intention is to replace the outdated and unsafe equipment with a reliable chlorination process. Chlorination booster pumps and pipework will be replaced, and the existing chlorine injection system replaced by a containerised system.



The new chlorine injection container will be placed outside the treatment plant as shown in Figure 20. The contractor will install a cable tray and power cables to the chlorine injection container and will decommission the old system.



**Figure 20: Example of replacement external chlorine injection container (BAM, 2018)**

### **3.2.7 Construction of laydown area in Mile 13**

A laydown area or construction compound will be built outside of the GVWC WTP boundary for the duration of construction in order to allow the storage of materials, equipment and welfare containers for labourers. The location of the laydown area is shown in Figure 7. The expected size and extent of the laydown area is shown in Figure 21.

The laydown area is located adjacent to the WAPNP buffer zone. In meetings between GVWC and NPAA, an agreement was made that the compound should not intersect the buffer zone. A meeting on site between GVWC, NPAA and the Contractor shall take place to agree the boundary of the site.

The boundary of the site will be fenced off. An access road into the site off the main road will be constructed from low strength concrete, and if required a crushed stone base. The site will be clear of all vegetation. Where possible trees over 3m tall will be left in place. The slope site will be levelled to suit the requirements of the site.

100mm thick reinforced concrete slabs will be poured to construct hardstanding for storage areas. A shelter workshop will be constructed for repair of construction vehicles and offices and welfare units installed. Floodlights will also be installed to allow 24 lighting of the site.

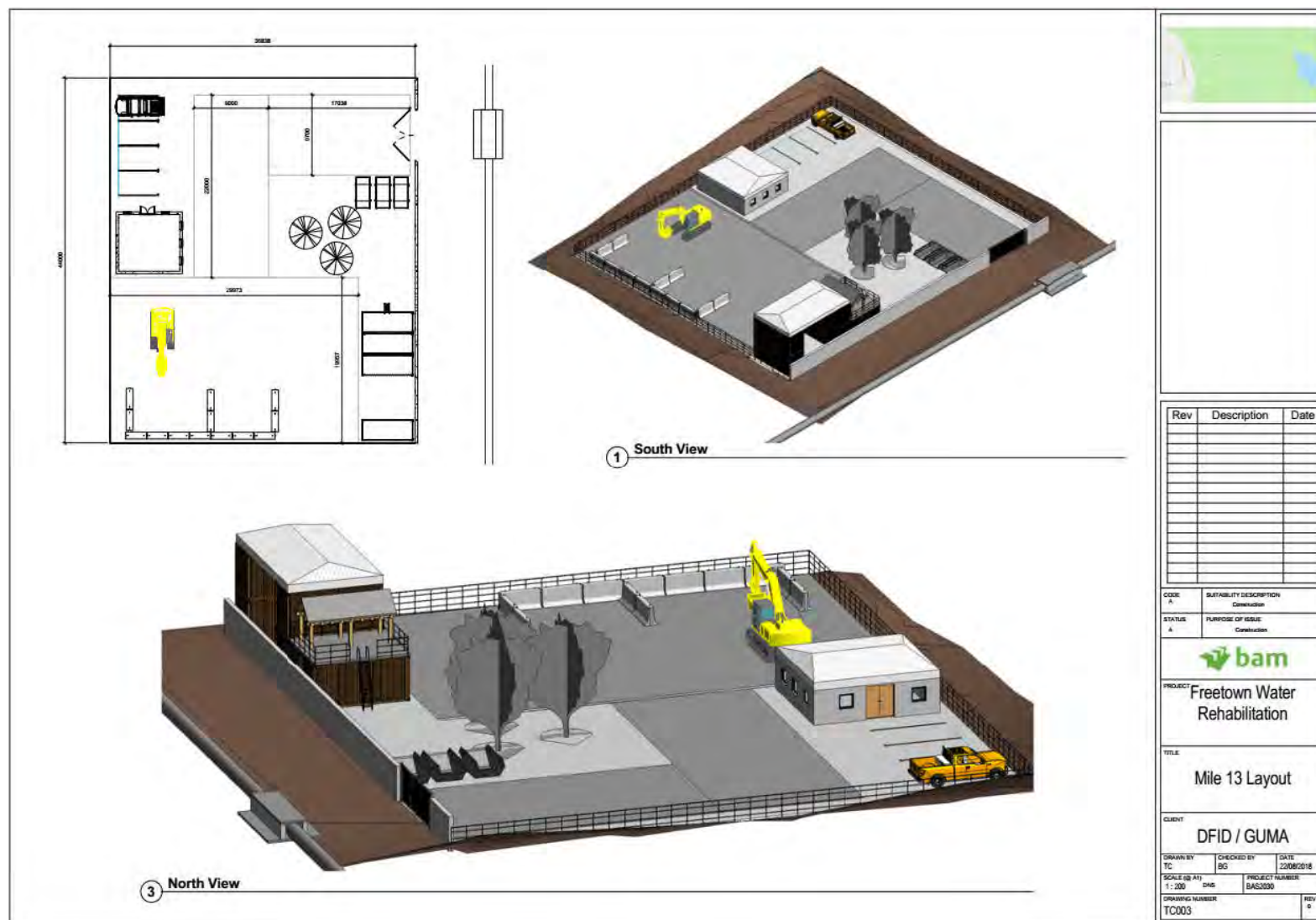


Figure 21: Mile 13 Site Compound Layout Plan





### 3.3 Work Package 3 – Rehabilitate the transmission system

The transmission main system conveys water 16km from Guma WTP as far as Spur Road WSR. A single 800mm main leaves the Clear Water Tank at Guma WTP and runs for approximately 200m before splitting into parallel 450mm and 700mm mains. The 450mm main runs northwards for approximately 3.6km before increasing in diameter to 550mm and continuing to Spur Road WSR. There are 11 offtakes along the length of the 450/550mm main supplying communities along the Peninsula Road, as well as transmitting water to the Spur Road WSR.

It is a 4.4km sections of this 450-500mm dia main that will be rehabilitated, along with rehabilitation of 3 cross connections to the 700 mm dia transmission main that runs parallel to it along the Peninsula Road. The cross connections are at Lakka, Goderich & Spur Road.

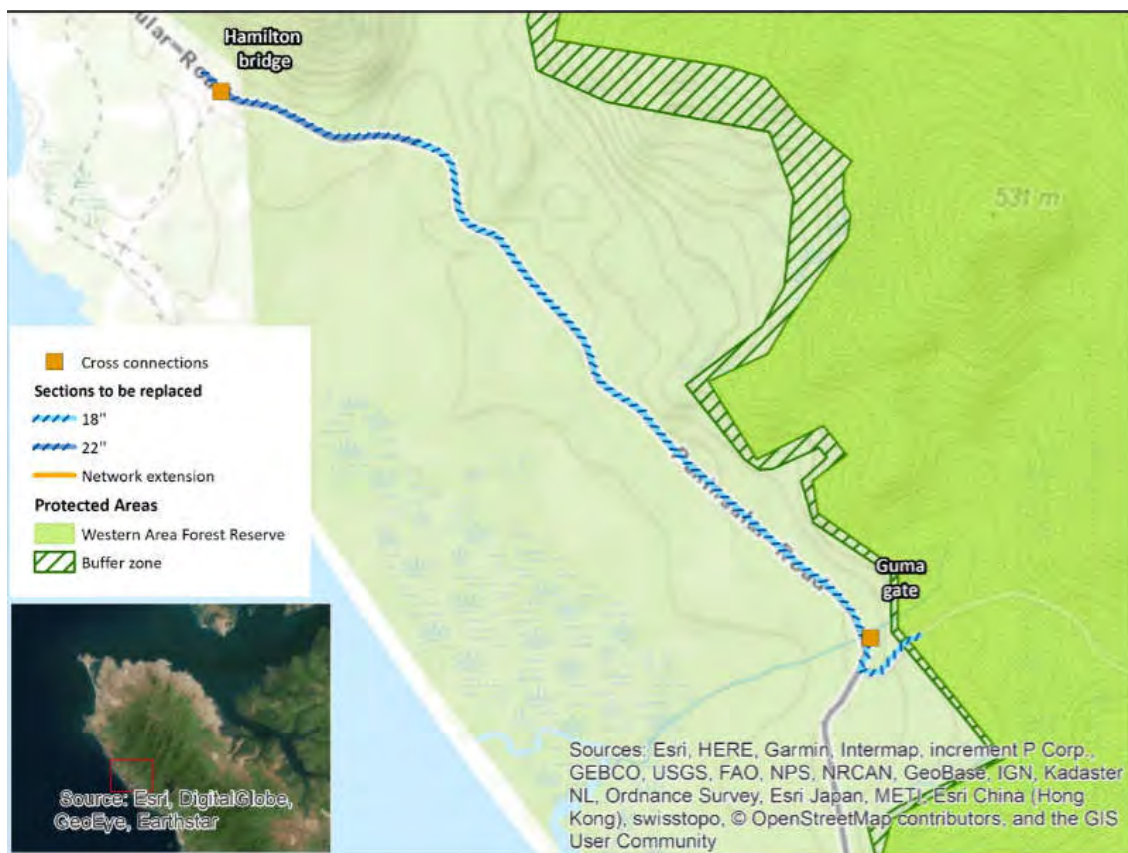
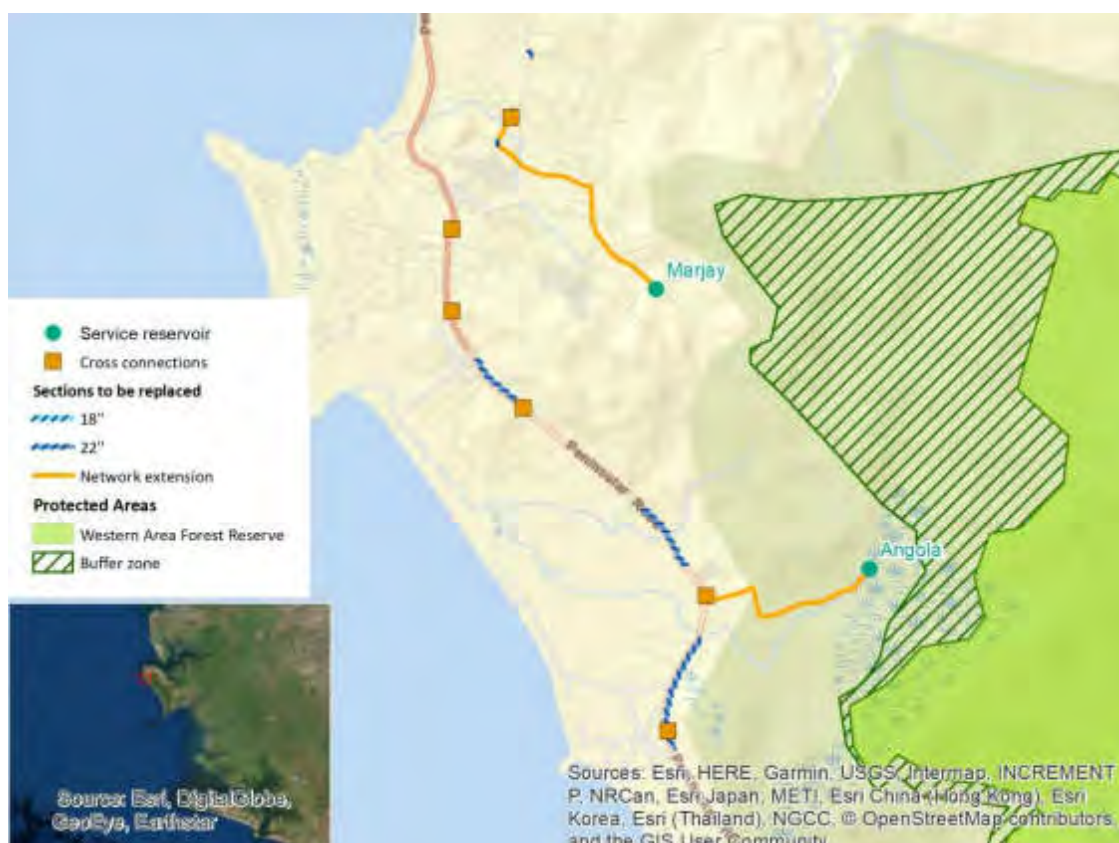


Figure 22: Work Package 3 -Trunk main from Guma Gate to Hamilton Bridge



**Figure 23: Work Package 3 -Service reservoirs, cross-connections and projected rehabilitation of mains beyond Hamilton Bridge**

As well over 90% of the total water supply to Freetown is supplied from Guma WTP, effective operation of this transmission system is essential for effective water distribution throughout the Freetown area. The cross-connections are required to allow water supply to continue even if one or more sections of either transmission main fails.

The items included in Work Package 3 are listed below:

**Table 5: Work Package 3 Activities**

Work item	Description	Envisaged works
3.1	Replace above ground section of the transmission main	Replace a problematic 4.4km section of high pressure 450/550mm dia. old steel main which is prone to bursting and damage <ul style="list-style-type: none"> <li>• Peg out pipe alignment</li> <li>• Excavate trench</li> <li>• String out pipes</li> <li>• Install pipes</li> <li>• Backfill</li> <li>• Pressure test and Chlorinate</li> </ul>
3.2	Construction of service reservoirs at Marjay Town and Adonkia	Two service reservoirs along the Peninsula road to assist to control supply pressures and provide additional <ul style="list-style-type: none"> <li>• Construction two service reservoirs at Marjay town and Angola</li> <li>• Lay 4.7km of DN200 pipeline to the Angola Reservoir Site</li> <li>• Lay 2.1km of DN300 pipeline to the Marjay Reservoir Site</li> <li>• Prepare foundations for Braithwaite Tanks</li> </ul>

		storage to aid the rationing programme	<ul style="list-style-type: none"> <li>• Install and commission Braithwaite Tanks</li> </ul>
3.3	Rehabilitation of cross-connections between transmission mains	Essential cross connections between the twin transmission mains needs to be returned to full operation	<p>Guma Branch:</p> <ul style="list-style-type: none"> <li>• Refurbish two Gate Valves and bypass valves at Guma Branch, Lakka Cross connection, Goderich Cross Connection and Spur Rd Cross Connection</li> <li>• Construct new fence around valves and chambers</li> </ul>

### 3.3.1 Work item 3.1 Replace above ground section of the transmission main

This activity comprises the replacement of a problematic 4.4km section of high pressure 450/550mm diameter old steel main which has been known to burst. The pipeline is predominantly above ground and can be damaged as vehicles drive over the pipe and communities encroach the other and build properties over and around the pipe.



**Figure 24: The existing pipeline to be replaced has significant encroachment of residents and businesses. It also crosses rivers that will need to be careful managed for construction.**

The works would involve burying the pipeline along the length and constructing three offtakes.

A separate downstream section crosses the river at Juba bridge. This replacement is required as the existing pipeline is leaking and easily damaged in the rainy season by heavy flows in the river.

Detailed drawings of the pipeline FW-ATK-0301-2-DR-NE-9563-65 are included in Appendix 2.





### **3.3.2 Wok item 3.2: Construction of service reservoirs at Marjay Town and Angola**

Whilst water is currently distributed in the West the network is in need of rehabilitation. By constructing two tanks at Marjay town and Angola, it is intended to feed the networks in the west of Freetown (including those in Work Package 5.2) from these two new steel structures. This would remove the pipelines from direct distribution from the main Guma WTP to Spur Road WSR transmission line and allow GVWC improved controls.

Two sectional steel tanks shall be provided. At Marjay Town the tank of expected dimensions 25m x 25m x 5m height will be constructed for a total storage capacity of 3ML. At Angola site, the sloped site will require extension geotechnical intervention to allow a flat base for a tank. It is anticipated that reinforced concrete or rock gabion basket retaining walls shall be constructed to allow a flat space to be prepared. A circular tank of approximate 12m radius, 6m height shall be constructed although the exact dimensions shall be confirmed on the completion of further site investigation. The anticipated storage capacity will be 2ML.

Fittings and ancillaries shall include but not be limited to the following;

- Top entry inlet pipework and connections, DN 250.
- Additional blank flanged pipework connection for future additional inlets, DN250
- Overflow pipework and connections, DN300
- Washout sump and pipework, DN200
- Outlet pipework and connections, DN400
- All requirements for access and maintenance including ladders, platforms, handrailing and access covers.
- Float valve arrangements
- Level gauge with externally visible display
- Ventilation

To feed both tanks transmission main from the existing network up to the new reservoirs will be required. For the Angola reservoir 4.7km of 200mm diameter pipeline shall be constructed whilst for the Marjay reservoir 2.1km of 300mm diameter pipeline shall be constructed.

The Contractor shall establish working compounds at both sites for the duration of the works.

The locations for the pipelines and reservoirs are shown in drawings FW-ATK-0502-2-DR-NE-9536- 9544 in Appendix 2.

### **3.3.3 Work Package 3.3: Rehabilitation of cross-connections between transmission mains**

There are four key cross connection points between the twin transmission mains between Guma WTP and Spur Road WSR. These essential valves all GVWC to control the flow of water in the west of Freetown. HVL Solutions visited Freetown earlier this year and successfully rehabilitated the valves. In particular leakages at valves in Lakka were halted leading to an estimated 0.75Mld saving.

The four cross-connections are located at:

- Guma Y Branch;
- Lakka Cross Connection;





- Goderich Cross Connection; and;
- Spur Road Cross Connection.

Remaining works to be completed at these sites include minor civil rehabilitation works such as anti-rust painting to valves and ironmongery, replacing manhole covers, re-instating boundary fence lines and concrete repairs.

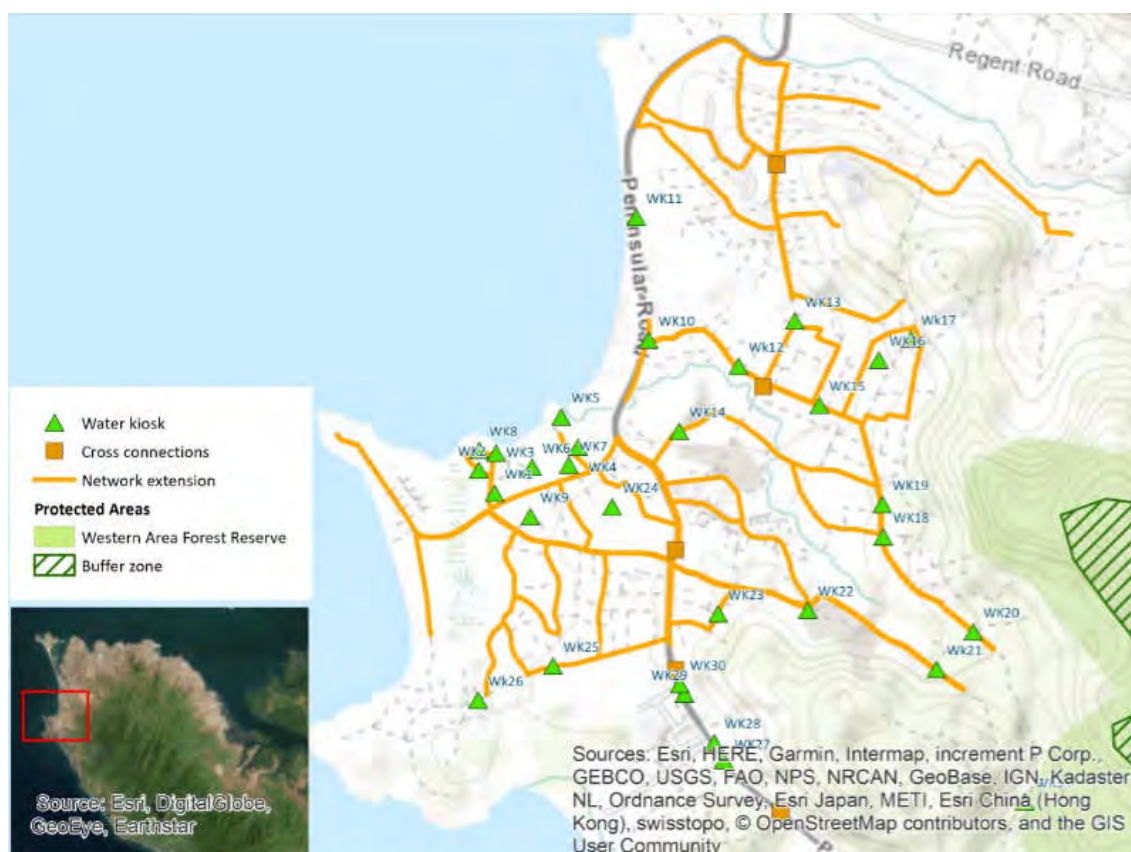
### **3.4 Work Package 5 - Distribution improvements**

The distribution network consists of approximately 250km of formal network as well as a considerably greater length of “spaghetti” mains. Because of a rapid increase in the population of Freetown during the last 10-15 years, and GVWC’s shortage of working capital, the distribution network has not been expanded to keep pace with the city’s development. The lack of system development has led to this widespread use of spaghetti service lines. A GVWC field exercise estimated that for every 1km of new main, approximately 35km of spaghetti main can be decommissioned, significantly reducing the length of network requiring maintenance and causing leakage.

Of the 250km of formal network, a considerable portion is quite old (>40 years) cast iron and asbestos cement (AC) mains. There are a number of these water mains identified for rehabilitation that will help restore supply to certain areas (where the existing main has been taken out of service) or reduce leakage.

In addition, very little water currently gets to the east of the city. The Bulk Transfer System (BTS) – the method of moving water from Spur Road Reservoir to the east – was designed and built in 1994 but has never been operational. As designed, the top water level of Spur Road reservoir (117mOD) is sufficient to drive water through the BTS to fill Tower Hill, Income Tax, Dan St., Africanus Road and Wellington Reservoirs. However, under current operation, the water level in the pipework downstream of Spur Road remains at no more than 90mOD, which is insufficient to supply these reservoirs.

The items in this Works Package aim to optimise the operation of the BTS, giving GVWC the ability to move large quantities of water from the west to the east and hence provide the city with a far more equitable distribution of water. It also aims to provide flow meters at key points on the trunk main system so that flows on it can be monitored to confirm the distribution of water to various parts of the city, particularly the east. This Works Package will also rehabilitate key water mains.



**Figure 25: Work Packages 5 - Projected areas of network improvements**

The Work items within Work Package 5 are listed below.

**Table 3: Work Package 5 activities**

	Work item	Description	Envisaged works
5.2	Distribution System Extensions	New mains extensions in supply areas where spaghetti connections are widespread to improve reliability and reduce losses	<ul style="list-style-type: none"> <li>Install 34,6km of new distribution network</li> <li>Install the water points as the networks progress</li> </ul>
5.5	Communal waterpoints/ kiosks	Provision for the construction of water kiosks in areas where the network will be limited or areas supplying people unable to afford individual connections	<ul style="list-style-type: none"> <li>House connections</li> <li>Communal water point design</li> </ul>
5.6	Commission Bulk Transfer System	The pipework exists to deliver water to the east of Freetown, but it has never been properly commissioned so has never worked effectively	<ul style="list-style-type: none"> <li>Design a Bulk transfer system</li> <li>The bulk transfer system will be repaired from SPUR road to further downstream</li> </ul>
5.7	Install Bulk Flow Metering	Essential flow metering monitor flows in the main transmission/transfer system to provide system performance information to GVWC Management, including some key reservoir	<ul style="list-style-type: none"> <li>Install district metering flowmeters, bulk flow meters and reservoir level transmitters</li> </ul>



5.9	Rehabilitation of networks from East End Police to Wellington	Due to the failure of the water network to deliver water to the east of Freetown what distribution there was has fallen into disrepair.	<ul style="list-style-type: none"> <li>• Replace the distribution network</li> <li>• Decommission asbestos cement pipe</li> <li>• River crossings</li> </ul>
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### 3.4.1 Work Item 5.2: Distribution System Extensions

Work Item 5.2 includes for the install of 34.6km of distribution network. The network will distribute water from the two new steel reservoirs constructed as part of Work Item 3.2 at Angola and Marjay Town. The network ranges in size from 80mm to 200mm. The network will be built up to house boundaries by the Contractor. GVWC will then connect the home to the new network.

Drawings showing the extent of the proposed network are shown in Appendix 2 - Drawing FW-0502-2-DR-NE-9536-9544. Where pipes are situated on paved roads, the pipes will be constructed in the utility right-of-way which is located off the road, outside of the drainage channel. This is a demarcated portion of public land dedicated to service installation. Surveys of the routes are being carried out in co-ordination with resettlement experts to determine where the new pipes will require temporary or permanent relocation of residents, businesses or property. Where the pipes are located on unpaved roads, the pipes will be buried in the road at a 1.5m offset from the road boundary (edgeway, boundary wall, house or either identifiable boundary).

Small teams will operate on this work package normally a mini-digger with a team of labour and materials trucks. The works will progress with the intention of completing a set number of km of pipe every day. On this basis the disruption in any one location will be minimal as works progress. Pipes are intended to be buried at 600mm below road surface in pea gravel surround. Material used to excavate the trench will be used to backfill and compact above the pipe surround. In cases where this depth is not achievable, concrete surround may be used to protect the pipe at a shallower depth.

Where works will take place on narrow streets it is likely the road will be temporarily closed allowing only pedestrian traffic to bypass the works. Wider streets will use traffic management system such as flag men to keep road traffic moving around the works.

Where pipes cross the road, trenches through the road will be dug to place a concrete or HDPE duct. Pipes will then be placed through the duct. The pipes will be tested before commissioning.

### 3.4.2 Work Item 5.5: Communal waterpoints/kiosks

In some locations across the city, it shall not be feasible to connect all houses and rather water kiosks shall be installed. The exact design of the water kiosk will be finalised during detail design. The rough principles (Adam Smith, 2018) are include below:

- Constructed with low-cost metal panels fabricated off-site; this will allow GVWC to easily set up and, if necessary, dismantle and move a kiosk;
- Design is scalable down from a small 1.2m x1.2m shop with a 3-10,000m<sup>3</sup> storage tank outside to a 2.5m x 3.5m shop with a 10,000m<sup>3</sup> tank inside with the option of additional storage tanks outside



- Dispenser can be a low-tech option with a pipe and a lever valve OR a kiosk can have more complex pre-paid options built in.
- Kiosk will have two meters to measure water coming in (this is used to monitor payments to GVWC) and water being sold.

Locations:

The exact locations of the kiosks have not yet been determined but they will be along the networks being constructed in this project. It is anticipated that up to 35 kiosks will be constructed.

### **3.4.3 Work Item 5.6: Commission Bulk Transfer System**

Work Item 5.6 will include very little construction work. This work item requires the commissioning of a pipe that distributes water from Spur Road reservoir across the east of Freetown to fill key reservoirs. The commissioning works will include teams of workers opening valves and allowing water to flow through the network. It is anticipated that unexpected misconnections could be found, or burst pipes occur during commissioning. These would be repaired.

These works are intended to change how water is distributed to the East resulting in a more reliable supply to that area.

### **3.4.4 Work Item 5.7: Install Bulk Flow Metering**

Work Item 5.7 ties closely to Work Item 5.6 and includes the installation of bulk flow meters to measure flow through the network and water level monitors at reservoirs to monitor the level of water in the tanks. These works will include the construction of concrete chambers to house the flow meters with steel manholes covers.

### **3.4.5 Work Item 5.9: Rehabilitation of networks from East End Police to Wellington**

Work Item 5.9 includes the construction of new networks at four locations in the east of Freetown:

- 15.4km of New DN150 Main and Decommission 7.6km of 300mm Asbestos Concrete main;
- 2.6km of new DN150 main and decommission 2.6km of 150mm Asbestos Concrete main;
- 600m of DN100 at Peacock Farm; and;
- 300m of DN100 at Taylor Street.

Construction shall occur as indicated in Section 3.4.1. Asbestos Concrete pipes are intended to be buried in situ to avoid the risks associated with digging up the pipes and removing to landfill.

## **3.5 Work Package 6 – Orugu sources to Allen Town**

Allen Town Water Treatment Plant and Service Reservoir are currently GVWC's most easterly facilities. The WTP is supplied through an old AC pipe from a weir on the Orugu River at Charlotte. In GVWC's proposals for Priority Areas it was intended that the facilities at Charlotte would be upgraded and the pipeline replaced but extensive development in the upper Orugu catchment and around the weir site have made this option non-viable from a water quality and security perspective and it has been dropped.



It was therefore necessary to identify a new source or sources of water for Allen Town in the upper areas of the catchment – Mortem and Mongegba. Like all rivers in this region the flows are vulnerable to severe seasonal fluctuations and deficits will be experienced during the dry season, but the water quality is potentially good as the catchments are relatively undisturbed. The relatively recent water treatment plant at Allen Town is also in need of refurbishment and upgrading and this is included. An overview drawing showing the two sources, proposed connection pipework, proposed connecting distribution network and the location of the Allen Town Reservoir is shown in Figure 26.

There are two Work Packages – work package 6.5 and 6.9 included in this Work Package. A summary description of each is given in Table 6.

**Table 6: Work Package 6 activities**

	<b>Work item</b>	<b>Description</b>	<b>Envisaged works</b>
6.5	Transmission Mains for Orugu Sources	Transmission proposals linked to the water resource studies to deliver water to Allen town.	<ul style="list-style-type: none"><li>• Construct new weirs at Mortem and Mongegba tributaries</li><li>• Install transmission lines from weir sites to road</li><li>• Install transmission line to Allen Town (4,9km)</li><li>• Construct pipe crossing to Orugu river</li></ul>
6.9	Rehabilitation of Allen Town distribution network	Relatively recent network but with a key pipeline needing rehabilitation.	<ul style="list-style-type: none"><li>• Extend and rehabilitate 8,75 km of Distribution network from Allen town WTP</li></ul>



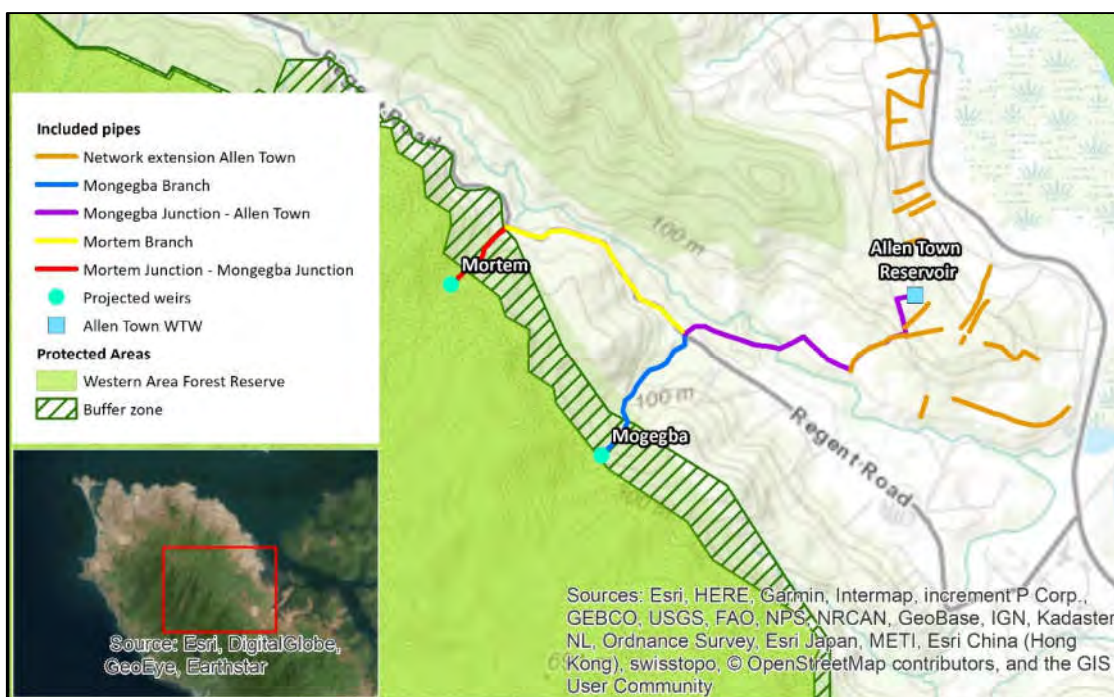


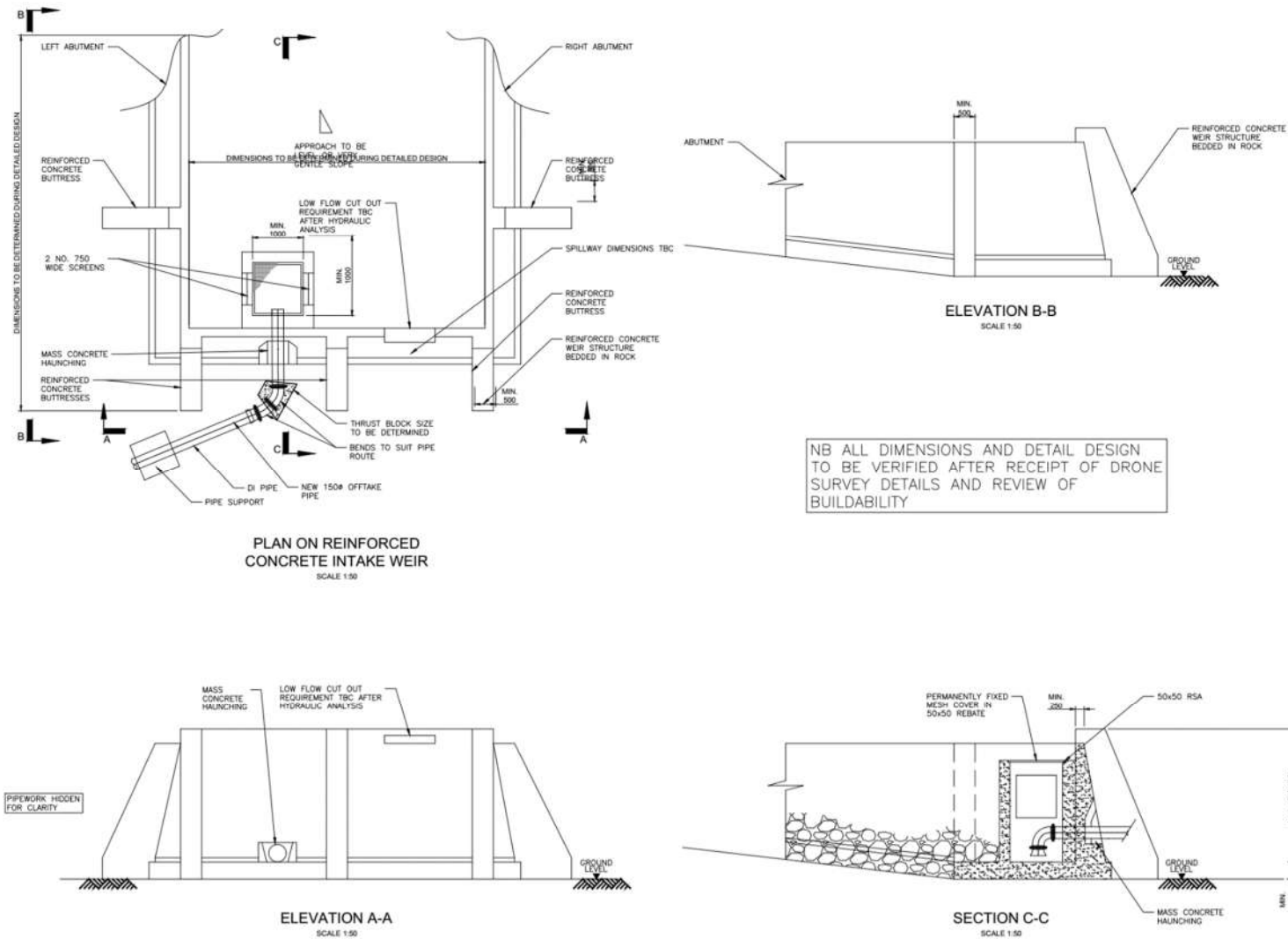
Figure 26: Work Package 6 – Transmission main from Orugu Sources to Allen Town

### 3.5.1 Work Package 6.5: Transmission Mains for Orugu Sources

Work Package 6.5 includes the capture of two sources at Mortem and Mongegba. Both are located within the WAPNP or its buffer zone. The works include the construction of a weir at each location and a water inlet at each weir. A new pipeline through the WAPNP buffer zone shall be constructed to transport the water to the Allen Town WTP.

As part of early site investigation into both sites, NPAA have allowed the Contractor to construct pedestrian pathways up to each site. Construction works will include for the further removal of vegetation around the two weir locations to allow equipment and machinery to work, and also along the pipeline route both to allow materials and equipment up to the weir site and during the burial of the new pipelines. The river will be diverted temporarily to allow a dry working space. A reinforced concrete base, side walls and buttresses shall be constructed bedded in rock or a gabion rock basket design used. A mass concrete inlet structure with mesh screens will allow water to flow into a new 150mm offtake pipe. A drawing showing the expected layout is shown in Figure 27.

From Mortem weir a 700m long, approx. 150mm diameter pipe will carry the water down the mountain to the main road where a larger pipe will connect along the main road to the junction with the Mongegba source and onward to the Allen Town WTP. In total 1.7km of new pipe of variable diameter between 150mm – 300mm is anticipated to be constructed. The offtake pipelines from either weir will be buried to 600mm depth with trenches filled with pea gravel pipe surround, and then back filled with the removal material. At river crossings alternative construction techniques will include embedding in concrete in the river bed to protect the pipe during the rainy season. The detailed Stage 2 design deliverables have been provided in Appendix 2 in which drawings FW-ATK-0605-2-DR-C-9527-9530 show the pipelines to a 1:5000 scale.



**Figure 27: Proposed Weir Structure to be constructed at Mortem and Mongegba sources**





**Figure 28: Photos along proposed offtake pipeline route – challenging construction conditions**





WP 6.5 also includes refurbishment works at the existing Allen Town WTP. The existing Allen Town WTP was constructed in 2012. The treatment process comprises: 1 circular clarifier, 1 clarified water buffer tank, 2 pressure sand filters and 1 water tank with chemical disinfection. Clarified water is pumped from the clarified water tank to the service reservoir, via the pressure filters. Flows from the reservoir are then distributed to Allen Town & Calaba Town.

The plant is impacted by the lack of reliable water raw water supply. The design may decide to put parts of the WTP out of service.

The existing plant layout includes an unsafe chemical batching facility which involves working at height. As part of the works new Calcium Hypochlorite batching plant will be located at ground level with staircase provided for maintenance access. A new building approximate dimensions 5m x 5m by 2.5m height shall be constructed to house the new batching equipment. The batching room shall be built and include suitable ventilation/systems for any airborne dusts, vapours or gases to atmosphere. The building shall have a reinforced concrete base with a minimum thickness of 300mm.

### 3.5.2 Work Package 6.9: Rehabilitation of Allen Town distribution network

This WP details with the rehabilitation of the Allen Town distribution network fed from the Allen Town WTP and can only be successful on completion of WP 6.5 and therefore the successful delivery and treatment of additional water to the Allen Town WTP. This package includes the extension and rehabilitation of 8.75km of distribution network. Most of the network is new pipelines between 75mm – 200mm diameter.

A construction compound will be established at the Allen Town WTP. An overview drawing is Figure 29. Detailed Drawings FW-ATK-0609-2-DR-C-9523 – 9525 in Appendix 2 show the extent of the pipelines.



**Figure 29: Proposed networks for Allen Town – (Dark Blue = Existing, Light Blue = Rehabilitation, Red = New)**

Pipes shall be buried in accordance to the specification to minimum depth of 600mm except where an alternative is approved. Where the pipelines are built in tarred roads the road will be reinstated.



Where pipelines are buried in unsurfaced road, the trench materials will be used to backfill the roads. Example pipe bedding details are included in Figure 30.

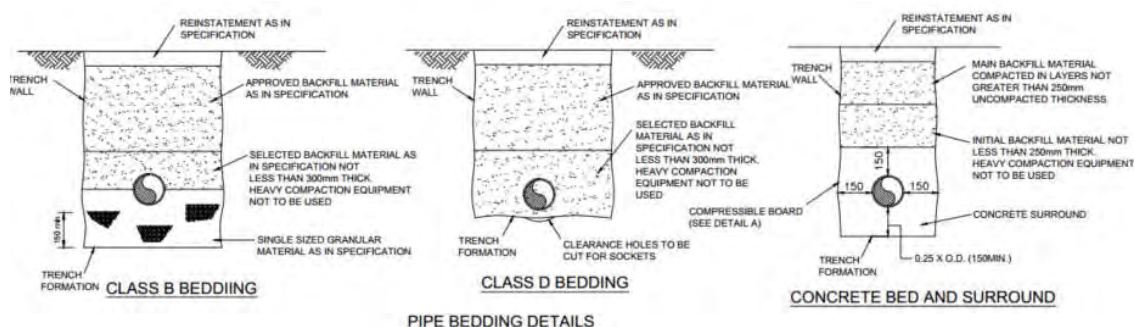


Figure 30: Pipe Bedding Details

### 3.6 Work Package 9 – Pumping schemes to Wilberforce and other communities

This work package now only comprises WP 9.1 which involves rehabilitation at the Spur Road reservoir (see Figure 31) in particular the replacement of pumps and more minor works such as installing replacement ladders. Spur Road reservoir is a key pumping station which pumps water to the elevated areas of the city, to Governor's Lodge and Wilberforce reservoirs. An overview of the work package is included in Table 7.



Figure 31: Spur Road Reservoir

**Table 7: Work Package 9**

Work Package	Description	Envisaged works
9.1	Replace Spur Road Pumps and provide standby generator	<p>Direct replacement of pumps at Spur Road Reservoir pumping to Governor's Lodge and Wilberforce Reservoirs, includes new generator and refurbishing the existing transformer.</p> <p>Spur road pumps and generator:</p> <ul style="list-style-type: none"> <li>Place one new pump on the location of the removed pump. Place a new MCC, Substations &amp; control system.</li> <li>Place the new standby generator.</li> <li>Connect the newly placed materials to make one working system. At this stage the old pump is connected to the existing power supply and the new pump to the generator. Test the new system</li> <li>Remove the old pump including old MCC's.</li> <li>Place pump number 1 &amp; connect the piping &amp; cabling.</li> </ul> <p>Flow metering SPUR road:</p> <ul style="list-style-type: none"> <li>Make chambers for flow metering of two inlet pipes and one outlet pipe.</li> <li>Place level transmitters to monitor levels in the reservoirs.</li> <li>Send the data to other system(s) using a telemetry system.</li> </ul>

Spur Road reservoir is located at 117m above sea level (masl). The pumps (Figure 32) and motors are to be replaced together with the pump control system. In addition, the design shall include for a diesel generator for emergency power supply when the utility power is unavailable. The new pumps will pump water through an existing 300mm diameter rising main pipeline to Governor's Lodge which is located at 238 masl, and onwards via a 200mm diameter rising main existing pipeline to Wilberforce is located at 185masl. There are no works intended to the existing rising mains.

Only one of the two pumps is currently operational and equipment at the site present high levels of surface corrosion. The replacement pumps will be capable of pumping up to 500m<sup>3</sup>/hr.



**Figure 32: Existing Spur Road Pump**



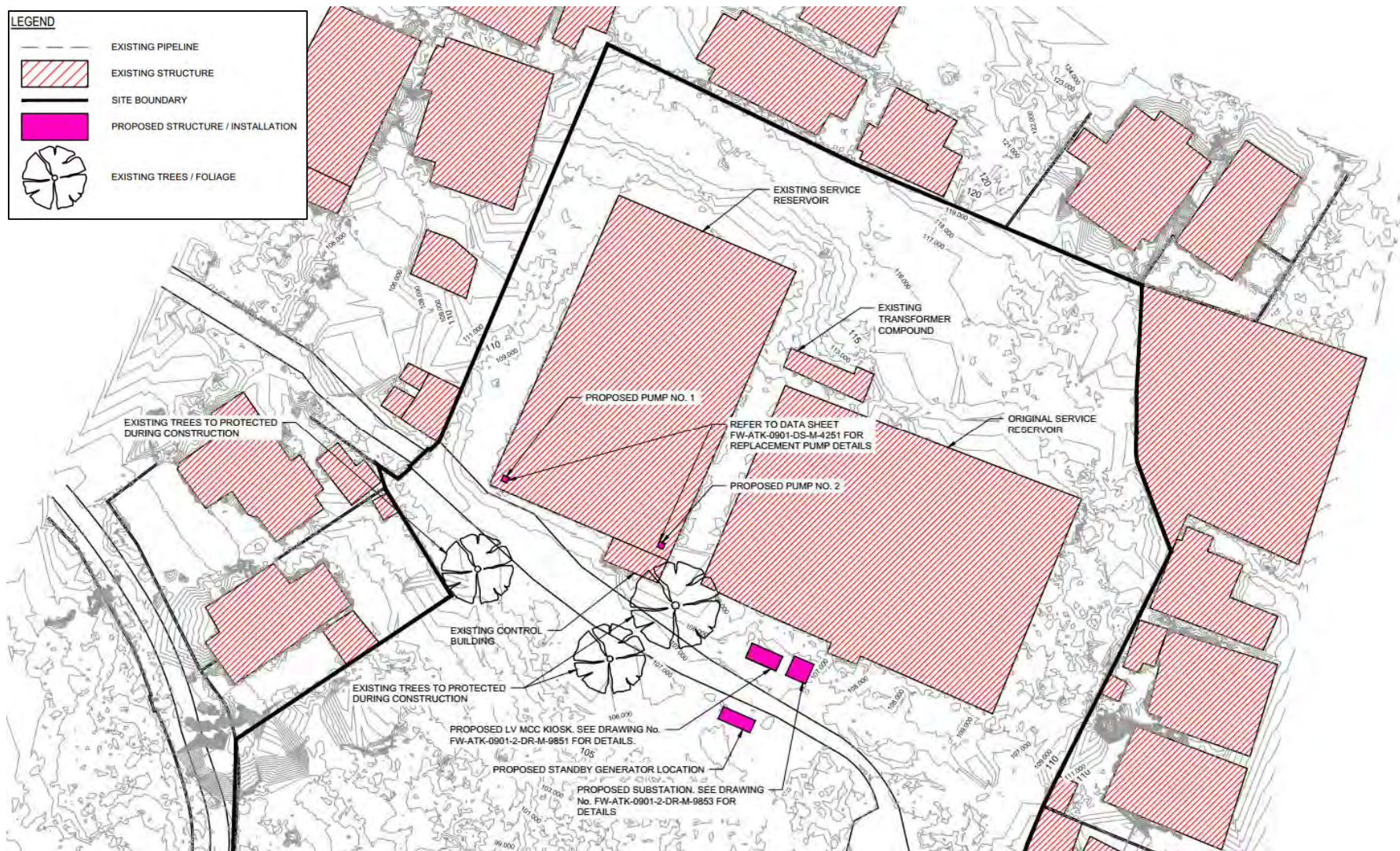


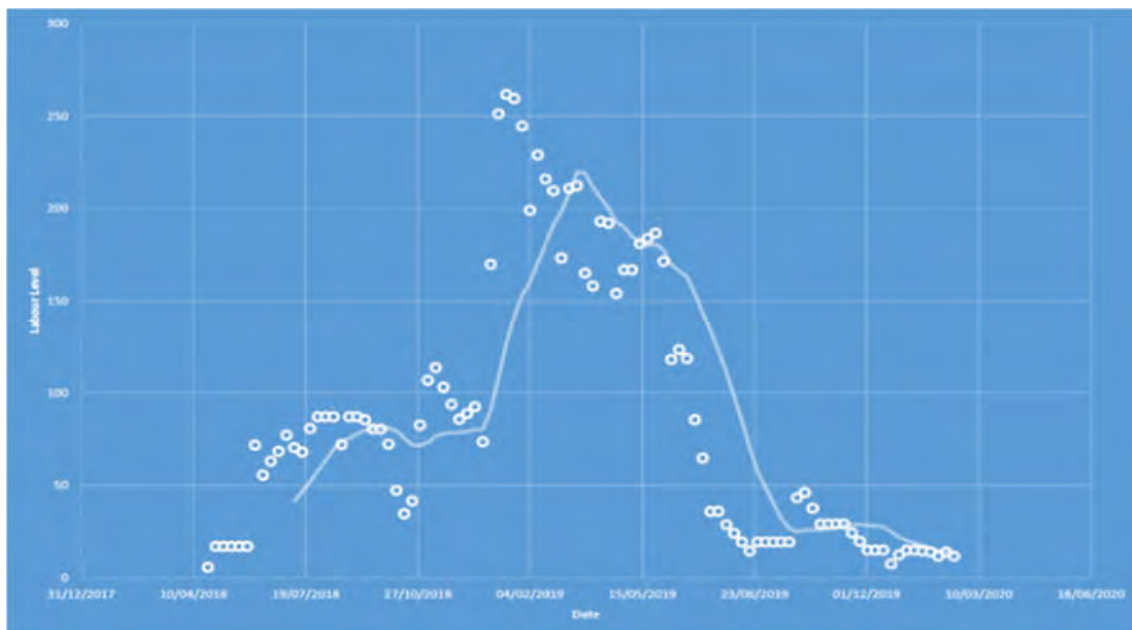
Figure 33: Spur Road Reservoir Site – Proposed Site Layout



Figure 33 shows the proposed site layout. A new motor control station kiosk will be constructed to house a replacement low voltage MCC unit. The old pumps will be removed, and new pumps installed in a revised location. The existing location is to be determined and may include the construction of a new building to house the pumps.

### 3.7 Employment and Labour

The Contractor employs labour through a local labour agency. Supervision, health and safety and controls are provided by Senior Management and experienced foremen from BAM Nuttall. Whilst BAM Nuttall intend to use some subcontractors, the vast majority of labour will be employed directly by BAM Nuttall during the works. The works are anticipated to maximise towards early 2019 and then drop off throughout 2019. At the height of works up to 200 labourers from the local community expect to be employed. The majority of the labour force will be from Sierra Leone.



**Figure 34: Freetown Water Rehabilitation total labour levels**

No child labour or forced labour will be used as part of the Freetown consortium's contractual obligations. This obligation is supported by IMC's (Project Consortium Lead) and BAM's (Contractor) strong policies to prevent child labour, Appendix 4. BAM has also supported and developed the capacity of the local labour agency to ensure enforcement. All employment legislation will be followed.

### 3.8 Duration and Timing

The project commenced in March 2017 with a period of feasibility study and preliminary design. Early construction works are expected to commence in September 2018 with works ramping up with completion of all construction by December 2019.





## Section 4: Assessment of Alternative Project Options

This section presents the results of an organized process that has ensured that reasonable alternative options, of different types, have been considered. Alternative options may include no project alternative (do nothing), location, design and construction methods.

The consideration of alternative options at the design stage, before any commitment to a particular action has been made, has to be integrated in a proactive way in the ESHIA and provides the opportunity to minimize or eliminate the negative environmental and social impacts of the project. Alternative options may be considered at different times during the development of the project in the form of selection or elimination of first technical options and optimization of final engineering designs.

The assessment of alternative options is provided by work package and considers only the works that can have a negative impact.

### 4.1 Work Package 1 Guma Dam and WTP

#### 4.1.1 Do nothing?

Refurbishment in the WTP are necessary to improve the water management of GVWC and the efficient water supply into the network. For instance, WP 1.8 (Install back-wash water recycling system) has a direct impact on the quantity of water supplied by increasing the reliable output of the plant by 2-3Mld. Another example is that the following work packages do improve the quality and reliability of the plant which has a positive impact on the management and performance of the utility.

- 1.4 Repair Leaking Structures
- 1.5 Refurbish filter beds
- 1.6 Rehabilitate electrical and control installations
- 1.7 Install Plant Flow Metering

The rehabilitation of electrical and control installations might have an impact on the habitat of bats who roost in the intake tunnel, however, the project needs to rehabilitate the lighting in the intake tunnel to improve the working conditions of GVWC's operators carrying out their maintenance routine tasks in the tunnel for health and safety reasons.

The alternatives are related to minimising harm to bats and its habitat but may compromise on staff health & safety during construction and operation. This is part of the ESMP and monitoring plan that will be agreed with the contractor and GVWC's employees at the WTPs. Doing no works at the WTPs would have a major negative impact on GVWC's capacity to manage its utility more efficiently and can have an effect on the water supply in Freetown. Not building the temporary laydown area at Mile 13 would also have a negative impact on the programme compared to doing it because it makes more efficient the logistics, delivery of equipment and building materials related to work packages located in the western part of Freetown. The lay down area will be decommissioned after the works and returned to its initial state meaning impact is temporary.

#### 4.1.2 Location

The location of the works at the WTP can't be modified.

The location of the laydown area location has been chosen because it's located within GVWC's registered land and relatively close to the works in the western part of Freetown.



#### **4.1.3 Alternative**

No alternative has been suggested by the design team other than what has been accepted at feasibility stage.

### **4.2 WP3 Rehabilitate the Transmission System**

#### **4.2.1 WP 3.1 Replace above ground section of the transmission main**

##### **Do nothing?**

There is no alternative to replacing a problematic 4.4km section of high pressure 450/550mm dia. old steel main which is prone to bursting and damage. The National Water and Sanitation Policy (2010) aims at improving management and delivery of sustainable water services which is linked to the replacement of problematic parts of the network.

##### **Location**

The alignment has been chosen by the design team to reduce resettlement when possible and comply with SLRAs requirements.

##### **Alternative**

No alternative has been suggested by the design team other than what has been accepted at feasibility stage. The alternative of laying the replacement section in the existing pipeline alignment is not possible as this would result in an unacceptable outage to water supply during construction and commissioning.

##### **Design**

The alignment of the replacement section of the transmission main has been designed to be parallel to the existing section as far as practicable. The replaced section needs to connect into the existing main at both ends, therefore running the replacement section parallel reduces disruption and the land required. As the existing pipe section needs to remain in use until the new section is commissioned it is not possible to lay the replacement section at the same alignment as the existing.

The pipeline has been designed to minimum depths reducing trench widths and construction programme. The pipe route has been adjusted locally to avoid properties especially for the 1<sup>st</sup> 200m where the route was adjusted during detail design to utilise the contractor's laydown area and avoid disrupting the properties adjacent. This further meant that land clearance was minimised in this area.

##### **Construction methods**

There are no alternative construction methods as the ones that will be provided by the contractor.

#### **4.2.2 WP 3.2. Construction of service reservoirs at Marjay Town and Angola**

##### **Do nothing?**

WP 3.2 consists in constructing two steel service reservoirs at Marjay Town and Angola that will assist in controlling supply pressures, providing additional storage to aid the rationing programme along the Peninsular Road.

##### **Location**

The locations of the two service reservoirs cannot be changed as GVWC have purchased the sites and no other suitable sites at the required elevations in the area have been identified.



### Alternative

No alternative has been suggested by the design team other than what has been accepted at feasibility stage. No alternative suitable sites have been identified.

### Design

Inlet and outlet mains for the 2 new reservoirs will be located in the utility right of ways as advised by the SLRA to minimise disruption to landowners.

The 2 reservoir sites have already been purchased by GVWC from the previous landowners and currently both sites only have small temporary structures for the caretakers. The selection of the site is based on areas, i.e. adjacent the proposed network and also elevation so pressures are adequate to serve the network.

The decision to design a reservoir in sectional steel rather than reinforced concrete was based on the following:

- Reduced construction programme, weeks rather than months
- Access to the site is poor and concrete delivery trucks would be unable to access
- Simpler modular construction which will be warranted by the tank supplier
- Cost, much reduced costs

### Construction methods

There are no alternative construction methods as the ones that will be provided by the contractor.

## 4.3 Work package 5. Distribution Improvements

### 4.3.1 WP 5.2 Distribution system extensions

#### Do nothing?

This work package includes new mains extensions in supply areas where spaghetti connections are widespread to improve reliability and reduce losses. A core new network of 35kms of new mains provided and properties bordering this core network to receive new service connection. Also, the decommissioning of significant lengths of spaghetti mains by GVWC will contribute to reducing leakage. Rationalisation and improvement of the network means significantly less network to maintain and repair.

Doing nothing would not reduce the leaks in the networks as it stands nor increase the service supply to areas that receive little water in western and eastern parts of Freetown. The distribution system extension is also linked to the two service reservoirs to be constructed in Marjay town and Angola. The improvement of the network efficiency and water supply improvement is also linked to the national water and sanitation policy 2010 cited earlier.

#### Location

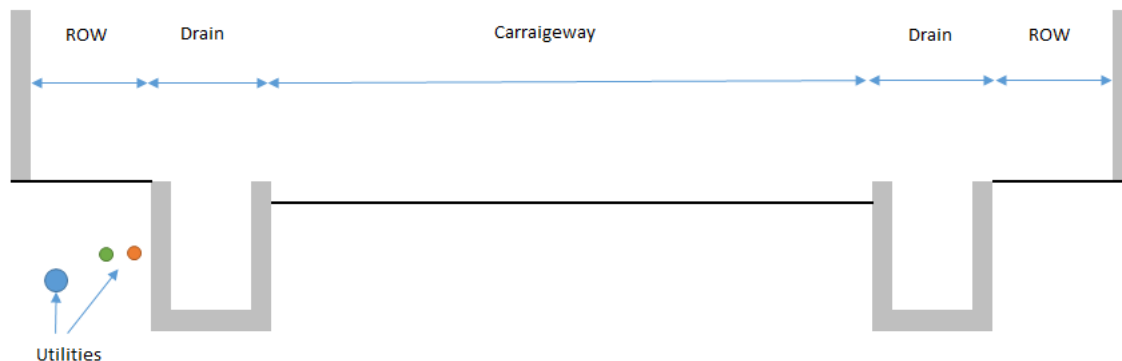
The location of the pipes have been decided after negotiations with SLRA, GVWC and the EPC Programme. These can't be modified and are summarised below.

35km of new mains will be laid as part of WP 5.2, the vast majority of which will be laid in road corridors. The current Freetown road network includes new tarred roads, old deteriorating tarred roads as well as unsurfaced dirt roads. SLRA has plans to eventually upgrade all roads to a new standard design (see Figure 1). The project has grouped roads into 2 categories: i) demarcated with the standard box drain and ii) Right of Way (ROW) SLRA design and roads that have not been demarcated with this design. It





is estimated that as part of WP 5.2 (New Networks in the West), approximately 40% of new watermain will be in demarcated roads and with 60% in non-demarcated roads.



**Figure 35: Standard SLRA Road Design including Drains & Right of Ways (RoWs)**

#### Alternative

No alternative has been suggested by the design team other than what has been accepted at feasibility stage.

#### Design

Conveying water to customers through the “spaghetti” pipe networks connections is an extremely inefficient method of supplying water. Furthermore, the cost of maintaining such a network and tackling leakage on it is very high. It is estimated that for every 1 km of new network main laid in WP 5.2, GVWC can decommission 30km of spaghetti pipe. This results in significantly less pipe to maintain and should significantly reduce leakage losses in the area. Furthermore, the design of the new networks in WP 5.2 has incorporated pressure managed areas, significantly reducing pressures in the area, and saving significant amounts of water as a result.

Pipes will be laid in the RoWs in demarcated roads and within the road corridor in non-demarcated roads. Where there is insufficient working space within the designated RoW, SLRA will enforce the RoW through the demolition of any structures occupying the RoW (in line with the RAP and applicable legislation) or advise of a new alignment if the former is not possible.

Customers directly bordering the new core network will receive a standard service connection. For customers who do not border the new core network, connection manifolds will be located at key locations to allow spaghetti connections to connect to the network. In doing so, significant lengths of spaghetti can be decommissioned.

#### Construction methods

There are no alternative construction methods as the ones that will be provided by the contractor.

### 4.3.2 WP 5.5 Communal waterpoints/kiosks

#### Do nothing?

The water kiosks are meant to be constructed in areas where the network will be limited or areas supplying people unable to afford individual connections. Not building the water kiosks can affect low-income households unable to afford individual connections.



### Alternative

There is no alternative to community water kiosks that would increase improved water supply in areas where the network coverage is limited.

### Location

Locations are based on intensive community engagement where community suggested a shortlist of potential sites and then we narrowed it down based on demand and various other technical criteria.

### Design

The concept design suggests the following features:

- Constructed with low-cost metal panels fabricated off-site; this will allow GVWC to easily set up and, if necessary, dismantle and move a kiosk
- Design is scalable down from a small 4'x4' shop with a 3-10,000m<sup>3</sup> storage tank outside to an 8' x 12' shop with a 10,000m<sup>3</sup> tank inside with the option of additional storage tanks outside
- Dispenser can be a low-tech option with a pipe and a lever valve or a kiosk can have more complex pre-paid options built in.
- Kiosk will have two meters to measure water coming in (this is used to monitor payments to GVWC) and water being sold
- Tank at Ground level on Concrete Plinth.
- Scour pipe to be fitted to clean tank periodically.

### Construction methods

There are no construction methods available.

## 4.3.3 WP 5.9 Rehabilitation of networks from East End Police to Wellington

### Do Nothing?

Due to the failure of the water network to deliver water to the east of Freetown what distribution there has fallen into disrepair.

### Alternative

No alternative has been suggested by the design team for WP 5.9a, b, c and d.

### Location

Location of the pipes can't be changed

### Design

The re-commissioning of the Bulk Transfer System (BTS) is arguably the most crucial element of the overall project as it will once again provide water to the reservoirs in the east and allow significantly greater quantities of water to reach the east of the city. However, in order to then ensure that water can be distributed from the reservoirs to customers without significant leakage issues, key sections of the network in the east need to be rehabilitated. The scope of WP 5.9 includes the rehabilitation of the following key mains:

- 7.7km long 300mm Asbestos Cement (AC) main from Ugun to Wellington (5.9a)
- 2.7km long 150mm Asbestos Cement main in Wellington (5.9b)
- 632m long 100mm Asbestos Cement main at Peacock farm in Wellington (5.9c)
- 302m long 50mm Galvanised Iron pipe on Taylor Street in Wellington (5.9d)



These mains are either in very poor condition, with high leakage rates and burst frequencies or have been shut off completely because they have deteriorated so much. Therefore, in the case of the latter, the replacement of these mains is very important in order to re-establish supplies to areas that have been cut off and do not receive water currently. And in the case of the former, the replacement of the water mains is vital to avoid significant water losses and pipe bursts when supply pressures are increased in the east.

Pipes will be laid in the RoWs in demarcated roads and within the road corridor in non-demarcated roads. Where there is insufficient working space within the designated RoW, SLRA will enforce the RoW through the demolition of any structures occupying the RoW or advise of a new alignment if the former is not possible. This will be in line with the Resettlement Action Plan and applicable legislation and policy.

Customers directly bordering the new core network will receive a standard service connection. For customers who do not border the new core network, connection manifolds will be located at key locations to allow spaghetti connections to connect to the network.

The existing AC water mains will be grouted and abandoned in situ.

#### Construction methods

There are no alternative construction methods as the ones that will be provided by the contractor.

## 4.4 Work Package 6. Orugu sources to Allen Town

### 4.4.1 WP 6.5 Transmission Mains for Orugu Sources

#### Do Nothing?

This work package combined pipeline with the intakes at Mortem and Mongegba to deliver up to 3MI/d each to Allen Town in the rainy season. The work package also provides for simple chlorination facilities at Allen Town.

#### Alternatives

Water resource options appear to be:

- Grafton boreholes (via Grafton Tank and pumps). However, a reliable yield has not been confirmed and it is not known whether these boreholes could provide a sustainable supply.
- The Mongegba stream Intake; reportedly a perennial stream with small existing intake chamber currently used by GVWC to fill tankers. This is however considered too low for the hydraulics to work, then this intake will continue to be used for tanker filling.
- Mortem (Toothik) River – run of river scheme – this would be a new source – considered as a possible dam site under SWSSF but not for run-of-river scheme.
- Diversion of flow from Kongo intake to Allen town; with Tacugama intake upgraded to continue to feed Babadori or vice versa.
- GVWC have suggested re-siting Charlotte Weir further upstream but there is no obvious location. The only ‘good’ quality water will come from streams originating in the Forest area and these are either utilised or listed above.
- Pumping of ‘Guma’ Water from Maxwell Street Reservoir about 5kms.

Any of the above would supply the same quantity of water supplied by Mortem and Mongegba weirs.



### Location

The location of the intake is based on height to ensure Allen Town can be gravity fed and negating any need for pumping.

### Design

Intake location designed based on height, to provide adequate pressure, and suitability of terrain to support the intake structure.

Intake structure is designed to minimise the use of imported materials and will utilise gabions built from locally sourced and processed rock. Concrete Canvas® is proposed for the intake face to minimise the need for large volumes of concrete and the weight of materials which need to be transported to the site.

Pipes in the forested area will be shallow buried to provide long term protection to the pipe. Existing intake pipework has been shown to be vulnerable to fire and impact damage as well as being vulnerable to tapping. Power for chlorination facility will be solar energy

### Construction methods

There are no alternative construction methods as the ones that will be provided by the contractor.

## 4.4.2 WP 6.9 Rehabilitation of Allen Town distribution network

### Do Nothing?

In terms of water supply, Allentown and neighbouring areas in the east contains the worst affected areas of the city. If Allentown WTP receives more water under Work Package 6.5, it makes sense to extend the network to formalise it and rationalise spaghetti pipes in the area.

### Alternatives

No alternative has been suggested by the design team other than what has been accepted at feasibility stage.

### Location

Location of the pipes can't be changed

### Design

Currently Allentown consists of a core network only serving key routes. As a result, a large network of informal spaghetti connections has developed in order to supply customers. With a more reliable supply from Allentown WTP expected with the implementation of WP 6.5, WP 6.9 will extend the formal network and allow the decommissioning of significant lengths of spaghetti mains. It is estimated that for every 1 km of new network main laid in Work Package 6.9, GVWC can decommission up to 30km of spaghetti pipe. This results in significantly less pipe to maintain and should significantly reduce leakage losses in the network.

Furthermore, there is a section of main crossing City Road requiring rehabilitation. Currently the main has been shut off resulting in supply to Calaba Town being severed. By replacing this section across City Road, it will allow supply to Calaba Town be re-established. This will be a significant achievement.

Pipes will be laid in the RoWs in demarcated roads and within the road corridor in non-demarcated roads. Where there is insufficient working space within the designated RoW, SLRA will enforce the RoW through the demolition of any structures occupying the RoW or advise of a new alignment if the former is not possible. This will be in line with the Resettlement Action Plan and applicable legislation and policy.



Customers directly bordering the new core network will receive a standard service connection. For customers who do not border the new core network, connection manifolds will be located at key locations to allow spaghetti connections to connect to the network.

### ***Construction methods***

There are no alternative construction methods as the ones that will be provided by the contractor.



## Section 5: Methodology

### 5.1 Desk Review

The purpose of the review is to obtain an overview of the existing environmental and socio-economic conditions at the Project site, identify gaps and recommend ways of addressing the gaps. Available documentation from various institutions and administration in hard and electronic copies were reviewed and evaluated against this ESHIA Study.

Publicly available document sources include studies, reports, information pertinent to water rehabilitation works in urban and peri-urban areas and Government policies and strategies.

The desk study entailed review of works previously carried out in the Project area and water rehabilitation works in other urban areas. Impact related information reviewed included: articles on the bats, DRR maps from the WASH consortium; stakeholder information from previous studies; information on pipe conditions from SMEC, GVWC data, articles on the water supply, health and safety for pipe laying, Allen town stakeholders, Health and safety document from BAM and other.

Various national legislation in the form of acts, policies and regulations related to the project were also reviewed to understand influence. In additional, some relevant international legislations were also considered.

### 5.2 Field Work

#### 5.2.1 Environmental and Socio-Economic Baseline Surveys

The consultants defined the study area and described the components of the natural and human environment.

This description addressed:

- The state of the physical, biological and socio-economic and cultural environment at the time of carrying out the study;
- Relevant information about changes likely to occur during the project's life span; and
- Relevant information on environmental changes in the absence of the project.

To limit the amount of information to be collected and analysed and to focus on relevant aspects with concrete and realistic proposals the consultants set limits that were based on the maximum possible interaction between the project and the environment, people, and society. The study justified the limits adopted and distinguished between areas of direct impact from those of indirect impact on the natural and human environments.

The site visits were undertaken:

- Scoping phase of the ESHIA study (13th – 20th April 2018)
- Baseline data collected during the ESHIA study period (5th – 21st June 2018)
- Further biodiversity studies (24<sup>th</sup> August 2018)

This offered an opportunity to identify the key stakeholders in the project area to initiate their participation in the ESHIA process at an early stage and confirm relevant baseline environmental and social issues that are likely to be affected by the implementation of the project.



The team of consultants undertook field observations of existing properties along the stretch of the Guma Valley's main transmission lines where works will be carried to identify various social-economic activities that are likely to be impacted by the project activities.

The data obtained from the desk and field studies were analysed and presented in this ESHIA Report.

### **5.2.2 Biodiversity Assessment Methodology**

The methodologies for conducting an EIA on biodiversity for proposed activities at the project sites were not the same and have been chosen for the identification of potential impacts on the socio-economic and biophysical characteristics of the environment. Altogether five taxa captured the interest of this study. These included Mammals (and bats), Reptiles and Amphibians, Avifauna, Fish and plants.

#### **Mammals (Including Bats)**

Reconnaissance survey: whereby team members searched around the work package sites for the occurrence and these were recorded mostly by chance observations or evidential signs (i.e. tracks, trails, scrapes, food remnants, sounds, location (habitat), droppings, footprints etc).

Opportunistic survey: where individuals were recorded immediately upon seeing them in the surveyed area.

Roost inspection: In the case of Bats, capturing using mist nets and identifying them using field guides especially for bats of Sierra Leone.

Interviews: We found this method very helpful such that most of the mammals recorded were confirmed to be present in the work package areas by resident communities and tour guides who have lived in and around those survey areas for most part of their lives.

#### **Reptiles and Amphibians: (Herpetofauna)**

Species diversity survey in which amphibians of the various species were identified and recorded during the field activities.

Time constrained searching techniques involved scanning the terrain and investigating potential hiding places or specific habitats to find and record individuals.

During this amphibian survey, two methods were applied. They included visual and acoustic. This was from the fact that most of the amphibian species are cryptic. Therefore, most herpetologists prefer the visual and acoustic to identify them. Their possible habitats (swamps, marshy areas, stagnant water bodies etc.) were thoroughly searched for amphibians.

#### **Birds**

Visual observation: This included observing birds by walking slowly along tracks and trails and stopping frequently. Attempts were made to cover as much ground and visit as many locations in the habitats as possible in the work package areas of Mile 13, Mongegba and Mortem.





This is known as direct identification method involving:

- sighting and seeing the bird
- observing the overall shape and appearance of the birds
- observing the foraging and social behaviours
- observing the different feather colours

Any species identified using this method were recorded and a species list was later prepared in the data analysis

Opportunistic/systematic survey: In this method the survey team moved in the forests especially at work package areas of Mile 13, Mongegba and Mortem to record any species found in those areas

### **Fish (Mainly Fresh Water Species)**

- On-site identification of fish species using field guide for fresh water species
- Visual observation to record species found

### **Plants (Vegetation)**

This ESHIA study covers floristic survey done on three project areas: Mile 13, Mortem and Mongegba in the Western Area Rural District. This is to provide data base on the plant species present within these project areas that are expected to be affected to some extent during the implementation of the Freetown Water Rehabilitation project. The field assessment conducted here is a prerequisite before the project commences.

### **Methodology of the Floristic Studies**

For this study, plant specimens were recorded and collected during a 4-day observational walk and field inventory, with voucher specimens collected for a large number of plant species. For the current survey, the main method employed was plant inventory in work package areas. Trees and shrubs and other plant species were identified and recorded.

### **Plants Identification**

There are many methods used in plants identification. The mostly considered the colour of the bark of trees, type of leaves, i.e. simple, compound, pinnate, bipinnate, type and colour of flowers, seed type, colour of bark slash (exudates), the liquid that comes out of the bark of the tree when slashed, smell and type of pods, even their shape was also used in the biodiversity assessment.

#### **5.2.3 Social Study Methodology**

The social baseline study involving a review of available data and appropriate literature materials on the project area of influence was followed by a reconnaissance visit in mid-April 2018, followed by field investigations in early June 2018 by various social experts to ascertain ground-truth facts contained in the literature, and to obtain primary data for this report.

The social study was carried out using participatory techniques and aimed at facilitating and enhancing awareness, mutual understanding, trust and capacity building. Information was collected on the following issues:

- Socio-economic and demographic characteristics of project affected communities;



- Formal and informal governing structures;
- General situation of Local infrastructure (electricity, water, transport, housing, health, etc.);
- Community awareness and perception about the project;
- Public perception of project impacts on environment, people and community livelihoods.

Data analysis was carried out for both primary data collected during the focus group meetings and household surveys as well as the secondary data collected by means of a desktop review of existing data sources to gather relevant socio-economic baseline information at a national and local level.

### **Primary Data Collection**

The seven key locations:

- Transmission main: southern section from Mile 13
- Lakka, Angola, Adonkia, Goderich & MMTTC, Marjay Town: distribution mains & transmission main
- Kissy Town – Wellington: transmission mains
- Allen Town & Calaba Town: distribution mains
- Mongegba source: transmission main & water sharing
- Mortem source: transmission main & water sharing
- Mortem & Mongegba - Allen Town WTP: transmission main

This covering various communities where work packages of the project are likely to have the greatest influence on the environment, people and community livelihood activities.

This created the sample frame from which a total of three hundred and eighty (380) randomly selected households were drawn and targeted for questionnaire survey. In a similar approach, focus group discussion meetings were conducted in these seven locations. For each location, three focus group discussion meetings were held: one for community leaders, another for business people and a third for women and children. In some locations, including Southern Section to Mile 13, two Focus Group discussion meetings were held because of the wide coverage of communities within these locations.

### **Administration of Household Questionnaires**

The questionnaire was administered to the head of household, or - in the rare event that the head was absent - their spouses or a responsible member of the household. Inventory checklists and a household questionnaire developed for this survey aided the gathering of relevant data used for analysis. The survey generated information about households' demographic and socio-economic characteristics, general situation of Local infrastructure (electricity, water, transport, housing, health, etc.), Community awareness and perception about the project, Community awareness and perception about the project and Public perception of project impacts on environment, people and community livelihoods. MS Excel was utilized to capture the data and SPSS for analysis. The key findings from the analysis of the data derived from the household survey will be presented in appropriate section of the ESHIA report.

Random sampling techniques were used to select the households interviewed and field enumerators ensured the household interviewed were spread throughout the survey location. The enumerators interviewed the household heads or a responsible person (preferably the household head's spouse).



The questionnaires were collected using Kobo Toolbox<sup>10</sup> across the work package areas, a data collection tool that can allow the enumerators to collect data via the app. This reduces the time and errors associated with paper questionnaires. The enumerators were all trained to use Kobo Toolbox in various sessions, followed by field pre-test. The pre-test served as a breakthrough which helped to identify gaps and other amendments in the questionnaire to be used for the actual data collection.

Using the Kobo Collect, the questionnaires were administered by trained enumerators mainly in Krio local dialect. These interviews lasted for about 25 - 35 minutes per household head and were conducted during the daytime. The enumerators carefully crosschecked responses in order to reduce observational errors arising from the use of this method. At the end of the day, the team met to share their field experiences as well as to identify ways of overcoming potential problems.

#### **5.2.4 Focus Group Discussion**

The focus group meetings primarily involved three major phases: introduction, the main discussion, and closure. During the introduction the facilitator/moderator introduced the focus group coordinators, explained the general purpose of the meeting and its structure. The participants from the various communities were also given the opportunity to introduce themselves for better understanding of the composition of the focus discussion group.

The main discussion focused on the deliberation on a variety of community issues/challenges that are centred on the Freetown Water Rehabilitation Project. The questions in the FGD guide are open ended and during the deliberations, other issues that were worth probing emerged. The questions were made open-ended to simulate individual contribution as well as group discussion. Questions were delivered in a way that did not suggest any answers or create biased responses. During the deliberation session, the question or issue under discussion was posed to the participants and they were given the free will to contribute and give their candid opinion and/or answers. Records of their responses were taken in the form of notes by FGD coordinators from the research team. In addition to note taking, the session was recorded by an electronic audio recorder to ensure that the session was fully covered.

The end phase entailed a wrap-up of the focus group discussion session. This allowed participants to express their final reflections, to clarify some points that needed more explanation and to synthesize the main points deliberated during the discussion phase of the FGD session.

The facilitator ended the focus group session by explaining in more detail the purpose of the survey and the overarching objective of the Rehabilitation of Freetown Water Supply Project.

#### **Number of Participants**

The number of participants involved varied between ten and fifteen, but in most cases, the number of participants was limited to twelve persons. Too large groups may be more challenging to moderate, as they tend to require stricter discussion rules to ensure that the participants speak one at a time and listen to each other, and consequently, more rigorously structured discussions may inhibit the group members to speak freely and spontaneously with each other. On the other hand, too small groups are less likely to generate rich discussions where a wide range of perceptions and experiences are raised and reflected upon.

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<sup>10</sup> Kobo Toolbox, <https://www.kobotoolbox.org/>, is a free questionnaire tool using a mobile phone app (KoboCollect) to collect the data. This means that it is quicker and more accurate than paper questionnaire and has features such as GPS.



## **Group Compatibility**

Group compatibility does not always ensure the open and comfortable environment necessary for a smooth and fruitful focus group. Responses may be greatly affected by differences in background or opinions. Levels of articulation and confidence may vary among the group, resulting in certain members being more vocal and less inhibited than others. This in turn may heighten the insecurities of shy or intimidated participants. Thus, in each of the FGD communities, there were three focus group discussion sessions conducted simultaneously; one was conducted for community leaders, another for women and children, and a third for business people.

## **Moderation of Focus Group Discussions**

The invited participants of each focus group met for approximately 1.5 hours to discuss issues of the project. The role of the moderator was to guide the focus group discussion by asking predetermined questions and to ensure there was a good quality of focus group results that address the purpose of the FGD. The moderator intervened in the process in order to stimulate the discussion. Even though the participants wandered off, the starting point remains determined by the organizers. In this context, the moderator had an important task to ensure that the relevant topics remain the focus of attention in the discussion without hindering participants from articulating their views and concerns.

### **5.2.5 Key informant interviews**

The key informant interviews provide detailed information through two-way communication. The stakeholder mapping and analysis provided the list of key actors to be approached.

The interviews were organised by invitation only through a process involving the ESHIA team and GVWC, so it is easier to tailor the questions and predict the issues to be raised.

The aim of the interview is to identify positive and negative impacts of the EPC project and its corresponding mitigation measures well as understanding the particular needs, interests and influence of each key actors interviewed.

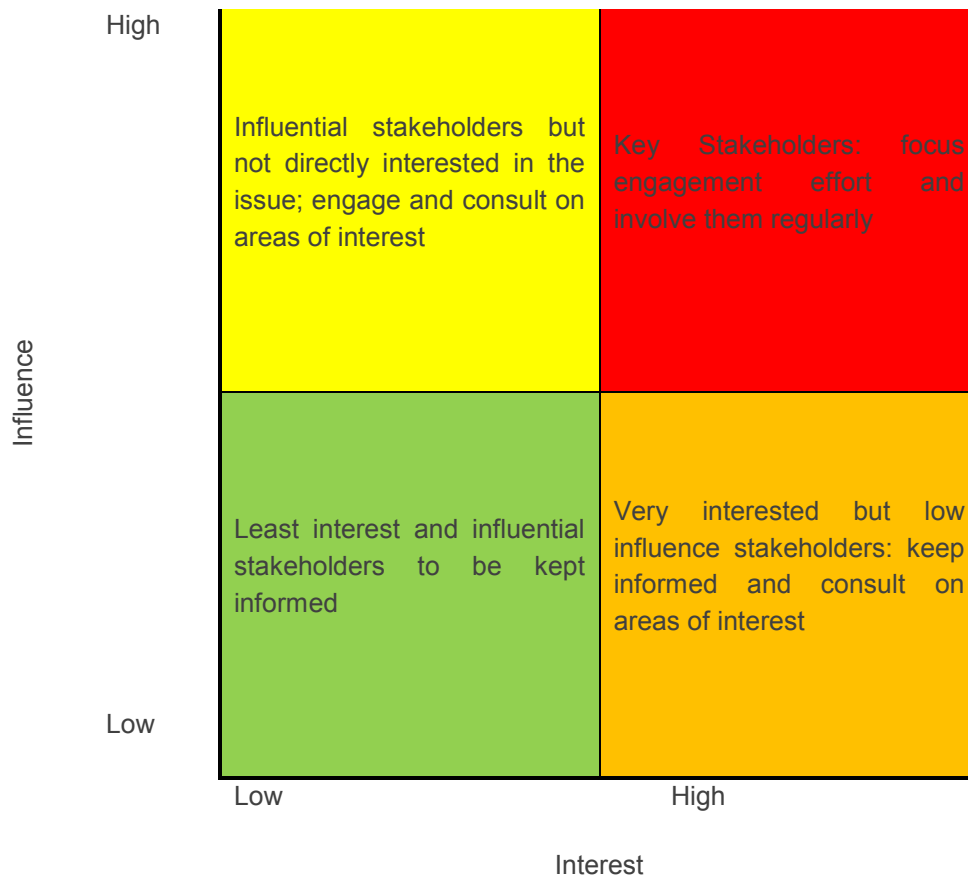
## **5.3 Consultation**

### **5.3.1 Mapping and Identification**

Stakeholder engagement is a vital part of the ESHIA leading into the social baseline, identification of significant impacts and mitigation measures. This can be used to maximize the social benefits of the project and to effectively manage the stakeholders. The first part of this is the identification of the stakeholders, their interest and influence so that the consultation phase will appropriate and effective.

This should identify all people or groups that have an interest in the project, are knowingly affected or unknowingly effected in some capacity. They can include government agencies, community groups, local residents, chiefs and more. A systematic approach was taken which built on existing knowledge from the ESHIA and the desk review information. The list was then cross checked with GVWC.

The resulting output is a list of stakeholders with the category, name, characteristics, interest and influence in a table. Influence is the ability to change and alter the project directly. Whereas interest is where the project falls within stakeholder's area of concern or effecting. Based on the influence and the interest some groups will only be kept informed, others consulted on in areas of interest and the rest regularly involved with communication and discussion. This is decided through the matrix which looks at Interest and influence, below.



**Figure 36: Chart of Influence and Interest**

The different matrix groups are used to by us to establish priority so that we can focus our attention and efforts in contacting and engaging the stakeholders effectively and efficiently. The follow are the different matrix groups in order of priority:

- **Green:** Stakeholders with low interest and low influence will be kept informed through notices. Some of these stakeholders will still be consulted if their experience, knowledge or data is useful to the project. These are stakeholders that are unlikely impacted.
- **Yellow:** These are stakeholders that are influential but have limited interest. The should be notified of the work and as they will likely have valuable information they will be consulted through tailored interviews.
- **Orange:** Stakeholders with high levels of interest but low level of influence. These are often the ones that it directly effects but have limited influence over the final decision. It is very important to engage with this group. Notice of the works, focus group discussions or semi-structured interviews will be undertaken.
- **Red:** High interest and high influence stakeholders that should be regularly consulted through formal interviews, informal interviews and focus group discussions. This group will likely be affected but can also change the outcome by the project.

### 5.3.2 Consultation Process

The Public Consultation process is an on-going process that spans the life of the project. Consultations with the affected local communities and with officials of Government Ministries, Departments, and Agencies local government, civil society and other representatives of the affected population were



undertaken to gain a comprehensive understanding of the types and degrees of adverse effects the project is likely to have on the environment, people and society.

Efforts were made to engage all stakeholder groups separately (considering gender equity, and representatives of vulnerable and marginalized groups), to have a voice in the process. In some cases, where necessary, consultation with certain stakeholder groups was done independently – for instance, women may be discouraged from being vocal participants during mixed gender meetings, so women-only consultations were required for their meaningful participation.

Meaningful two-way engagement was a requirement for building trust; all parties were encouraged to listen to each other and negotiate, rather than simply making demands or be limited to predetermined outcomes.

Final modes of engagement were confirmed after stakeholder identification had been undertaken. This involved semi-structured discussions and focus groups due to time and the number of consultations held across all communities within each work package. Other methods such as questionnaires were used and administered at household levels in the seven locations where FGD meetings were held.

The consultations and engagements:

- Provided clear, accurate, and timely information to stakeholders about the project and its potential impacts.
- Identified stakeholder values, interests, and concerns.
- Explored alternative approaches and discuss mitigation measures.
- Established transparent procedures for carrying out the proposed development.
- Developed practices and procedures that will avoid or reduce negative impacts.
- Enhanced environmental and social soundness and acceptability and be culturally appropriate.

### **Project Area of Influence**

Rehabilitation of Freetown Water Supply project has a wide area of influence covering Greater Freetown (in the Western Area Urban District) and parts of Western Area Rural District where Guma Valley's main Dam and water treatment plant is situated.

For the purpose of this ESHIA studies, public community consultation meetings and household surveys were concentrated in seven key locations, covering various communities where work packages of the project are likely to have the greatest influence on the environment, people and community livelihood activities.

#### **5.3.3 Public Disclosure Plan**

Below the process we followed for the public disclosure, the EPA guidance (2017) is provided in Italics and below is how we are met the process.

*Once the final draft of the EIS is received, EPA-SL will appoint a reviewer or a team of reviewers to assist the Agency in the review of the EIS.*

The ESHIA draft was submitted and reviewed by the EPA.

*Public disclosure will be held on a development when EPA-SL shall direct the proponent to hold a public disclosure relating to the assessment. EPA-SL shall oversee the hearing.*





The public disclosure commenced once notification was received by the EPA. The EPA was informed and invited to the meeting schedule.

*The participants of the public disclosure will include persons from civil society, residents of the community or the area affected by the development and the geographic area where the undertaking is located.*

*The developer shall hold two or more public disclosure meetings in respect of the environmental impact statement (environmental impact assessment document) for public participation in the decision-making process.*

*The developer should choose the date(s) and venue(s) of the public disclosure.*

Four Public Disclosures were undertaken.

Table 8: Public Disclosure Plan

Public Disclosures	Date	Time	Location
West	20 <sup>th</sup> August 2018	10am to 12pm	Angola Town
East- Calaba Town	22 <sup>nd</sup> August 2018	10am to 12pm	Pamuronkoh
Central	23 <sup>rd</sup> August 2018	10am to 12pm	British Council
East- Mongegba	24 <sup>th</sup> August 2018	10am to 12pm	Mongegba

*The developer is responsible for the publication of dates and venues of the public disclosure in at least two national newspapers.*

Information of the Freetown Project and information on the public disclosure was published within the Awoke and Standard Evening. We published adverts on the 6<sup>th</sup> August 2018 and 20<sup>th</sup> August 2018. See Appendix 9.

ESHIA Adverts also went out on Capital radio six times between 6<sup>th</sup> August 2018 and 17<sup>th</sup> August 2018.

*The information received at the disclosure, together with the final report and any recommendations may be made public. Modalities for the conduct of public disclosure are in Appendix.*

The Public Disclosure transcripts are summarised in and attached in the Appendix 11.

*In addition, copies of the EIS shall be made available at appropriate public places. A 21-day public notice of the EIS publication shall be served by EPA-SL for public information and reaction, through newspaper advertisement or postings at appropriate places as part of the review process. EPA-SL will collate public views. The review criteria are annexed (...).*

*The report will be gazetted and circulated to professional organizations for comments.*

*Depending on the location of the project the developer will be required to make announcements over the media in the local languages.*



ESHIA copies were available at IMC offices, GVWC offices and EPA offices. Adverts were in place 2 weeks before the first meeting as required by law and agreed with by EPA.

Advertisements were in English. However, the Mongegba, Calaba Town and West public disclosure meetings were undertaken in Krio.

*Staff of the Agency will also visit the site or operational areas of the project to ascertain the components and content of the EIA Report in the review stage.*

EPA attended all meetings.

## 5.4 Impact Identification and Significance Assessment

The data collection and the establishment of a baseline allows the potential impacts to be assessed to gauge their significance. All types of impacts are considered, building on the findings of the Scoping Study, including Direct, indirect and cumulative impacts.

A multitude of impact characteristics were to be considered, see below, in order to predict the impact and both the quantitative and qualitative data was used. Impacts will be comprehensively described; however, the matrix will be used to compare the findings in a simple and summative way. The matrix assesses the risk prior to measures applied during the ESMP and is used to prioritise what impacts need mitigation and monitoring measures.

### Impact Characterisation

The characteristics selected to assess the impact are magnitude, duration and scale. Each have different categories shown below. When choosing the characteristics and probability it is best to be cautious and score it high if the category is not obvious.

- **Magnitude-** The extend and the severity of how the impact affects the baseline; this considers the sensitivity of the receptor, the receptors resilience and the reversibility.

<b>Major</b>	Impacts that cause a noticeable negative and severe change on a receptor. This can often mean destruction of the 'receptor', large amount of change on an un-resilient receptor.	10
<b>Moderate</b>	Moderate impacts will still cause a noticeable and severe change however it is likely that the receptor is more resilient.	6
<b>Minor</b>	Minor impacts will still cause a noticeable change however it likely be less severe or the receptor resilient to this change.	4
<b>Negligible</b>	The changes to the baseline will be minimal; the receptors are resilient.	2
<b>Positive</b>	This is where the impact was a beneficial effect on the environmental or socio-economic baseline	-3

- **Duration-** The length of time of which the impact will affect the receptor. This is what would occur without mitigation.



<b>Permanent</b>	This is an impact that is irreversible.	5
<b>Long term</b>	This impact will affect the receptor for over 10 years but will eventually return to baseline conditions.	4
<b>Medium term</b>	Impacts that take between 5 and 10 years to return to the previous/baseline conditions.	3
<b>Short term</b>	Short term impacts will take between 1 and 5 years to return to near baseline conditions	2
<b>Temporary</b>	This is an impact that will only affect the receptor up to a year before returning to a similar level as the baseline.	1

- **Scale-** This is the size of the impact and proportional effects on the receptor.

<b>International</b>	If the project impacts an aspect to the point that it effects or alter the global status, then this is classed as international. For example, if the project destroys the habitat of an endemic species causing a significant reduction of the overall global population of that species.	5
<b>National</b>	This is where the project effected Sierra Leone as a whole. If it is affecting a high proportion of the Sierra Leone baseline, then it will be classed as national.	4
<b>Regional</b>	If the project only effects the whole of the Western Area or a similar sized area, then the impact is regional.	3
<b>Local</b>	This impact only effects surrounding area so at district or ward level.	2
<b>Site Only</b>	The impacts are confided to the site and areas of work.	1

Note: This does not mean that existing global issues, such as climate change, are an international impact as its to do with how this impact affects the global situation.

### Probability

This is the likelihood of the impact occurring. Currently, until works are being undertaken, all of the impacts identified are risks. These have different probability of occurring and depends on the site, the receptor, the times and the works.

<b>Definite/ Unknown</b>	If the impact will occur during construction, it is definite. However, if there is no certainty on how likely it is that an impact will occur then, to be cautious, it will be classed as unknown and the same score is given to definite impacts.	5
<b>High Probability</b>	These are impacts that will very likely occur.	4



<b>Medium Probability</b>	Medium probability is where there is the possibility of the impact occurring.	3
<b>Low Probability</b>	This impact may or may not occur. It is not improbable, but it is unlikely.	2
<b>Improbable</b>	These are impact that are not likely to occur. There is a strong confidence that these impacts will only be a risk.	1

## Significance

The magnitude, duration, scale and probability of the impacts determine the significance of the effect. In calculating the significance, you can more easily quantify and compare the levels of impact. This highlights what level of mitigation and monitoring is needed.

To calculate the significance the magnitude, duration and scale are added up to give the severity of the impact. This is then multiplied by the probability,

Figure 37.

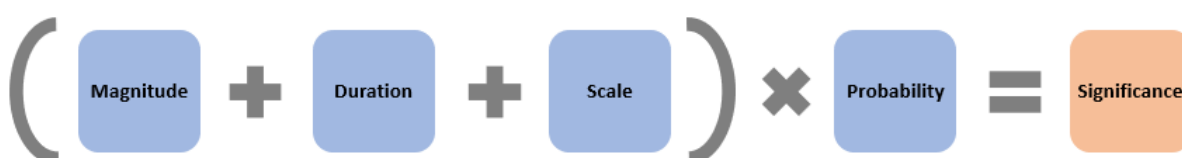


Figure 37: Significance Calculation<sup>11</sup>

The significance scoring is between -75 to 100 and used to categorise the impacts into significance ratings. This is also used to prioritise which impacts will be mitigated. Table 9 shows the significance descriptions, scoring and ratings.

Table 9: Significance Rating

Significance Rating	Description of Significance	Significance Score
<b>Major Negative Impact</b>	Severe (Major Magnitude), long term or permanent effect, that have an unacceptable risk of causing impacts on the environmental and/or socio-economic baseline. This can on a medium to large scale and are potentially irreversible. <b>Priority for mitigation and monitoring measures.</b>	Over 50
<b>Moderate Negative Impact</b>	Moderately severe effect on the environmental or socio-economic baseline. The effects are mostly moderate in the magnitude and unlikely to be on a permanent or larger scale. <b>Mitigation and Monitoring Measures should be covered within the ESMP.</b>	30 to 50

<sup>11</sup> • World Business Council for Sustainable Development (2016) Guidelines for Environmental and Social Impact Assessment. Cement Sustainability Initiative.  
<https://www.wbcsdcement.org/pdf/Guidelines%20for%20Environmental%20&%20Social%20Impact%20Assessment.pdf>



<b>Minor Negative Impact</b>	<p>Likely to only be on a minor magnitude. If there is any certainty of the impact occurring, then it won't be on an international or permanent nature. Very likely to be reversible.</p> <p><b>Mitigation Measures should be considered where available within the ESMP.</b></p>	15 to 30
<b>Negligible Impact</b>	<p>Minimal impacts on the environmental or socio-economic baselines. Reversible impacts.</p> <p>No mitigation measures are required however if there is a potential to create a positive impact then this will be added into the ESMP.</p> <p>Monitoring measure will be included if there is a risk that it could turn into a minor negative impact.</p> <p><b>Mitigation and Monitoring Measures are unlikely to be needed within the ESMP.</b></p>	0 to 15
<b>Positive Impact</b>	<p>Positive impacts on the environmental and socio-economic baselines.</p> <p>This don't need to be mitigated but where it is beneficial it will be monitored.</p> <p><b>Monitoring Measures should be undertaken within the ESMP.</b></p>	Under 0

## 5.5 Limitations and Assumption

### 5.5.1 Assumptions

- The ESHIA consultants assumed that all relevant and requested ESHIA data and information provided by GVWC, IMC worldwide, contractors and other implementing partners are reasonably accurate, reliable and applicable to the ESHIA study of this project.
- The consultants made effort to take an evidence-based approach in the compilation of this ESHIA report by seeking quality data and information from other sources at a level of detail that is adequate to conduct the ESHIA study. Hence, it is assumed that the study results and conclusions presented in this ESHIA report are qualified and accurate for the project.
- Most of the primary socio-economic data was obtained during the baseline survey through questionnaires, key informant interviews and focus group discussions. Stakeholder perceptions and actions are difficult captured and predicated results. Therefore, any changes may adversely affect any recommendations, opinions or findings.

### 5.5.2 Limitations

- The Allen Town and Calaba Town FGD did not have a full representation of the communities involved. It will be ensured that full representation occurs within the public disclosure.
- Due to the change of government, it was a challenge to engage a number of senior government representatives as they had only recently been appointed (or this process was still ongoing). Therefore, to date only 9 out of the 12 intended interviews have been conducted while the



remaining ones are still being scheduled. The remaining interviews will be completed as part of Phase 3 of the ESHIA and be incorporated in to the final report;

- There is no real benefit in undertaking water sampling; based on the activities involved qualitative data based on photographic and expert opinions will suffice.
- The detailed engineering designs are not available until September 2018 and the RAP will not be finalised. This therefore limits are understanding of the socio-economic mitigations.





## Section 6: Baseline Conditions

The baseline of the ESHIA is the actual pre-construction status without project. It covers socio-economics, physical, biological and human environment. Understanding the baseline is important to evaluate the significance of any project-induced impacts. The baseline also provides a way to monitor current impacts, the effectiveness of the mitigation measures suggested and management measures along with demonstrating compliance.

The main scope of this section is to give an overview the characteristics of the different environmental, social and health components present in the rehabilitation of Freetown Water Supply Project. The following table shows the baseline data and desk review used for the work packages included in the ESHIA study.

**Table 10: Baseline Data**

Baseline data & desk review	WP1	WP3	WP5	WP6	WP9
EPC Feasibility Study (2017)					
Strategic Water Supply and Sanitation Framework (2008)					
Bat Survey (2017)					
Biodiversity Assessment (2018)					
Scour Tunnel Weir V-Notch calculation methodology and results (BAM, 2018)					
HVL valve assessment and completion report (2017 & 2018)					
EPC Screening and Scoping report (2017 & 2018)					
EPC Satellite and drone imagery (2018)					
Mott McDonald RAP preliminary report (2018)					
Focus group discussions (2018)					
WASH Data (Ministry of Water Resource Sierra Leone, 2017)					
Key informant interviews (2018)					
Work Package 5.2 (& 3.2 Mains) – ATKINS Modelling Design Report (2018)					
Socio-Economic Survey (2018)					



## 2015 Census Thematic Reports (2017)

## Draft Data from the Prefeasibility and Feasibility of Landfill Project (2018)

### 6.1 General baseline data

The following baseline documents cover different work packages that are summarised in this sub-section.

#### 6.1.1 Screening and scoping report

The specific objectives of the scoping report were to capture the essential environmental, social and health characteristics of the site areas and surrounding communities, to describe the potential engineering works and to provide an objective assessment of the possible adverse and beneficial impacts that would stem from the development of the project components. The scoping report explored the scope for avoiding, mitigating, or compensating for adverse effects and enhancing the beneficial aspects of the overall project. It therefore provided baseline information that have been utilised during the ESHIA study.

#### 6.1.2 RAP midterm report

The Resettlement Action Plan (RAP) services midterm report produced by Mott MacDonald in July 2018 is a useful baseline document to assess the current situation with regards to the risk of resettlement and compensation within WP 3.1, 3.2, 5.2, 6.5 and 6.9.

These WPs are primarily rehabilitations and extensions of existing water supply systems (pipe systems and tank construction) and therefore these packages are the focus for the RAP Services. Table 11 below indicates the WPs that will or may result in PAPs.

Nr	Work Item (as described by EPC)*	Stage 4 Start**	Stage 4 End**
3.1	Juba Bridge and 3 no. Mile 13 to Hamilton Bridge offtakes form existing pipeline	15/6/2018	19/3/2019
3.2	Construct service reservoirs at Marjay Town and Angola	17/10/18	9/3/2019
5.2	New distribution networks – Marjay & Angola WSZs	28/8/2017	14/12/2019
6.5	Transmission Mains for Orugu Sources	28/8/2017	22/10/2019
6.9b	Rehabilitation of Allen Town distribution network – Calaba Town 8" Rhab	1/10/2018	3/6/2019

**Table 11: Work packages that will or may result in PAPs (Mott MacDonald, 2018)**

The Resettlement Action Plan was not finalised at the time of producing the draft ESHIA because details designs were not yet available. Particularly, the extent of the pipe systems to be installed (e.g. pipe lengths) and for most systems where exactly these will be installed (e.g. left or right side of a road, and where precisely; start/end nodes of pipe lengths)<sup>12</sup>.

It is important to mention that the final decision from SLRA about where to position pipes on the roads to be affected can have a different impact on resettlement.

<sup>12</sup> Mott MacDonald (2018) Mott MacDonald Rehabilitation of Freetown Water Supply, Sierra Leone / RAP Services – Mid Term Report



The following text is adapted from the RAP Midterm report (MM, 2018)

To further clarify the pipe positioning along roads the EPC project outlines the following three scenarios for pipe laying:

- Scenario 1 – Demarcated Roads where the Utility Right of Way (ROW) is  $\leq 1\text{m}$
- Scenario 2 – Demarcated Roads where the distance between the outer edge of the road drain and the nearest discernible property boundary is greater than 1m
- Scenario 3 – Non-Demarcated Roads

Scenario 1 is showed in Figure 38 below.

To sum up, depending on the road classification (demarcated/non-demarcated), only the following two alternatives to install pipes will be available<sup>13,14</sup>.

In Non-Demarcated Roads the pipes, as per DFID instruction of 5 June 2018, will be laid 1500 mm offset from the outermost of the road towards the inside of the road;

In Demarcated Roads, the pipes will be laid within a 1m-wide utilities corridor, immediately beside and outside of the drain.

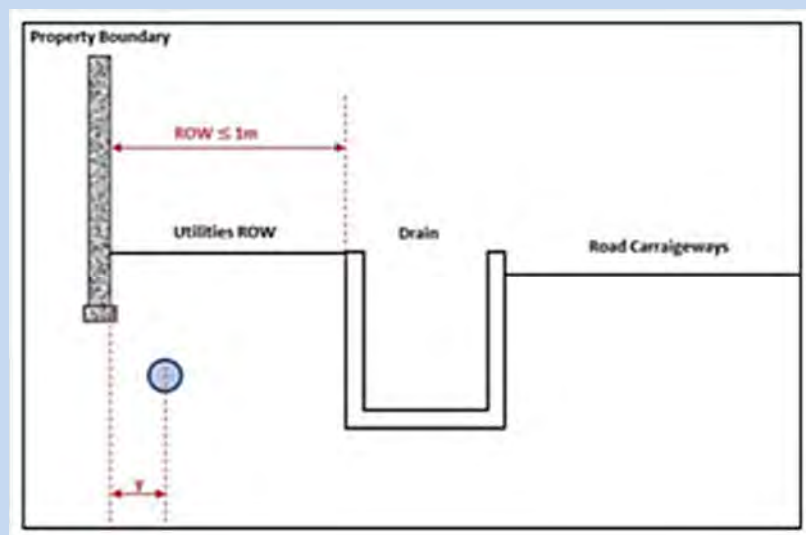


Figure 38: Scenario 1: lateral placement of pipe in RoW  $\leq 1\text{m}$  (EPC, 2018)

In case SLRA grants permission to the EPC to lay pipes 1500 mm within (inside the outer edge of) the RoW, being the responsibility of the GVWC, then from a RAP Services point of view there will be no PAPs associated with the project works along Non-Demarcated Roads.

### 6.1.3 Sierra Leone WASH Data Portal

The WASH Data provided by the Sierra Leone WASH Data Portal has been used as general baseline data to assess the situation in Freetown around water availability, water point management, impact of

<sup>13</sup> EPC (2017) Report on Discussions with SLRA September 2017

<sup>14</sup> Mott MacDonald (2018) Mott MacDonald Rehabilitation of Freetown Water Supply, Sierra Leone / RAP Services – Mid Term Report



seasonality in water access, waterborne infectious diseases, water point functionality and water point source type among other criteria. This information can also allow comparison data for monitoring purposes after the rehabilitation works will be carried out.

Chiefdom	Section	Community Name	Water point Name	Is water available throughout the year?
East III	Mayenkinah	Mayenkinah Freetown	19 Mayenkinah Road water point	Always water
East III	Pamuronko	Calaba town	74 sanders st water point	Seasonal
East III	Thunderhill	Thunder Hill	Methodist Boys' High School waterpoint	Always water
East III	Grass Field	power magazine	tap	Dry always / Never water
East III	Kissy Bye Pass(Term)	kassel farm	tap	Dry always / Never water
East III	Mayenkinah	Calaba town	33F Sanko Lane water point	Always water
East III	Kissy Mess Mess	looking town	tap	Dry always / Never water
East III	Industrial Estate	consider lane	2f consider lane	Seasonal
East III	Allen Town II	Kola tree	34 Sesay lane water point	Seasonal
East III	Kissy Mess Mess	thunder hill	upper thunder hill water point	Seasonal

Figure 39: Western Urban District Water Point Availability example (WASH Data portal, 2018)<sup>15</sup>

#### 6.1.4 Atkins modelling report

The Atkins modelling design report produced in December 2017 aimed at assessing whether existing watermain can be incorporated into the proposed core network, the pipe sizing for new core mains as well as the boundaries of the pressure zones, locations of key PRVs and tentative Fixed Outlet (FO) pressure settings. In the absence of any GVWC customer database on GIS or geo-directory of properties, demands were developed from first principals<sup>16</sup>.

The modelling report is relevant for the ESHIA particularly on the assessment of water demand in the areas covered by WP 3.2 Service reservoirs in Angola and Marjay town and 5.2 New distribution networks. The modelling report used 2015 census data to establish the water demands in the above mention part of the network.

Based on the 2015 Census populations in each Section as well as the buildings count for each Section, an occupancy rate per “building” was established.

Table 12: Occupancy Rates per “building” for each of the electoral Sections

	Pop from 2015 Census [A]	No. of HHs from 2015 Census [B]	“Buildings” Count [C]	2015 Occupancy Rate per “Building” [=A/C]
Gbendembu	28,236	4,497	3,992	7.07
Goderich-Adonkia/ Milton Margai	27,645	5,253	4,120	6.71
Goderich-Funkia	12,205	2,205	1,276	9.57
Hamilton	15,888	1,796	3,733	4.26
	<b>83,974</b>	<b>13,751</b>	<b>13,121</b>	<b>6.40</b>

The table below shows actual population figures as well as projected 2030 figures that were developed for use in the model.

<sup>15</sup> WASH Portal can be found via <https://washdata-sl.org/>

<sup>16</sup> Atkins (2018) Work Package 5.2 (& 3.2 Mains) - Modelling Design Report DFID/GVWC



Table 13: Population figures from the censuses and projected figures for 2030, Atkins (2018)

Year	Sierra Leone		York Rural		York Rural – Supply Area Only	
	Population	Average Annual Growth Rate	Population	Average Annual Growth Rate	Population	Average Annual Growth Rate
2004	4,976,871		63,537			
2015	7,092,113	3.3%	129,581	6.7%	77,726	
2030	9,720,000 <sup>1</sup>	2.1%	245,213	4.3%	107,285	2.2%

#### 6.1.5 Data from the Freetown Pre-Feasibility and Feasibility of landfill, Oxfam funded project

For the waste project, also being undertaken by IMC, population projections have been calculated for each ward building on the Ward Boundary Delimitation Report 2017<sup>17</sup>, 2015 Census Reports and Freetown Structure Plan 2014<sup>18</sup>.

This also gives another look at the different population projections. The table below has extracted the population for each ward where the works are going to be undertaken. This covers other areas not shown in the modelling report but doesn't narrow down onto the potentially affected populations.

<sup>17</sup> National Electoral Commission (2017) Ward Boundary Delimitation Report. <http://necsl.org/PDF/Documents/BD-Ward%20Description%20and%20Maps.pdf>

<sup>18</sup> Kamara, S.M. (2014) Freetown Structure Plan. Produced for the EU Support Project to Freetown City Council and Urban Planning Authorities Project. <https://www.theigc.org/wp-content/uploads/2014/08/Samuel-Kamara-Presentation-Delivered-by-Horatio-Gorvie.pdf>





	Mountain Rural		Waterloo		York					East 3								West 3		
	Barthurst	Regent	Jui-Grafton 6-10,16-22,29 -32	Jui-Grafton 7,8	Gbendembu and Adonkia	Gbendembu	Hamilton	Adonkia, Milton to Hamilton	Goderich Adonkia/ Milton Margai	Allen Town 2	Allen Town 1	Mayenkinah	Parmuronko	Robis	Industrial Estate	Congo Water 2	Congo Water 1	Old Wharf	Hill Station	Total
2017	3111	8161	21187	10525	21212	20409	4743	18394	19216	26657	17767	22066	20759	20896	24664	24147	19824	10646	25809	340193
2018	3383	8874	22803	11328	23375	22490	5227	20270	21176	27985	18652	23165	21793	21937	25893	25350	20812	11176	26665	362353
2019	3661	9604	24423	12133	25638	24667	5733	22232	23225	29367	19573	24309	22869	23020	27171	26602	21839	11728	27536	385331
2020	3956	10378	26118	12975	28076	27014	6278	24346	25434	30799	20528	25495	23985	24143	28497	27899	22905	12300	28421	409547
2021	4215	11057	27537	13679	30324	29176	6780	26295	27470	32359	21567	26786	25199	25365	29939	29312	24064	12923	29386	433435
2022	4487	11772	29009	14411	32724	31485	7317	28377	29645	33976	22645	28125	26459	26633	31436	30777	25267	13569	30366	458480
2023	4801	12594	30711	15256	35487	34143	7935	30772	32148	35599	23727	29468	27722	27905	32937	32247	26474	14217	31310	485452
2024	5131	13460	32481	16135	38445	36989	8596	33337	34827	37280	24847	30860	29032	29223	34493	33770	27724	14889	32268	513789
2025	5462	14328	34213	16996	41483	39913	9276	35972	37580	39040	26020	32316	30402	30603	36121	35364	29033	15591	33254	542967
2026	5810	15240	36008	17888	44727	43034	10001	38785	40519	40864	27236	33826	31823	32033	37809	37016	30389	16320	34254	573581
2027	6201	16266	38029	18892	48388	46557	10820	41960	43835	42659	28433	35312	33221	33440	39470	38643	31725	17037	35190	606076
2028	6710	17603	40733	20235	53073	51064	11867	46022	48079	44528	29678	36860	34676	34905	41199	40336	33114	17783	36146	644612
2029	7155	18769	42976	21349	57361	55190	12826	49741	51964	46640	31086	38607	36321	36560	43153	42248	34685	18627	37259	682516
2030	7622	19996	45304	22506	61944	59599	13851	53715	56115	48839	32552	40428	38033	38284	45188	44241	36320	19505	38397	722438



### 6.1.6 Census

The census thematic reports<sup>19</sup> can provide further dissemination of the population data.

**Gender Balance:** Within the western area there is a 50:50 split between the two genders (gender ratio is 99.9 Males to every 100 Females).

**Heads of Households:** 72% of the heads of households are male; 68.7% have had some form of education and 19% with higher education (university or vocation training after secondary school). For female heads of households only 48.7% have had some form of education with 10.4% going on to higher education.

**Education:** 14% of males and 31.2% of females are illiterate. Females, particularly older women, have had little or no education; however recent generations have seen a more balanced access to education.

**Religion:** In the western area, 30.1% are Christian and 69.1% are Islamic.

**Tribe:** The top five tribes in the Western Area are Tenne 40.3%, Mende 14.1%, Limba 13.2%, Fullah 6.9% and Krio 5.4%. Non-nationals make up 1.2% of the western area population.

**Employment:** Unemployment is pretty balanced across both genders. However, there is a big difference in which sectors males and females work in. Women are much more likely to work in the service sector, shops or petty trading whereas men are more likely to be in construction (tradesmen), professional and technical roles. The male dominated sectors typically have the higher wages. In the western area 52% of children (10 to 15 years) undertake paid or unpaid work; only 43% combine this with school work.

**Poverty:** Freetown has the lowest prevalence of poverty, at 35%, in Sierra Leone; the Western Rural Area has a higher prevalence of 51% but is still under the country's average poverty rate. Poverty prevalence is falling, and the poverty levels are similar for male and female heads of households.

**Disability:** 12.8% of the population in Freetown is disabled and normally experience a higher level of unemployment and are less likely to have attended school.

**Agriculture:** 4% in Western Urban Area and 29% in Western Rural Area are agricultural households. Agriculture, in this region, is normally always for profit and is normally a mixture of crops, animals and/or fishing in the Western Rural Area and animals and fishing in Freetown.

**Drinking Water Sources:** The census looked into drinking water sources. Just over 60% of people got their water from piped water (piped into theirs or their neighbours' compound) or public taps within Freetown. A further 15% get their water from protected wells and over 5% from sachets or bottles. Only 2% get their drinking water from streams.

### 6.1.7 Socio-economic survey

The socio-economic study includes results from respondents living in the vicinity of areas affected by the rehabilitation and construction works, therefore, covering needs and concerns of these

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<sup>19</sup> Thematic Reports- <https://www.statistics.sl/index.php/census/census-2015.html> .Full References are in the reference section



affected people. These concerns have been useful to assess the positive and negative social impacts of the project for each work package as well as identifying what are the current situation in terms of supply, availability and quality of the water supply services.

#### **6.1.8 Key informant interviews**

The key informant interviews cover all work packages included in the ESHIA. The minutes taken from these meetings with high-level public officials as well as other relevant stakeholders are a useful baseline data to assess the current situation before starting the construction phase. Also, as with all other baseline information included in this study, it will contribute to generate mitigation measures collaboratively and to support future monitoring.

#### **6.1.9 Biodiversity assessment**

The biodiversity assessment also provides baseline data on five taxa in the area affected by the works around the weir site and on the pipeline route from the weirs to Reagent Road.

The biodiversity surveys related to WP6 were carried out at Mongegba and Mortem. The results are summarised below, and the full assessment be found in Appendix 3.



**Table 14: Summary of the biodiversity assessment**

<b>Work Package 1: GVWC's Water Treatment Plant</b>				
<b>Mammals</b>	<b>Reptiles &amp; amphibians</b>	<b>Avifauna</b>	<b>Fish</b>	<b>Plants &amp; trees</b>
Similar to Mongegba, 13 species altogether were recorded as present among which 2 are listed as vulnerable and two others as endangered, all other mammal species at this site have been listed as least concern	Altogether 4 species of reptiles and 7 species of amphibians were recorded at the treatment works wherein two species of amphibians have been list as near threatened	A total of 69 species were recorded at this site among which 2 of these have listed as near threatened and 2 as vulnerable	No fish was recorded at the treatment works	83 tree species were recorded, and 21 plant species were also recorded alongside among which 7 of the tree species have been listed as vulnerable and 1 listed as near threatened
<b>Remarks/ Recommendations/Mitigation measures:</b>				
<p>Care must be taken to protect these animals from physical damage during rehabilitation.</p> <p>Care must also be taken to protect their hiding/dwelling places (habitats) during the rehabilitation</p> <p>Leave the rest of the vegetation cover to serve as alternative habitat for these species</p> <p>In the case of bats in the tunnel the assessment</p>	<p>Maintain water in the tunnel for the amphibian species to survive during rehabilitation</p> <p>In all cases the rehabilitation work should not be extended for longer periods so that the impact on the threatened species can be temporal</p>	<p>Maintain the forest cover for the high forest dependent species of birds</p> <p>Reduce the number of trees to be chopped around the rehabilitation areas at this site as these be habitats for the birds</p>	<p>No fish was present at the treatment works</p>	<p>The chopping up of trees should be restricted to the rehabilitation areas of the treatment works and should include a small of trees to reduce the loss of vegetation cover</p> <p>Maintain valuable tree species especially those that have been listed as vulnerable and near threatened</p>



<p>carried out in August 2017 highlighted the following mitigations measures:</p> <p>1 - Carrying out the works where the bat population is at its lowest which is during the rainy season</p> <p>2- Reduction of lights during the works preventing any unnecessary use of lights when possible</p> <p>3- Considering working at night</p> <p>4- Besides assessing potential fluctuations of the bat population and, if appropriate, adapting mitigation measures during the project, a monitoring plan should be put in place to observe the colony after the construction work and evaluate success of the mitigation measures. Colony counts, assessment of species composition, and activity monitoring would</p>				
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<p>constitute suitable methods to this end.</p> <p>An alternative would also be to find a suitable roosting site where bats could relocate to. It should be located in the vicinity of the intake tower and comply with similar conditions (i.e. temperature and humidity). To this end, an experienced bat specialist could capture the bats and take them to the new site. This does not mean that the bat colony will settle in the new location.</p>				
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Work Package 1: Laydown Area at Mile 13				
Mammals	Reptiles & amphibians	Avifauna	Fish	Plants & trees
There has been some evidence that bats have been present in some of the mature trees in the area.	No herpetofauna, were observed.	No birds were observed.	No fish was recorded at the treatment works	There are 21 species of trees within the perimeter and a further 6 species that are of economic value. In particularly the Magnefera indica (Mango) trees within the compound.





				There were 13 species of non-tree vegetation.
<b>Remarks/ Recommendations/Mitigation measures:</b>				
Protect the matures tree on sire.	Protect the nearby stream from pollution.	Protect the matures tree on sire.		All economic trees identified within the perimeter of the lay-down area should be protected as these are not only useful ecologically but also serve as source of income to the resident communities

<b>Mongegba site (WP6.5 Orugu sources to Allen Town)</b>				
<b>Mammals</b>	<b>Reptiles &amp; amphibians</b>	<b>Avifauna</b>	<b>Fish</b>	<b>Plants &amp; trees</b>
Altogether 13 species were recorded among which 2 have been listed as vulnerable and two others as endangered, all others at this site have been listed as least concern (see Appendix 3)	Three species of reptiles and eight species of amphibians were recorded altogether among which two of the amphibian species have been listed as near threatened (see table). All other species of both the reptiles and mammals have listed as least concern	86 individuals belonging to 31 species altogether were recorded in the survey, but none was identified to be of conservation concern	No identifiable species were recorded here during the study although there were fingerlings of Tilapia fish in stagnant pools of the stream which suggest that this species can be found here	81 tree species and 21 plant species were recorded altogether among which 7 of the tree species have been listed as vulnerable and one as near threatened by IUCN (see table)
<b>Mongegba site: Remarks/ Recommendations/Mitigation measures</b>				



<p>Ensure the protection of these animals when they come out from their places when the work is in progress since the quest for bush meat is high among the locals</p>	<p>Reptiles and amphibians differ in their habitat preferences. Thus, amphibians need water for breeding and other activities so leaving water channels and maintaining flow quantity of approximately (construction engineers to suggest) downstream during work will reduce the impact especially if work requires draining all available water.</p> <p>Amphibians like hiding under leaf litters thus care must be taken to protect them from physical damage if they are detected</p> <p>Care must also be taken to avoid snakes and other reptiles during work if they are detected</p> <p>Impact on these animals is minimal/temporal if the work is not extended for longer duration</p>	<p>The forest cover around the work site should be maintained to serve as offset for the bird species. Trees serve as temporal and permanent habitats for some birds therefore the construction should not chop off the vegetation cover but reserve it for the avifauna</p> <p>The scale of impact will be temporal with shorter duration of work</p>	<p>Maintain water channels with regulated flow of water downstream to ensure the survival of fish species</p> <p>Work should not be extended for longer duration to minimize the impact</p>	<p>There is already observed deforestation in this work site from people engaged in agriculture, charcoal burning, stone mining and building which in some way has got a negative impact on both tree and plant species. In that regard therefore, this project/construction work should reduce drastically the quantity of vegetation cover to chop off so that the scale of impact can be minimized. Ensure that work duration is reduced so that impact is on a temporal scale</p> <p>Fast growing trees like acacia can be planted around the work site as a way of restoring the land after the construction work</p>
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Mortem site (WP6.5 Orugu sources to Allen Town)				
Mammals	Reptiles and amphibians	Avifauna	Fish	Plants & trees
7 species were recorded to be present in this area of which none was identified as having conservation concern	3 species of reptiles and 3 species of amphibians were recorded altogether as present among which only 1 species of the amphibians was recorded as near threatened, all the reptile species as least concern (see table)	31 species were recorded to be present in this area, but none was found to be of conservation concern	Similar to Mongegba work area there was no identifiable fish species at this site	82 tree species and 21 plant species were recorded altogether among which 7 of the tree species have been listed as vulnerable and one as near threatened by IUCN, no <i>Lophira alata</i> was recorded here (see table)
Mortem site: Remarks/ Recommendations/Mitigation measures				
Ensure the protection of these animals when they come out from their places when the work is in progress since the quest for bush meat is high among the locals	<p>Generally, amphibian species highly depend on water, meaning that the construction process should not take away all the water facilities around for species survival.</p> <p>There should be at least a water catchment or passage area for amphibians to move freely. The construction work should not be a cause on species disturbance or damage them as there are</p>	<p>The forest cover around the work site should be maintained to serve as offset for the bird species</p> <p>Trees serve as temporal and permanent habitats for some birds therefore the construction should not chop off the vegetation cover but reserve it for the avifauna</p> <p>The scale of impact will be temporal with shorter duration of work</p>	<p>Maintain water channels with regulated flow of water downstream to ensure the survival of fish species</p> <p>Work should not be extended for longer duration to minimize impact</p> <p>Water pools should be maintained, or catchments sites made available to reduce the impact on the species</p>	<p>Care must be taken to protect valuable tree species to prevent the loss of these trees</p> <p>Reduce as much as possible the number of tree species to be chopped so that the impact from deforestation already evident can be reduced</p> <p>Planting of fast growing trees at this site is recommended to replace those lost during construction work</p>



	<p>some leaf litters that are as small as 6mm.</p> <p>Amphibians like hiding under leaf litters thus care must be taken to protect them from physical damage if they are detected</p> <p>Allow snakes and other reptiles to escape if they are detected</p>	<p>As work is limited to specific areas at this site the remaining forest cover should be maintained to ensure habitat availability for these birds</p>		<p>Although some of the recorded tree species are of conservation value, the loss of some of them will not have a broader impact due to their abundance in the work package areas.</p>
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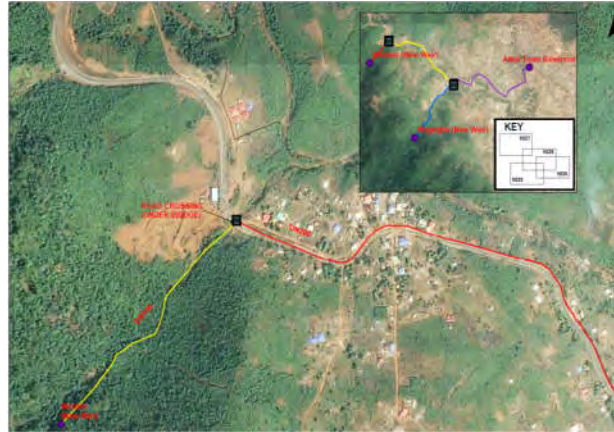


### 6.1.10 Photographs and satellite & drone imagery

Photographs, satellite and drone imagery has been useful to identify the area impacted by the construction of the weirs and pipeline route to Reagent Road and Allen Town. Images can be also useful as a monitoring tool in case of encroachment or deforestation of the area. The figures below show the status of the weir site at Mortem and Figure 40 the untouched forested on the path to Mortem in December 2017.



**Figure 40: Weir site at Mortem (BAM, 2018)**



**Figure 41: Satellite map of Mortem site and pipeline from weir Towards Allen Town (Atkins, 2017)**

Figure 42 below shows the weir site at Mortem in early 2018 and Figure 43 the effect of deforestation on the path to Mongegba weir where trees were cut and burnt to produce charcoal.



**Figure 42: Weir site at Mortem (BAM, 2018)**



**Figure 43: Recently deforested areas along the path to Mongegba and production of charcoal in May 2018 (Naranjo, 2018)**

Figure 44 illustrates the path to Mortem weir in May 2018. This will need to be cleared to allow materials and equipment to be carried up to the weir site as well as allowing the installation of the transmission main section to be installed. Figure 45 below, however, shows very clear signs of housing construction in the path leading to Mongegba weir in May 2018.





**Figure 44: Site of New Transmission Line and path to the Weir between Regent Road and Mortem (Naranjo, 2018)**



**Figure 45: Encroachment and new works ahead along the path to Mongegba weir (Naranjo, 2018)**

Figure 46 depicts the Orugu River where the transmission main is meant to cross on its way to Allen Town WTP. A drone image taken in early 2018 is also provided showing the Orugu river crossing.



**Figure 46: Orugu crossing at Allen Town (EPC, 2018)**



**Figure 47: Aerial imagery of Orugu crossing at Allen Town (EPC, 2018)**

The map produced by Atkins in January 2018 (Figure 48) shows the proposed section of 300mm AC pipe to be replaced by EPC corresponding to WP 5.9a





Figure 48: Proposed plan for replacement of 300mm AC main (Atkins, 2018)

## 6.2 Work Package 1 - Guma Dam and WTP

The following documents cover the baseline conditions of work packages within work package 1 which are summarised below.

### 6.2.1 Work item 1.1 Scour and Guard Valve refurbishment

During the scoping phase the project team assessed a continuous flow of water leaking from the scour valve at Guma dam down to the forest, though an initial examination of the water course downstream of the spillway indicated the water is confined to a small section of a wide rock filled channel, typically 10m or wider, with the forest present only from the edges of the channel.

The assessment of the scour valve status carried out by HVL is a useful document to understand the issues around the heavy leakage at the scour valve tunnel. A V-notch weir calculator recorded a leakage flow of almost 2000m<sup>3</sup> a day<sup>20</sup> (approx. 23 litres/s). HVL produced the completion report which provides information on the current status of the scour valve after refurbishment. The leakage has stopped completely.

<sup>20</sup> BAM (2018) Scour Tunnel Weir V-Notch calculation methodology and results



**Figure 49: Heavy leakage from existing scour valve (BAM, 2018)**



**Figure 50: Leakage water from the scour valve flowing down to the forest (Dean, 2018)**

### **6.2.2 Work item 1.2, 1.3 and 1.6.**

The Bat survey provides baseline data on the status of the bats roosting the in the intake tunnel. The survey was carried out by Dr Natalie Weber in August 2017, an Ecologist and Zoologist specialised in bats.



**Figure 51: Photographs of two hand-held individuals of *Hipposideros aff. ruber* recorded in the Guma tunnel in August 2017**

The biodiversity assessment provides baseline data on five taxa in the area around GVWC'S WTP. These included mammals, reptiles and amphibians, avifauna, fish and plants.

This rapid assessment did not find any bats in the tunnel; however, this might be caused that the due to the heavy rain no specimen was in the tunnel at that time of the day. Bats have since been recorded in the tunnel by the contractor.

#### **6.2.3 Work item 1.4 Repair leaking structures**

The V-Notch Weir calculation carried out by BAM indicated that leakage at the WTP could be as much as 380m<sup>3</sup> per day.

### **6.3 Work Package 3 – Transmission Network Improvements**

The baseline conditions covering work packages in work package 3 have been described in 6.1 General Baseline Data.

#### **6.4 Work Package 5 – Distribution Improvements**

The baseline conditions covering work packages in work package 3 have been described in 6.1 General Baseline Data.

### **6.5 Work Package 6 – Rehabilitation of Transmission and Distribution Mains**

Work item 6.5 & 6.9: Weirs and Transmission Pipeline to Allen Town

### **6.6 Work Package 9 – Pumping schemes to Wilberforce and other communities**

The baseline conditions covering work packages in work package 3 have been described in 6.1 General Baseline Data.





## Section 7: Impact and Risk Assessment and Recommended Mitigations

The following table includes the main aspects associated with the environmental, social and health impacts and risks identified by the ESHIA Team. Out of the possible impact scale of 100 (Major Negative Impacts) to -65 (Positive Impacts) based on the different impact categories below, Table 15. Major negative impacts are red; moderate negative impacts are orange, minor negative impacts are light orange, negligible are yellow and positive in green; however, these colours are on a scale so a moderate negative impact of 45 will be a darker orange than a moderate impact of 32.

**Table 15: Impact Categories**

<b>Magnitude</b> is the extent and severity of how the impact affects the baseline condition	<b>Duration</b> is the length of time the impact will affect the receptor.	<b>Scale</b> is the size of the impact and proportional impacts on the receptor	<b>Probability</b> is the likelihood of the impact occurring.
Positive (-3)	Temporary (1)	Site Only (1)	Improbably (1)
Negative negligible (2)	Short Term (2)	Local (2)	Low Probability (2)
Negative minor (4)	Medium Term (3)	Regional (3)	Medium Probability (3)
Negative Moderate (6)	Long Term (4)	National (4)	High Probability (4)
Negative Major (10)	Permanent (5)	International (5)	Definitely/Unknown (5)

There is only one impact with a significance of over 50 (at 52– ‘Reduction of river flow to downstream water users’) and only two that is between 40 to 50. Forty percent of the impacts listed are positive.

**Table 16: Summary of impacts and risks**

WP	Impacts	Receptor	Phase	Magnitude	Duration	Scale	Probability	Significance (-60 to 100)
Mile 13	Access to Vegetation of community importance	Local Community	Construction	Negligible	Short term	Local	High Probability	32 Moderate Negative Impact
All	Air pollutions and dust	Local Environment	Construction	Minor	Temporary	Local	High Probability	28 Minor Negative Impact
All	Anti-Social Behaviour through workers movement including sexual misconduct, drugs and theft	Local Community	Construction	Minor	Temporary	Local	Medium Probability	21 Minor Negative Impact
Mile 13, 3.1, 3.2, 3.3, 5.2, 5.5,	Changes in local hydrology e.g. Run off	Local Environment	Construction	Minor	Temporary	Local	Definite/ Unknown	35 Moderate Negative Impact



WP	Impacts	Receptor	Phase	Magnitude	Duration	Scale	Probability	Significance (-60 to 100)
5.6, 5.9, 6.5, 6.9, 9.1								
1.5, 1.6	Chlorine leaking into the environment from the old pipes or from construction	Local Environment	Operation	Major	Permanent	Local	Low Probability	34 Moderate Negative Impact
WP 1, 9.1	Clearing overhanging vegetation	Biodiversity	Construction	Negligible	Short term	Site Only	Definite/ Unknown	25 Minor Negative Impact
6.5, Mile 13	Clearing vegetation from access paths and work areas	Biodiversity	Construction	Minor	Permanent	Site Only	Low Probability	20 Minor Negative Impact
All	Disruption of Public Utilities	Local Community, Business and Institutes	Construction	Moderate	Temporary	Local	High Probability	36 Moderate Negative Impact
All	Disruption of Social and Cultural Values through worker movements	Local Community and Workers	Construction	Moderate	Temporary	Local	Low Probability	18 Minor Negative Impact
1.1, Mile 13, 6.5	Disturbance on wildlife in the area	Biodiversity	Construction	Negligible	Temporary	Local	High Probability	20 Minor Negative Impact
All	Employment for Work	Local Community	Construction	Positive	Temporary	Local	High Probability	-24 Positive Impact
6.5	Encroachment in National Park	Biodiversity	All	Major	Medium term	Local	Medium Probability	45 Moderate Negative Impact
All	Extend the life of the infrastructure	Water Supply	Operation	Positive	Permanent	Regional	Definite/ Unknown	-55 Positive Impact
All	Forest Cover	Forest	Construction	Moderate	Medium term	Site Only	Medium Probability	30 Moderate Negative Impact
All	Greenhouse Gases Emissions	Climate Change	Construction	Minor	Short term	Site Only	Definite/ Unknown	35 Moderate Negative Impact
All	Handling and Storage of Construction Materials	Local Environment	Construction	Moderate	Temporary	Local	Medium Probability	27 Minor Negative Impact
5.9	Hazardous Construction Waste	Local Environment	Construction	Major	Short term	Site Only	Medium Probability	39 Moderate Negative Impact
All	Improve Efficiency of Infrastructure	Water Supply	Operation	Positive	Permanent	Regional	Definite/ Unknown	-55 Positive Impact
1.1	Improve operability of valves	Water Supply	Operation	Positive	Permanent	Site Only	High Probability	-36 Positive Impact
1.1, 1.2, 1.3, 1.5, 1.6	Improve the health, safety and wellbeing of GWWC operational staff.	Workers	Operation	Positive	Permanent	Site Only	Definite/ Unknown	-45 Positive Impact



WP	Impacts	Receptor	Phase	Magnitude	Duration	Scale	Probability	Significance (-60 to 100)
All	Improve Water Security	Water Supply	Operation	Positive	Permanent	Regional	High Probability	-44 Positive Impact
1.5	Improved operation of filters	Water Supply	Operation	Positive	Permanent	Site Only	High Probability	-36 Positive Impact
1.6	Improved plant reliability and resilience	Water Supply	Operation	Positive	Permanent	Regional	High Probability	-44 Positive Impact
All	Increase GVWC capacity	GVWC	Operation	Positive	Permanent	Regional	High Probability	-44 Positive Impact
3.1, 3.2, 3.3, 5.2, 5.9, 6.5, 6.9	Increase of GVWC Customers	GVWC	Operation	Positive	Permanent	Regional	Medium Probability	-33 Positive Impact
All	Increase reliability of Water Supply	Freetown	Operation	Positive	Permanent	Regional	High Probability	-44 Positive Impact
All	Increase Water Network	Freetown	Operation	Positive	Permanent	Regional	High Probability	-44 Positive Impact
All	Increase Water Pressure	Freetown	Operation	Positive	Permanent	Regional	High Probability	-44 Positive Impact
All	Increase Water Quality	Freetown	Operation	Positive	Permanent	Regional	High Probability	-44 Positive Impact
1.5	Increased filter run times	Water Supply	Operation	Positive	Permanent	Regional	High Probability	-44 Positive Impact
Mile 13, 6.5	Landscape changes	Local Environment	Construction	Minor	Temporary	Site Only	Medium Probability	18 Minor Negative Impact
1.2 & 1.3	Light and Noise Disturbance on Bat Colony within Ingress Tunnel	Biodiversity	All	Moderate	Short term	Local	High Probability	40 Moderate Negative Impact
All	Light Disturbance from works	Local Community, Biodiversity	Construction	Minor	Temporary	Site Only	High Probability	24 Minor Negative Impact
Mile 13	Noise at BAM compound	Local Community	Construction	Moderate	Temporary	Local	High Probability	36 Moderate Negative Impact
All	Noise Disturbance from works	Local Community, Biodiversity	Construction	Minor	Temporary	Local	High Probability	28 Minor Negative Impact
9.1	Noise from Generator	Local Community	Operation	Negligible	Permanent	Local	High Probability	36 Moderate Negative Impact
All	Non-Hazardous Construction Waste	Local Environment	Construction	Minor	Temporary	Site Only	Definite/Unknown	30 Moderate Negative Impact
3.1, 3.2, 5.2, 5.9, 6.5, 6.9	Potential for Water Pollution	Water Supply	Construction	Moderate	Temporary	Local	High Probability	36 Moderate Negative Impact
All	Reduce leaks and bursts	Water Supply	Operation	Positive	Permanent	Regional	High Probability	-44 Positive Impact
3.1, 3.2, 3.3, 5.2, 5.9, 6.5, 6.9	Reduced access to homes and businesses	Local Community	Construction	Minor	Temporary	Local	Definite/Unknown	35 Moderate Negative Impact





WP	Impacts	Receptor	Phase	Magnitude	Duration	Scale	Probability	Significance (-60 to 100)
1.5	Reduced downtime for maintenance	Water Supply	Operation	Positive	Permanent	Regional	High Probability	-44 Positive Impact
1.5	Reduced filter media loss	Water Supply	Operation	Positive	Permanent	Site Only	High Probability	-36 Positive Impact
1.4	Reduced flow in drainage channel downstream of the Works	Local Community	Operation	Positive	Permanent	Local	High Probability	-40 Positive Impact
3.1, 3.2, 3.3, 5.2, 5.9, 6.5, 6.9	Reduced water loss to informal supply	Informal Users	Construction	Positive	Permanent	Regional	High Probability	-44 Positive Impact
WP 1	Reduced Water Quantity Discharge at GVWC	Water Supply	Construction	Negligible	Temporary	Local	Low Probability	10 Negligible Impact
1.8	Reduces daily discharges to river	Water Supply	Operation	Positive	Permanent	Local	High Probability	-40 Positive Impact
1.1, 6.5	Reduction of River Flow to downstream water users	Local Community	Operation	Moderate	Permanent	Local	High Probability	52 Major Negative Impact
3.1, 3.2, 3.3, 5.2, 5.9, 6.5, 6.9	Resettlement	Encroachers	Construction	Major	Permanent	Local	Low Probability	34 Moderate Negative Impact
All	Risk of injury on site	Local Community and Workers	Construction	Moderate	Temporary	Site Only	High Probability	32 Minor Negative Impact
All	Road Traffic Accidents	Road Users	Construction	Major	Temporary	Site Only	Low Probability	24 Minor Negative Impact
All	Sales of Local Materials and Goods	Local Community	Construction	Positive	Temporary	Local	High Probability	-24 Positive Impact
1.7	Significant improvement to the control of the treatment process and more efficient use of chemicals	Water Supply	Operation	Positive	Permanent	Local	High Probability	-40 Positive Impact
All	Soil Erosion	Local Environment	Operation	Minor	Short term	Local	Medium Probability	24 Minor Negative Impact
Mile 13	Spread of Diseases through worker movements	Local Community and Workers	Construction	Moderate	Temporary	Local	Low Probability	18 Minor Negative Impact
3.1, 3.2, 3.3, 5.2, 5.9, 6.5, 6.9	Traffic Disruption	Road Users	Construction	Moderate	Temporary	Local	High Probability	36 Moderate Negative Impact
1.8	Treatment and disposal of sludge	Local Environment	Operation	Positive	Permanent	Regional	High Probability	-44 Positive Impact



WP	Impacts	Receptor	Phase	Magnitude	Duration	Scale	Probability	Significance (-60 to 100)
6.5	Water Pollution from construction	Water Supply	Construction	Moderate	Temporary	Local	Low Probability	18 Minor Negative Impact
1.2, 1.3, 1.4, 1.1	Working in Confined Spaces	Workers	Construction	Minor	Temporary	Site Only	Definite/Unknown	20 Moderate Negative Impact
All	Waste Water Increase	Water Supply	Operation	Negligible	Permanent	Regional	Medium Probability	36 Moderate Negative Impact

## 7.1 General impacts

The description of impacts in this section shall be grouped. This is because some of the impacts can affect similar work packages. Therefore, the following subsection will cover common or general impacts.

### 7.1.1 Risk of injury on site- Worker and Public Safety

Construction has the potential to cause a range of injuries and accidents through heavy materials, operation of equipment and transportation. Where pipes will be laid there will also be the excavation of 700mm to 2.5 m deep trenches. The open trenches and manholes can create health and safety risks for both workers and pedestrians in case of unstable excavations, inadequate storing, fencing and signage.

There will also be works to rehabilitate the WTP where there is the potential for chlorine to spill on the workers and working in confined and dark spaces. Some of the works are in areas which are also home to venomous snakes and other biodiversity which could pose a threat to the workers. Therefore, their interactions need to be limited and plans prepared so that potential negative interactions can be appropriately responded to.

Appropriate site closure and rehabilitation of the site shall be ensured after construction has finished to prevent any public safety impacts.

#### Mitigation measures:

- Safety conditions in the trenches during construction phase shall be ensured through the use of appropriate battering, shoring systems and dewatering.
- Trenches and excavated areas shall be clearly identified and temporary fencing, drainage crossing, access routes and signage provided to improve access and avoid accidental falls into these areas.
- Workers should not enter a trench more than waist deep without appropriate safety precautions such as shoring.
- Safe access to homes and businesses will be maintained, where feasible throughout the duration of the works. However, access may be restricted at times to allow works to proceed, this will be with prior consent from the landowner. Access will be restricted.
- Clear signage, warning signs, barriers and signals shall be placed at strategic locations in sufficient number and spacing to show diversion routes for pedestrians and vehicular to keep them separated from the construction site.
- Warning signs and other protective barriers shall be erected to prevent accidents to citizens due to open ditches, heavy machinery and construction vehicles, material handling and storage etc.



- Appropriate services (working toilets and hand washing facilities) and areas appropriate for lunch and breaks need to be made easily available to the contractors.
- These measures should all be outlined in the Health and Safety Plan, the Traffic Management Plan and the Emergency Response and Preparedness Plan.
- Once construction has finished appropriate site closure is required with removal of construction materials, closing of trenches and reinstating of the sites.

### **7.1.2 Disruption of public utilities and services due to relocation and damage**

The works proposed will necessitate road cuts, excavation of trenches which in some cases produce the following impacts:

- Relocation of existing public utilities resulting in the interruption of water and electricity services for a limited period of time.
- Accidental damages to existing services and private properties might occur during excavation, materials handling, etc;
- Increased risk of accidents
- Materials delivery and removal have the potential to increase traffic congestion in the immediate vicinity of the works and near the storage areas.
- The works related to pipeline rehabilitation or construction will affect temporary access to homes and other places such as schools, places of worship, etc.

There is a risk of additional water shortages during the construction works because some sections of the network will need to be disconnected temporarily. This concern has been acknowledged widely during FGDs and interview with PAPs and if not managed properly will lead to social unrest. GVWC will need to ensure a minimum temporary water service provision, which is not the responsibility of the contractor.

#### **Mitigation measures:**

- All affected consumers will be notified at least 3 days in advance of any works taking place.
- Area of works well demarcated following consultations with utility companies to determine the locations and alignments of electrical cables, water mains and communication cables.
- Keep utilities informed prior to excavations within 20 m of their respective alignments
- Produce a detailed works' planning and construction phasing schedule to reduce disruption time, and coordinate service interruptions with utilities and FCC/Wards.
- Advise affected people in advance regarding scheduled interruptions in water and electricity services.
- Repair any accidental damage to utilities (likely to be only electrical cables) as soon as possible.

### **7.1.3 Handling and Storage of Construction Materials and Wastes**

The improper management of construction materials and wastes, including wastewater from portable toilets, can have an environmental health impact in adjacent properties, drainage channels and nearby streets.

#### **Mitigation measures:**

- Designate storage areas for plant, material, waste, flammable substances and hazardous substances etc.



- Proper storage of materials and wastes (use covered containers and remove and replace them before they overflow)
- According to the law in Sierra Leone the contractor should coordinate with the FCC for the correct handling and disposal of construction waste in areas that are suitable.
- In case of accidentally spilling or dumping waste outside an approved disposal area, the contractor should inform EPA/relevant authorities and compensation measures will be triggered.
- The excavated materials in the vicinity of the worksite should be stored appropriately on site and managed to avoid dispersion and sedimentation of drainage channels, nearby street and adjacent properties.

#### **7.1.4 Changes in local hydrology and Potential for Water Pollution**

The following planned construction and commissioning activities could affect surface water receptors:

- Increased sediment run-off from the construction sites, pipe storage areas and offloading areas after vegetation and soil stripping, until the area has re-vegetated after reinstatement.
- Discharge of storm water from the pipeline trench and excavations –
- Accidental release of potential contaminants (e.g. fuel, hazardous waste, chemicals) during pipeline, construction or at the construction camp, pipe storage areas and offloading areas;

Several sediment-generating activities have been identified that may occur during construction. Where there is a significant slope, consequent erosion may deliver fine sediments from the site to the drainage channel that is then carried to downstream receptors (Freetown bay). Sediment may also be discharged in water pumped from the pipe trench and excavations during construction and during the construction of open-cut crossings, either because of soil handling or the use of vehicles.

##### **Mitigation measures:**

- The Contractor may need to extract storm waters from the trenches and other construction works to ensure working conditions and manage run-off in a way that erosion is limited.
- Proper storage of materials and wastes (not overfilling bins or use bins with covers)

#### **7.1.5 Air pollutions and dust**

Respiratory health impacts can be caused by dust and motorised vehicles and equipment exhausts with adverse impacts on pedestrians, nearby residents and site workers. The latter can be exacerbated if vehicles are poorly/improperly maintained and/or driven badly.

Dust generated by the works will travel downwind before settling. The distance travelled depends primarily on wind speed and particle size. For example, smaller particles and strong winds result in greater dilution effects but mean that the dust is deposited over a larger area. However, dust issues typically occur within a few metres of their point of generation. The impacts are of low significance, temporary and restricted to dust settling on buildings and vehicles in the immediate vicinity as well as potential disturbance of residents.

The residual impacts associated with combustion emissions and greenhouse gas emissions will be of low significance. Although a short-term increase in dust levels during construction is unavoidable, they are generally of low significance.

##### **Mitigation measures:**



- Appropriate use of transport and equipment - as per the official transport or equipment instructions and using the appropriate tool for the job.
- Cover loose material on the construction sites, especially in windy locations/conditions
- Cover materials being transported.
- If there is a large amount of dust likely to be produced from certain activities or due to adverse weather, then wetting down surfaces, transport tires and equipment and screening of specific sites to prevent dust entering the atmosphere.
- Restrict vehicle speeds, to avoid stirring up dust.
- Clean dirty/dusty areas.

#### **7.1.6 Noise**

The construction and rehabilitation works are likely to cause temporary disturbance due to many kinds of noise. Noise will be produced by workers, vehicles, excavation, concreting, road and rock breaking, etc., from powered equipment as well as other sources of noise from regular construction activities.

These can include:

- Logistics and use of access roads by construction vehicles.
- The maintenance and use of vehicles, plant and equipment during construction.
- Improperly/incorrectly maintained/silenced vehicles and equipment.
- Construction camp operations (including generators).
- Stringing pipe, cold pipe bending and pipe welding.
- Operation of borrow pits and concreting.
- Workers communications and movements – conversations, shouting, phone calls, etc.

The combination of machinery being used at any one time during the construction process will vary, and noise levels will fluctuate accordingly.

At Mile 13 during the works there will be a generator running throughout the construction period in an area where there was once limited noise.

At WP9 a permanent standby generator will be installed within the compound which will cause noise during periods of no electricity. The neighbouring landowners and users are mainly residential, however they will also likely have their own generators, so the level of noise is not considered to be out of the ordinary. Also, the generator will be located in the middle of the site inside a building which will limit the noise's footprint.

#### **Mitigation measures:**

- Hearing protection equipment for workers where the noise level is expected to reach hazardous levels – at 85dB or above.
- Where work will be undertaken at night consideration will be given to residents. If the residents are unreasonably affected, then compensation should be considered.
- Proper maintenance of vehicles and machinery according to maintenance requirements
- Take into consideration noise suppression capability in the procurement of vehicle and powered mechanical equipment and deciding construction methods and maintain suppression measures at all times.
- Consideration of the location of the generator at Mile 13, install in building/noise suppression enclosure



- If the noise level which will disturb the nearby residence at a level that is considered damaging to their health (globally considered to be 90dB within the residency) then temporarily removal or compensation should be investigated.

#### **7.1.7 Use and Storage of fuels and Hazardous materials**

Hazardous materials such as oils and fuel for machinery and cement will be used during the construction and rehabilitation phase. If stored and handled inappropriately or spilled and not contained, these materials may pollute soils and nearby streams. Liquid effluents from preparation of concrete, sediment dewatering and wastewater from portable toilets, private dwellings and other buildings may contaminate the waters course.

Inappropriate use and storage of hazardous materials can lead to contamination of soil and water sources due to spills or leaks. Risk of fire.

##### **Mitigation measures:**

- Secondary containment for fuels to avoid spill contamination and inspection during operation
- Toolbox training including training in fuel and waste handling
- Maintain the MSDS Sheets for hazardous materials on site
- Firefighting equipment, designated trained staff contact details of fire & rescue service
- Designate an area within the construction sites to keep non-hazardous construction waste:
- Manage the collection of the construction waste by an official waste removal company:
- Ensure that the waste is disposed of in a safe and appropriate location (i.e. no risk of leachate from the waste causing harm to humans or the environment)

#### **7.1.8 Traffic Disturbance**

The EPC project will generate traffic congestion and temporary road closures due to Materials supply and removal that will generate circulation of trucks on the Peninsular Highway and Regent Road among others. This can lead to increased risk of accidents.

##### **Mitigation measures:**

- Prepare and implement traffic management plan
- Coordinate all traffic arrangements with Police, SLRA and FCC, Ministry of Works, Wards and other authorities as relevant
- Advise affected people in advance regarding road closures and rerouting of vehicle and pedestrian traffic
- Carry out works on short sections of limited length, to minimize closure of large stretches of main and side streets, according to the Project Planning.
- Outside of working hours, especially at night, all barriers and signs will remain at sites, with directed lighting and / or lighted signs placed as required to warn both vehicular and pedestrian traffic
- As appropriate for traffic levels Flagmen shall be used to warn and direct vehicle traffic around construction sites and hazards during working hours
- Restore the project environment to the state to which it was prior to construction.
- Where safety/isolating barriers, etc., cannot be installed sufficient trained staff shall always be present to manage construction-related activities and public movement (consider use of 2-way radios).
- GVWC to keep community leaders informed





### **7.1.9 Light Disturbance**

For security of the site and public safety night-time lighting will be required in some locations. Within WP6 and WP1 this will also disturb the wildlife and communities which are not normally impacted by the light disturbance.

#### **Mitigation measures:**

- Consideration of the light during site setup, e.g. shining the lights toward the important work areas
- Turning off unnecessary lighting

### **7.1.10 Disturbance from Workers**

The majority of the workforce will be local to Freetown and therefore any disturbance is likely to be minimal. Although some temporary issues with the community may arise such as:

- Anti-Social Behaviour through workers movement including sexual misconduct, drugs and theft
- Increase in HIV/AIDs

#### **Mitigation measures:**

- Education and Awareness of local community and their codes of conduct.
- Stakeholder Engagement
- Briefing of labour to confirm zero Tolerance on Sexual Misconduct, Violence towards women, poor behaviour, health and safety etc.
- Managed in line with the Stakeholder Engagement Plan produced by Mott MacDonald.

### **7.1.11 Mosquitoes**

During and after construction, if water is allowed to pool there will be the high potential of mosquitoes breeding and as such the risk of malaria increases. This in turn puts pressure on the local health care facilities and the household income.

#### **Mitigation measures:**

- Appropriate site closure with filling of holes, removal of materials and reinstatement of the area.
- The water kiosks need to be designed and installed in such a way that water cannot accumulate.
- Proper maintenance will need to be undertaken by GVWC.
- Stakeholder Engagement

## **7.2 Works within the Protected Area and the buffer zone**

The following impacts are considered more specific to the work packages located in the buffer zone or within the protected areas.



### **7.2.1 Potential for Water Pollution**

There is a risk of downstream contamination during the construction period from construction materials, oil, fuels, wastes, etc.

#### **Mitigation measures:**

- Remove all construction waste from the weir to the road. Have appropriate measures in place to manage safe disposal of waste from the site.
- Measures in place to manage hazardous materials.

### **7.2.2 Reduction of River Flow to downstream water users**

Flow quantity is often as important as water quality in rivers and streams. Interruption of river flows has the potential to adversely impact ecological sustainability, other water abstractions and the dilution of other downstream discharges. The Project has then assessed the potential impact of abstraction at these locations in relation to seasonal flow rates in the rivers.

The weirs located at Mortem and Mongegba will capture water flowing to the Orugu River. Mortem and Mongegba streams pass around an estimated 2 Mld each for around 7 months of the year (generally June through to December), although December flows may not be reliable in drier years. There is no data on the hydrological assessment of the flows/intakes because such activity was descope as part of “value engineering” for the stage 3 pricing of the EPC project.

The river will be diverted on a temporary basis and will have limited impact on flows at Mortem and Mongegba. Also, there is a community in Mongegba that collects water for domestic and agricultural uses from the Mongegba river downstream which will be affected if the weir upstream impounds all available water. If so, these communities will be encouraged to fetch water at the new weir therefore compromising its water quality and the surrounding environment.

#### **Mitigation measures:**

- Ensure environmental flow is left at the weirs
- Ensure the design includes an alternative to leave flow of water to downstream users at Mongegba and Mortem.
- During the dry season there is the possibility, even if only for a short time, that there will be insufficient flows at the weir to operate the intake and it will be closed off in which case all flow (however little) will go downstream. In order to maintain a downstream flow GVWC would need to throttle the intake valve to ensure there will be downstream flow.



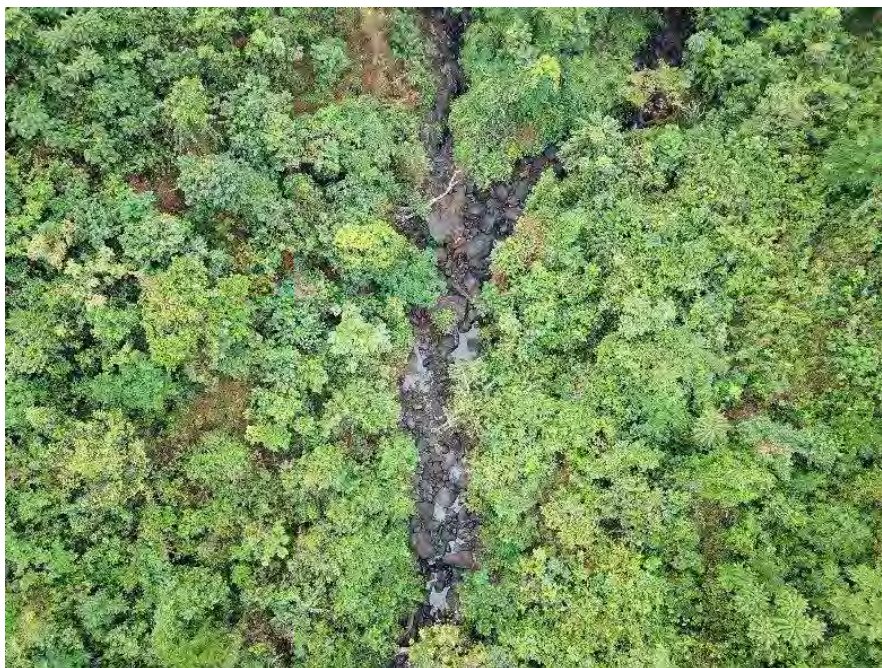
**Figure 52: Leakage water from the scour valve flowing down to the forest (Dean, 2018)**

There is a positive impact on the reduction of leakages at the WTP. The refurbishment of the scour valve (WP1.1), has reduced the flow of water wasted completely. A V-notch weir calculator recorded a flow of almost 2000 m<sup>3</sup> a day (approx. 23 litres/s) which has stopped after the refurbishment. The impact of reducing the run-off from the scour valve is considered low. It may affect flora, fauna and communities downstream however, this effect is considered minor in comparison to the major benefits of having more clean water available to supply Freetown.

Also, through the installation of a back-wash system (WP1.8) at the WTP the EPC project considers there is potential for significant reduction in water loss associated with backwashing. Overall by reducing the frequency of backwashing and reclaiming most of the backwash water, a net saving of at least 1,500 m<sup>3</sup>/day of water should be realisable.

### 7.2.3 Encroachment affecting water catchments

There is a luxuriant forest cover at Mortem starting from the access road to the weir site. Clearing the path to access the weir sites can attract encroachment. This has been confirmed since the path was cleared to access Mongegba. In just a few months some of the forested area close to the weir is gone. Part of what used to be forest is now burnt and diverse informal economic activities are taking place (i.e. rock mining, charcoal production, agriculture, etc.).



**Figure 53: Untouched weir site at Mortem (BAM, 2018)**

Clearing the path has a low environmental impact. An interesting example comes from the Tacugama weir located in a catchment close to Mortem and Mongegba sites. Figure 55 below illustrates the forest





recovery at the weir and along the pipeline route at Tacugama. This means that the impact at Tacugama was temporal and low, however, the area of Tacugama is patrolled by rangers to avoid encroachment. This has proved to be an effective conservation mechanism that could be replicated in Mortem river and Mongegba river.



**Figure 54: Tacugama ranger at Tacugama weir (TCS, 2017)**



**Figure 55: Tacugama pipeline (Dean, 2017)**

Site closure and reinstatement of the area is important to dissuade some people from encroaching. All except the access path, if required for future maintenance, should be left in a similar state to what it was found in.

#### **Mitigation measures:**

- Inter-governmental collaboration between, MWR, NPAA, MLPE, EPA and GVWC to protect the sites within the 'buffer zone' and 'protected area'.
- Community engagement with neighbouring communities to stop encroachment
- The project must ensure that care is taken to protect valuable tree species to prevent the loss of these trees. All pipeline should be laid within the cleared path to avoid/limit loss of trees. Planting local trees adjacent to the path to Mongegba is recommended to replace those that may be lost during construction work. It is not advisable to plant invasive species such as Eucalyptus or Acacia.
- Monitoring of the signage of the vegetation of interest.
- Appropriate construction site closure, removing all construction materials and waste, and reinstatement of the area.

#### **7.2.4 Excessive manual handling (DN150 Ductile Iron Pipe)**

The installation of DN150 Ductile Iron pipe on the transmission main to the weirs implies logistic and health and safety issues. Each pipe length weights 135kg and will required to be transported through sloping and twisting paths which are steep in places. European standards limit manual handling to 25kg per person. This impact could be reduced by using PVC pipes instead of Ductile Iron, however, GVWC would prefer to use Ductile Iron to reduce risk of illegal water tapping.

#### **Mitigation measures:**

- Temporary works systems to be developed to minimise the effects of manual handling through difficult terrain. Mechanical lifting to be utilised wherever possible when working in accessible areas.



### **7.2.5 Bat Colony**

Although the ESHIA team did not see signs of bats in the intake tunnel during the biodiversity assessment in June 2018 there is evidence of bats roosting in the tunnel from the bats survey assessment carried out in August 2017 and during access since. The works in the tunnel (WP1.2, 1.3 and 1.6) will affect the bats and mitigation measures need to be considered.

#### **Mitigation measures:**

- Carrying out the works where the bat population is at its lowest which is during the rainy season
- Reduction of lights during the works preventing any unnecessary use of lights when possible
- Considering working at night
- Monitoring plan should be put in place to observe the colony after the construction work and evaluate success of the mitigation measures. Colony counts, assessment of species composition, and activity monitoring would constitute suitable methods to this end.
- An alternative would also be to find a suitable roosting site where bats could relocate to. It should be located in the vicinity of the intake tower and comply with similar conditions (i.e. temperature and humidity). To this end, an experienced bat specialist could capture the bats and take them to the new site. However, this does not mean that the bat colony will settle in the new location.

### **7.2.6 Flora and Fauna loss and disturbance within WP6.5 and Mile 13**

This work package area is known to host large populations of different types of species (birds, mammals, amphibians) etc., due to their undisturbed nature.

There will be some loss, and noise disturbance on vegetation and fauna during the construction phase at the laydown area, the weir sites and the pipeline to the weirs. There may also be disturbance of flora and fauna and some limited trees and scrub loss in other work packages. Some of the mature flora also supports some of the fauna within the area and may therefore have a significant effect on the local environment.

The vegetation, particularly regarding the mango trees at Mile 13, often also has community value. Loss of these trees will be felt by the community. The prioritisation will be to protect this vegetation. It has been strongly suggested to safeguard the bigger mango trees on the site. However, the access to these trees of community value will also reduce during construction.

The project should ensure the protection of animals when the work is in progress since the quest for bush meat is high among the locals.

There are wide variety of amphibians and reptiles in the area of the works. Amphibians like hiding under leaf litters thus care must be taken to protect them from physical damage if they are detected as well as allowing snakes and other reptiles to escape wherever they are detected.

#### **Mitigation measures:**

- Inventory of all trees of significance to be noted.
- Adequate protection provided around the tree roots/trunk to limit damage from pedestrians, site labour and construction traffic.
- Monitoring of the signage of the vegetation of interest
- Tool box training on identifying and respecting wildlife



- Minimise cutting of vegetation
- Keep lighting and noise to a minimum where possible
- Protect the mature mango trees at Mile 13
- Relocate/Replant smaller trees adjacent to the pipeline route. Care should be taken not to plant over the pipeline and restrict future access for maintenance purposes.

### **7.3 Construction and Rehabilitation works in Urban areas in WP3, 5, 6 and 9**

#### **7.3.1 Abandoned water mains/ pipes**

Abandoned pipelines can create a safety hazards and environmental problems. They effectively create underground voids, which can cause subsidence and soil destabilization, possibly leading to accidents, and water ingress as well as living and breeding space for vermin, especially rats.

Removal of AC pipes involving cutting and breaking can release asbestos fibres into the air, posing risks to public health.

##### **Mitigation measures:**

- Leave existing AC pipes buried underground
- Implement adequate health and safety measures to handle and dispose of AC materials
- Agree common AC management approach between FCC and GVWC

#### **7.3.2 Resettlement**

According to the field observation, informal interviews and FGDs a common impact of the project would be the displacement of business places and houses along the pipes that will be rehabilitated and in areas where new pipes are laid. This is an important concern for businesses and residents that are encroached along GVWC main distribution pipeline. Buildings ranging from tin and wooden structures to concrete and brick buildings can be affected through damage of part of the property (such as the property wall or parking area) or destruction of the structure.

Work Package 3, 5 and 6 are primarily rehabilitations and extensions of existing water supply systems (pipe systems and tank construction) and therefore these packages are the focus for the ongoing RAP activities carried out by Mott MacDonald.

The Potential PAPs have been identified. Details of the potential PAP, consultation with the PAP and compensation will be stipulated by Mott MacDonald's in the full RAP being produced for this project. The final RAP is due mid-October.

##### **Mitigation measures:**

- Resettlement will be managed and monitored through the Resettlement Action Plan and Stakeholder Engagement Plan that will be produced by Mott MacDonald
- Resettlement will be avoided where possible
- Stakeholder Engagement

### **7.4 Cumulative Impacts**

Cumulative environmental effects can be defined as effects on the environment which are caused by the combined results of past, current and future activities. Over time, direct and indirect human activities combine to collectively impact the environment.





In order to understand the impacts there needs to be an understanding into other projects and activities within the area and their potential impacts. Other projects within Freetown are briefly summarised below:

- **Physical mapping of the Guma Valley Water Company pipe water network, Millennium Challenge Corporation** - SMEC is undertaking an MCC funded project to map GVWC's pipe network and to strengthen GVWC GIS capacity. However, the full data are not available at the time of writing this report.
- **Guma Valley Water Company Institutional Strengthening, Urban WASH Sector Coordination and District Metering Area and Water Kiosk Demonstration Pilot, Millennium Challenge Corporation** - Adam Smith International (ASI) is undertaking a Millennium Challenge Corporation (MCC) funded project that is looking at institutional set up and designs of water kiosks points. They are looking to develop different management systems and kiosk designs that will allow the GVWC to implement water kiosks projects easily themselves. For this there will be two pilot projects were ASI will implement the water kiosk in Aberdeen and Kington. They are also hoping that GVWC can operate a third with ASI's support. The Project will coordinate with GVWC and ASI on the designs and management models of the water kiosks. Community engagement will also occur that will look at local opinions and need on water kiosks.
- **WASH Consortium, DFID funded** – Oxfam is leading a consortium which aims to increase access to safe and affordable water, sanitation and hygiene services. This includes improving the waste management within Freetown and creating water kiosks. They have undertaken a large amount of research on the WASH and have been involved in policy development for waste, water, and hygiene as well as guidelines relating to the implementation of projects.
- **Token to Lumley Road Improvements, Kuwait Fund** – 24km of the Peninsular Highway between Token and Lumley will be upgraded to a four-lane highway with an asphalt surface and improvements to 11km of access roads.<sup>21</sup>
- **SLRA Road Upgrading** – SLRA has a variety of projects throughout Freetown with the aim of improving and maintaining roads. This includes:
  - Widening of Hillcut Road; Regent Road Junction - Choithrams Hospital – Jomo-Kenyatta Road - 4.38km
  - Rehabilitation of Western Rural District roads (Waterloo Township) Project

**Tacugama Chimpanzee Sanctuary** – Although not a project, this organisation's activities need to be considered; there interested are in biodiversity conservation, particularly relating to chimpanzee. They active patrol and enforce the national park around the perimeter of the sanctuary. This is undertaken through success coordination with NPAA.

#### 7.4.1 Cumulative Effects of the Ongoing Projects

If we look at where the expected impacts of these project overlap with this Freetown Project, we can get an idea of the potential cumulative impact. This overlap can be in terms of aim, location or works being undertaken and can positively or negatively contribute to the overall project, see Table 17.

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<sup>21</sup>Kuwait Fund (2017) Signature of a Loan Agreement for financing of the Token - Lumley Road Improvement Project in the Republic of Sierra Leone [https://kuwait-fund.org/en/web/kfund/current-news-events/-/asset\\_publisher/8Vn82dPrFd8B/content/signature-of-a-loan-agreement-for-financing-of-the-token-lumley-road-improvement-project-in-the-republic-of-sierra-leone](https://kuwait-fund.org/en/web/kfund/current-news-events/-/asset_publisher/8Vn82dPrFd8B/content/signature-of-a-loan-agreement-for-financing-of-the-token-lumley-road-improvement-project-in-the-republic-of-sierra-leone)



**Table 17: Cumulative Effects of the Ongoing Projects**

Impact	Project Significance	ASI	WASH Consortium	SMEC	Tacugama Chimpanzee Sanctuary	Tokeh to Lumley Road	SLRA Activities	Cumulative Total
Capacity Building	Positive Impact	+	+	+	+			+4
Increase Access to water	Positive Impact	+	+					+2
Reduce Leaks and Bursts	Positive Impact			+				+1
Encroachment	Moderate Negative Impact				+			
Public and Worker Safety	Minor Negative Impact					-	-	-2
Traffic Disturbance	Moderate Negative Impact					-	-	-2
Resettlement	Moderate Negative Impact	-	-			-	-	-4

### **Capacity Building**

ASI and SMEC projects also have comments which looks at increasing the capacity of GVWC in similar areas to this project. Together it is hoped that in future GVWC will have the capability to manage their water infrastructure. WASH Consortium and Tacugama Chimpanzee Sanctuary also look at increasing the capacity of stakeholders with a high influence over this project. Therefore, these projects directly benefit this positive impact.

### **Increase Access to Water**

Both ASI and the WASH Consortium will be implementing water kiosks; although there is the potential for overlap coordination and collaboration will be undertaken to ensure that the access to the new water source that kiosks provides reaches the maximum number of people.

### **Reduced Leaks and Burst**

SMEC project will reduce leaks or bursts through providing GVWC a better understanding of the existing pipes whereas this project will reduce leaks or bursts through rehabilitation of infrastructure. Either way this will reduce the water loss from leaks and bursts and improve maintenance.

### **Encroachment**

Tacugama Chimpanzee Sanctuary is successful managing encroachment through working in collaboration with NPAA to patrol the forest for the Tacugama Weir. Their positive does not cancel out our negative but instead should provide us with knowledge of how to successively implement this project.



### ***Public and Worker Safety and Traffic Disturbance***

Traffic along the Peninsular Highway around Juba is already congested. By adding diversion or closing part of the road will lead to (manageable) disturbances and disruptions. This will likely temporarily exacerbate existing traffic issues at Juba. However, if all projects put in traffic diversions and work occurs at the same time then the potential impact on the Tokeh to Lumley traffic could become very significant. This should be unlikely given the timeframes of both projects but, nevertheless appropriate communication will be required.

These traffic works could increase the risk of accidents from road vehicles or exacerbate reduced access.

SLRA will be coordinated with and informed when diversions will be in place for this project, therefore this will be limited and managed in accordance to the Traffic Management Plan. Consideration on crossing points and work section lengths will be undertaken.

### ***Resettlement***

There is a high potential for economic and residential resettlement; this is often due to informal settlement and encroachment onto SLRA right of way and lack of enforcement.

There is the potential for resettlement within ASI and WASH Consortiums kiosks projects, and for both the road projects. The scale of ASI and the WASH Consortiums will be small and limited due to there often being some flexibility in the location and minimal land being required. However, road rehabilitation projects will likely require land under SLRA RoW that has experienced encroachment.

No locational overlap in this regard will limit one community being unfairly effected and therefore ensuring that this project completes a RAP will safeguard against any remaining and excessive negative impact that result from this project.

### **7.4.2 Cumulative Effects from Other Sources**

An increase of water supply can generate more wastewater despite the lack of facilities and infrastructure to treat and manage this. This will exaggerate an existing problem.

Waste management in Freetown is poor with the majority of the waste going to the dumpsites at Kingtom and Granville Brook. The management of these sites are inappropriate but there are currently no alternatives. This is a problem effecting all construction and as such unavoidable cumulates with the rest of the waste from the city.



## Section 8: Stakeholder Consultations and Public Disclosure

### 8.1 Stakeholder Identification

Stakeholders have been identified systematically by the ESHIA team and with Guma Valley Water Company. The resulting output is the below stakeholders with the category, name, characteristics, interest and influence in a table.



### 8.1.1 Government Departments and Local Government Institutions

Relevant Stakeholders	Characteristics	Interests	Influence
Freetown City Council (FCC)/ Mayor	<ul style="list-style-type: none"> <li>Communication between wards and community</li> <li>Waste management and city-wide policy</li> <li>Other interests include healthy environment for citizens.</li> </ul>	MEDIUM to HIGH - Interest in the city-wide benefits.	MEDIUM - Responsible for the local leadership and general project awareness raising.
Members of Parliament	<ul style="list-style-type: none"> <li>Community leadership of effected communities</li> </ul>	HIGH - This project directly impacts the area of leadership	MEDIUM - Local leadership can change the direct of this project through direct pressure on the project.
Ministry of Health & Sanitation (MoHS)	<ul style="list-style-type: none"> <li>Information on sanitation and water diseases</li> <li>Working with community health groups</li> </ul>	HIGH - The provision of potable water plays a role in control of water related diseases. Access to water has a social impact too, e.g. affecting mental health	MEDIUM - Collaboration with implementing partners to ensure the achievement of project objectives
Ministry of Information and Communication (MIC)	<ul style="list-style-type: none"> <li>Government of Sierra Leone's spokesperson</li> </ul>	LOW - No effect on their mandate	LOW - No effect on their mandate
Ministry of Internal Affairs (MIA)	<ul style="list-style-type: none"> <li>Policing and National Security</li> </ul>	MEDIUM - Effects on traffic.	LOW to MEDIUM - Communicate with the Police in relation to security and traffic.
Ministry of Labour	<ul style="list-style-type: none"> <li>Responsible of health and safety and employment legislation</li> </ul>	MEDIUM – This project is employing a number people	MEDIUM - Implements workers health and employment legislation.



Ministry of Lands, Housing and Environment (MLHE)	<ul style="list-style-type: none"> <li>EPA – SL reports to this Ministry</li> <li>Responsible for Land ownership and resettlement</li> </ul>	MEDIUM to HIGH - ESHIA and resettlement are key features under the Ministry's mandate.	MEDIUM - EPA reports to this Ministry. May require endorse on land issues
Ministry of Local Government & Rural Development (MLGRD)	<ul style="list-style-type: none"> <li>Responsible for local government</li> </ul>	LOW to MEDIUM - Effects those under its mandates (no direct effect), although WARD-C falls under this ministry	LOW to MEDIUM - No direct effect on its responsibilities
Ministry of Water Resources	<ul style="list-style-type: none"> <li>Responsible for water at the policy and strategy level</li> </ul>	MEDIUM to HIGH - The project is directly related to its mandate of providing potable water	MEDIUM to HIGH - The project is directly effects their policies and strategies
Ministry of Works, Housing and Infrastructure (MWHI)	<ul style="list-style-type: none"> <li>SLRA reports to this Ministry</li> </ul>	MEDIUM - May need to obtain building permits for some work items.	MEDIUM - The project may not require high level decision beyond SLRA's mandate
Western Rural District Council (WARD C)	<ul style="list-style-type: none"> <li>Ward Communication</li> <li>Community meetings</li> </ul>	MEDIUM - Project falls within the priority areas of the council – the provision of potable water. Same role & interest as FCC.	MEDIUM - May be of help in coordinating community engagement meetings and project awareness raising.

### 8.1.2 Implementing and Executing Agencies

Relevant Stakeholders	Characteristics	Interests	Influence
Chief Minister, Office of the President	<ul style="list-style-type: none"> <li>Supervise the utilities including GVWC</li> <li>Deals with any utility conflict</li> </ul>	MEDIUM - Directly affects agencies it supervises, including GVWC.	MEDIUM to HIGH - May have make high level decisions related to the project and resolving potential conflicts between GVWC and other utilities.





Electricity Water Regulatory Commission (EWRC)	<ul style="list-style-type: none"> <li>Responsible for the implementation of regulatory frameworks for the supply of water and electricity.</li> </ul>	MEDIUM to HIGH - This project effects the water supply within Freetown	MEDIUM - Issues licences and compliance of certain legislation. Has the ability to put pressure on GVWC.
Environmental Protection Agency (EPA)	<ul style="list-style-type: none"> <li>Responsible for EIA licensing and environmental monitoring</li> </ul>	HIGH - Responsible for project's environmental compliance	HIGH - Issuer of EIA Licence which is a prerequisite for large parts of Project implemented. Will also monitor compliance during construction.
Guma Valley Water Company (GVWC)	<ul style="list-style-type: none"> <li>Project Client- responsible for implementing the project</li> </ul>	HIGH - Ensuring all project's objectives are achieved	HIGH - Project achievement depends on effective and efficient implementation.
National Commission for Privatisation (NCP)	<ul style="list-style-type: none"> <li>GVWC reports to this public-sector commission</li> </ul>	LOW - No privatization interests	LOW - May not require taking a decision that may influence project implementation.
National Protected Area Authority (NPAA)	<ul style="list-style-type: none"> <li>Responsible for protected areas and buffer zones</li> </ul>	MEDIUM to HIGH – Some project work packages extend into protected areas or their associated buffer zones.	HIGH - Some project work packages extend into protected areas or their associated buffer zones
Sierra Leone Police	<ul style="list-style-type: none"> <li>Site security and traffic diversions</li> </ul>	MEDIUM to HIGH - Traffic diversions and disruptions are the responsibility of the police.	LOW to MEDIUM - Only influences the traffic diversion and site security.
Sierra Leone Roads Authority (SLRA)	<ul style="list-style-type: none"> <li>Responsible for matters of roads and right-of ways</li> </ul>	HIGH - Encroachment on SLRA's right-of-way and laying of pipes below or alongside the roads	HIGH - Management and compensation of resettlement. Control of right of way and allocation of where the pipes should be laid.
Utility Companies (Sierratel and EDSA)	<ul style="list-style-type: none"> <li>Coordinate access to demarcated areas</li> </ul>	HIGH - Project work packages may affect their utility transmission lines	MEDIUM to HIGH - If not properly coordinated, project implementation may



		be delayed or may affect these utility lines.
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### 8.1.3 Interest Groups

Relevant Stakeholders	Characteristics	Interests	Influence
Community Health Groups	<ul style="list-style-type: none"> <li>Ensuring communities implement proper health, sanitation and hygiene measures</li> </ul>	MEDIUM - Provision of portable water has an influence on the community health, sanitation and hygiene	LOW to MEDIUM - Collaboration to ensure the achievement of project objectives and access to data.
Market Traders Association	<ul style="list-style-type: none"> <li>Project may affect their livelihood activities.</li> </ul>	HIGH - May effect members directly.	LOW to MEDIUM - Limited legal influence except for compensation and consultation. Pressure from the public.
Media	<ul style="list-style-type: none"> <li>Advertising and publicising the project</li> </ul>	LOW to MEDIUM - Project requires advertisement and could provide a source of information	MEDIUM - EPA regulations require project to be advertised/publicized through electronic and print media.
Tacugama Rangers	<ul style="list-style-type: none"> <li>Delegated protected areas and buffer zones responsibility</li> </ul>	MEDIUM to HIGH - Project work packages extend into protected areas or their associated buffer zones	MEDIUM - Has a relationship and influence with the NPAA.
Transport Unions (Motor Drivers Union; Bike Riders Association)	<ul style="list-style-type: none"> <li>Project may affect their businesses</li> </ul>	MEDIUM - Project implementation may affect where they pick and drop passengers. Should be easily mitigated	LOW - No significant influence envisaged. Potential pressure from the public



WASH Net	<ul style="list-style-type: none"> <li>Civil society pressure group for water and sanitation</li> </ul>	MEDIUM to HIGH - Project is consistent with its overarching WASH objective.	LOW - Collaboration may be required
Water Users Association	<ul style="list-style-type: none"> <li>Bottle/plastic water businesses that rely on GVWC supplies.</li> <li>Project may affect their businesses</li> </ul>	MEDIUM to HIGH - Increased water supply through project implementation may reduce their production cost.	LOW - No significant influence under legislation.

#### 8.1.4 International Groups and Donors

Relevant Stakeholders	Characteristics	Interests	Influence
Adam Smith International (ASI)	<ul style="list-style-type: none"> <li>Data on kiosk design in different areas</li> <li>MCC water kiosks project</li> <li>Undertaking stakeholder consultation</li> </ul>	LOW to MEDIUM - The project kiosk components can influence the ASI project. Data sharing.	LOW to MEDIUM - Location of kiosk is a key element of the project and secondary data may be valuable for this venture
African Development Bank	<ul style="list-style-type: none"> <li>Interested in water supply improvements in Freetown;</li> <li>Interested in the ESHIA and RAP</li> </ul>	MEDIUM to HIGH - This project and ESHIA can highly influence future African Development Bank funding	MEDIUM – Collaboration and coordination is important for this project.
Department for International Development (DFID)	<ul style="list-style-type: none"> <li>Providing the funding of the project</li> </ul>	HIGH - DFID fund project	HIGH - Funding and supervision of the project.
Millennium Challenge Corporation	<ul style="list-style-type: none"> <li>Funding a water kiosk project in Western Freetown.</li> <li>Data on Kiosk/resettlement policy framework.</li> </ul>	MEDIUM to HIGH - Lessons learned from this project may influence future implementation	LOW - May provide data as literature on similar projects.



Mott MacDonald	<ul style="list-style-type: none"> <li>Construction supervision for the project</li> <li>Completing the Resettlement action plan and Stakeholder Engagement Plan</li> </ul>	HIGH - Responsible for ensuring that the construction works are done in accordance with engineering specifications, construction timelines and are undertaking the RAP.	HIGH - Responsible of the construction supervision and implementing the resettlement action plan.
WASH Consortium	<ul style="list-style-type: none"> <li>DFID funded project</li> <li>Implemented by a consortium led by OXFAM</li> <li>May have data on related projects</li> </ul>	MEDIUM - Lessons learned from project may influence future implementation	LOW - May provide data as literature on similar projects.

#### 8.1.5 Potentially Affected Groups

Relevant Stakeholders	Characteristics	Interests	Influence
Chiefs	<ul style="list-style-type: none"> <li>Chiefs led the local communities and report to the honourables (members of parliament).</li> </ul>	HIGH - This directly effects their area of over which they are responsible for.	MEDIUM - Report to the local honourable. They are highly influential within the community and are an effective form of community communication.
Encroachers	<ul style="list-style-type: none"> <li>Encroached businesses and dwelling units on SLRA's Right-of-Way</li> </ul>	HIGH - This directly effects their area of residence or livelihoods	LOW to MEDIUM - Limited legal influence but except for compensation and consultations. Pressure from the public.
Local Businesses	<ul style="list-style-type: none"> <li>Local businesses on areas or nearby areas where work will be undertaken.</li> <li>Petty traders or other types of local businesses</li> </ul>	HIGH - Some resettlement of businesses- directly effecting their livelihoods.	LOW to MEDIUM - Limited legal influence except for compensation and consultation. Pressure from the public.



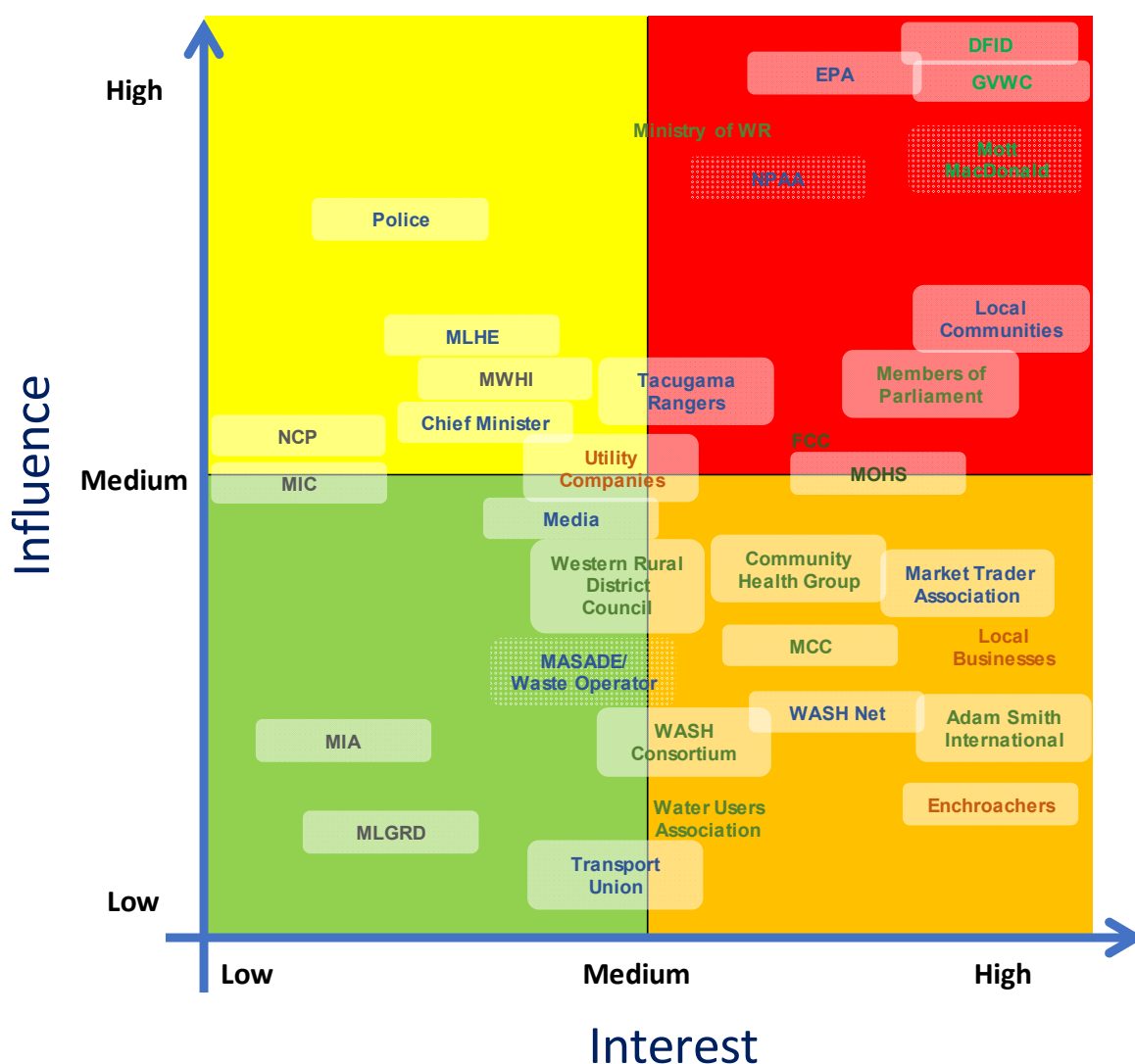
Local Communities	<ul style="list-style-type: none"> <li>Potential resettlement and land acquisition within the communities.</li> <li>Temporary disturbances causing a negative impact on local communities.</li> </ul>	HIGH - This directly effects their area of residence or livelihoods	MEDIUM to HIGH - Can influence or pressure important implementing agencies or government agencies
Users of Illegal Connections	<ul style="list-style-type: none"> <li>User of Water for businesses or households through illegal connections</li> </ul>	HIGH - Taking away a source of water for which the users are relying for consumption or businesses	LOW - These are illegal connection and have no protection under legislation and policy.

#### 8.1.6 Other

Relevant Stakeholders	Characteristics	Interests	Influence
MASADA/ Operators	Waste <ul style="list-style-type: none"> <li>Waste collection and disposal contractor for FCC</li> </ul>	MEDIUM - Implementation of the project will rely on MASADA for waste collection & proper disposal & documentation	MEDIUM - Waste needs to safely collected and disposed of.



The Matrix below was developed based off the table above.



**Figure 56: Stakeholder Matrix**

The following are the different matrix groups:

**Green:** Stakeholders with low interest and low influence on the project, and unlikely to be impacted by it. They will be kept informed through notices, however some of them will still be consulted if their experience, knowledge or data is useful to the project.

The category also includes Ministries that are important to consult but are unlikely to be affected.

**Yellow:** These are stakeholders that are influential stakeholders that have limited interest. They should be notified of the work and as they are likely to have valuable information they will be consulted through tailored interviews.

The category also includes Ministries and agencies that have direct influence over certain aspects of the project and interest in them.





**Orange:** Stakeholders with high interest – often because they are directly affected - but with little or no authority to make decisions, and no/low direct influence. They can often provide/apply indirect influence though. It is therefore very important to engage with stakeholders in this group.

Notice of the works, focus group discussions or semi-structured interviews will be undertaken.

**Red:** Stakeholders with a high interest in the project - because they are affected by it - and a high influence on it, because of their authority or responsibility and their ability to change its outcome(s). Examples include Ministries (legal authority), Mott MacDonald (contractual responsibility), and local communities - because their rights are directed protected under legislation.

They are therefore priority stakeholders that should be regularly consulted through formal interviews, informal interviews and focus group discussions.

## **8.2 Consultation Tools Results**

The Public Consultation process is an on-going process that spans the life of the project. Consultations with the affected local communities and with officials of Government Ministries, Departments, and Agencies local government, civil society and other representatives of the affected population were undertaken to gain a comprehensive understanding of the types and degrees of adverse effects the project is likely to have on the environment, people and society.

### **8.2.1 Focus Group Discussion**

During the draft ESHIA phase, seven focus group discussions were undertaken throughout the project area. Each community were was split into three groups:

- Community Leaders
- Businesses
- Women (and Children)

It should also be noted that women were often present in the businesses group and/or the community leaders group.

From there the Focus Group Discussion Guide, in Appendix 5, was followed, tailored to each group. Below is the summary of what was found. The full transcripts are in Appendix 6. The table below summarises the local communities' thoughts on the project, the perceived positive and negative impacts and potential mitigation measures. The final ESMP's mitigation measures are set up to ensure consideration into those identified by the community.

Although, it should be noted that not all the impacts (positive or negative) identified will occur or will be significant. This is just a record of the community views; incorporation into the report has been undertaken. Often these perceived risks come from the communities' experience of previous projects that have been undertaken; where poor construction practices were used, excavation in properly closed or lack of community involvement.



Communities	Characteristic	Positive impact as perceived by the community	Negative impact as perceived by the community	Mitigation Measures as perceived by the community
<b>Adonkia, Goderich and MMTC</b>	<p>Key livelihoods activities are petty trading, construction workers and fishing. Flooding was identified by all groups as a key environmental issue and key diseases- the contaminated water and poor sanitation were identified causes of cholera, skin disease, malaria, typhoid and skin diseases.</p> <p>Health care and water were the key infrastructure challenges. Long distance to travel, time and harassment are the main water related issues facing women and children.</p> <p>Women and Community were aware of the project but didn't know the specifics.</p>	<ul style="list-style-type: none"> <li>• Increased access to safe drinking water;</li> <li>• Local employment;</li> <li>• Sales of local material;</li> <li>• Increased school attendance; and</li> <li>• Compensation to land owners.</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of vegetation through clearing- this includes smallholder farms;</li> <li>• Drainage and runoff;</li> <li>• Possible erosion and water pollution</li> <li>• Displacement of businesses;</li> <li>• Traffic; and</li> <li>• Risk of accidents.</li> </ul>	<ul style="list-style-type: none"> <li>• Alternative water sources during construction;</li> <li>• Appropriate Traffic Management, Consultation with Relevant Authorities, and other safety measures;</li> <li>• Use local labour and material;</li> <li>• Monitor the works</li> <li>• Compensation and Relocation; and</li> <li>• Informing the Communities.</li> </ul>
<b>Allen and Calaba Town</b>	<p>Petty trading, sand mining, building, construction and fishing are the main activities. Flooding is the main environmental problem. Diarrhoea, Cholera, typhoid and skin diseases are the main water related issues due to unsafe water.</p> <p>Poor water and poor roads are the key infrastructural challenges. Fighting within the water sites, long distances, school attendance, poor hygiene, time, child labour, security and harassment faced by women and children.</p>	<ul style="list-style-type: none"> <li>• Employment opportunities;</li> <li>• Reducing social tension;</li> <li>• Saves income;</li> <li>• Reduces water diseases;</li> <li>• Availability of water;</li> <li>• Increase school attendance;</li> <li>• Reduced child labour</li> <li>• Reduced lateness to work and school;</li> </ul>	<ul style="list-style-type: none"> <li>• Displacement of private property and businesses;</li> <li>• Temporary cut off from water;</li> <li>• Accidents;</li> <li>• Water sellers income reduced or lost permanently;</li> <li>• Pipes exposed;</li> <li>• Generating mud;</li> </ul>	<ul style="list-style-type: none"> <li>• Compensation and relocation;</li> <li>• Use of local labour and materials;</li> <li>• Clear diversions;</li> <li>• Local youth employment;</li> <li>• Purchase of local material;</li> <li>• Stakeholder engagement;</li> </ul>



Communities	Characteristic	Positive impact as perceived by the community	Negative impact as perceived by the community	Mitigation Measures as perceived by the community
	Community leaders knew of the project.	<ul style="list-style-type: none"> <li>• Reduce anti-social behaviours;</li> <li>• Local employment;</li> <li>• Reduced conflict from illegal connections</li> <li>• Improved sanitation; and</li> <li>• Reduced plastic (bottles and sachets)</li> </ul>	<ul style="list-style-type: none"> <li>• Potential increase in malaria if stagnant water is left.</li> </ul>	<ul style="list-style-type: none"> <li>• Safety signs and appropriate safety measures;</li> <li>• Alternative source of water during construction; and</li> <li>• Close excavated holes and trenches.</li> </ul>
<b>Kissy Town</b>	<p>Stone Mining, petty trading and driving are some of the predominant activities. The main environmental issue is flooding, and the main diseases are diarrhoea, typhoid or cholera.</p> <p>Water is a key infrastructural challenge. Particularly water problems faced by women and children from the long distances, time, harassment, school attendance, antisocial behaviour.</p> <p>The community was unaware of the project.</p>	<ul style="list-style-type: none"> <li>• Availability of water;</li> <li>• Saves time and income;</li> <li>• Reduces water disease and improve health;</li> <li>• Increased school attendance and academic performance;</li> <li>• Reduces antisocial behaviour;</li> <li>• Employment Opportunities, particularly for youths;</li> <li>• Reduces child labour;</li> <li>• Improves Sanitation;</li> <li>• Increases sales of food and materials during construction;</li> <li>• Reduces costs of running a water business; and</li> </ul>	<ul style="list-style-type: none"> <li>• Displacement of businesses and private property;</li> <li>• Road Works- temporary road closures and traffic;</li> <li>• Accidents;</li> <li>• Generation of mud;</li> <li>• Erosion and water contamination;</li> <li>• Disturbing wildlife</li> <li>• Water cut off during construction; and</li> <li>• Reduces water vendors income.</li> </ul>	<ul style="list-style-type: none"> <li>• Compensation;</li> <li>• Alternative traffic route;</li> <li>• Appropriate signs;</li> <li>• Employment of local people and use of local material;</li> <li>• Control noise levels;</li> <li>• Forestation of areas;</li> <li>• Community engagement; and</li> <li>• Excavated areas should be covered.</li> </ul>



Communities	Characteristic	Positive impact as perceived by the community	Negative impact as perceived by the community	Mitigation Measures as perceived by the community
		<ul style="list-style-type: none"> <li>• Reduces illegal connections.</li> </ul>		
<b>Marjay Town</b>	<p>The predominant livelihood activities undertaken are petty trading, sand and stone mining, fishing and more.</p> <p>They felt that flooding and erosion were the worst environmental problems. The key water related diseases were Diarrhoea, Typhoid and Malaria.</p> <p>They feel that one of the biggest infrastructure issues is the lack of piped water. Particularly effecting women and children including time consumed, hard to travel terrain, leading to harassment and reducing quality of education.</p> <p>Only community leaders had a fair idea of the project, but all groups agreed that the project was desirable.</p>	<ul style="list-style-type: none"> <li>• Reduce school dropout due to less time and distance collecting water- this means less lateness and less tired;</li> <li>• Employment Opportunities;</li> <li>• Lower Risk of Accidents</li> <li>• Lower child labour- its normally the children who collect water</li> <li>• Reduce Water Diseases</li> <li>• Saves time</li> <li>• Improves petty trading by increasing access to water</li> </ul>	<ul style="list-style-type: none"> <li>• Displacement or Disturbance of businesses;</li> <li>• Water cut off during construction;</li> <li>• Resettlement of Households;</li> <li>• Accidents from the construction sites;</li> <li>• Reduced income from water vendors.</li> </ul>	<ul style="list-style-type: none"> <li>• Compensation and Relocation;</li> <li>• Alternative Road Routes during Road Works;</li> <li>• Appropriate Signs and other safety measures;</li> <li>• Alternative Water Provision during the construction;</li> <li>• Community Involvement;</li> <li>• Using community labour and material.</li> </ul>
<b>Mongegba</b>	<p>Petty trading, stone mining, driving, agriculture and charcoal are the key livelihoods activity.</p> <p>The environmental problems are water pollution, flooding, landslides, erosion and more. The main diseases are diarrhoea, typhoid and malaria mainly caused by poor sanitation.</p>	<ul style="list-style-type: none"> <li>• No lateness to school and more efficient learning;</li> <li>• Lower child labour</li> <li>• Reduce water diseases</li> <li>• Higher standards of living</li> <li>• Increased sanitation</li> </ul>	<ul style="list-style-type: none"> <li>• Potentially increased erosion;</li> <li>• Disturbance and resettlement;</li> <li>• Accidents within the construction site;</li> </ul>	<ul style="list-style-type: none"> <li>• Alternative sources of water during and post-construction;</li> <li>• Compensation and relocation;</li> <li>• Community involvement;</li> </ul>



Communities	Characteristic	Positive impact as perceived by the community	Negative impact as perceived by the community	Mitigation Measures as perceived by the community
	<p>The main infrastructure challenges being health care, education and water facilities. The effect on women and children from these water issues resulted in long walks, poor quality water, rough terrains, cost of the water, reducing the quality of education and harassment.</p> <p>There was very little knowledge about the project, but all groups said that this water project was important.</p>	<ul style="list-style-type: none"> <li>• Reduction in antisocial behaviours;</li> <li>• Increase water for livelihoods and agriculture;</li> <li>• Use of local materials;</li> <li>• Household savings; and</li> <li>• Better access to safe water.</li> <li>• Increased source of water for agriculture</li> </ul>	<ul style="list-style-type: none"> <li>• Water cut-off during construction;</li> <li>• Effect the communication or electricity network; and</li> <li>• Loss of flora;</li> <li>• Community labour ignored.</li> </ul>	<ul style="list-style-type: none"> <li>• Appropriate traffic diversions;</li> <li>• Local labour and material used;</li> <li>• Cover excavated areas;</li> <li>• Minimise deforestation</li> </ul>
<b>Mortem</b>	<p>The main livelihoods activities are stone mining, woodcutting, gardening/farming. Illegal waste, strong winds, landslide and flooding are some of the main environmental issues. The main diseases are diarrhoea, typhoid and malaria mainly caused by poor sanitation and lack of clean water.</p> <p>Infrastructure issues are associated with water, health care, sanitation, education and recreational facilities. Distance, harassment and theft in absence are specific water related issues effecting women and children.</p> <p>Community leaders had heard about this project.</p>	<ul style="list-style-type: none"> <li>• Drinking Water;</li> <li>• Improved sanitation;</li> <li>• Employment opportunities;</li> <li>• Compensation of land owners;</li> <li>• Increase in sale of food and goods during construction</li> <li>• Boost the local economy;</li> <li>• Cleaner environment</li> </ul>	<ul style="list-style-type: none"> <li>• Soil Erosion and loss of soil quality;</li> <li>• Minor water pollution;</li> <li>• Reduction of water quantity;</li> <li>• Displacement of businesses;</li> <li>• Accidents;</li> <li>• Difficulty accessing the other side of the road;</li> <li>• Pipe exposure- damage to pipes from vehicles;</li> <li>• Noise;</li> <li>• Traffic;</li> <li>• Breeding places for Mosquitos;</li> </ul>	<ul style="list-style-type: none"> <li>• Compensation and relocation;</li> <li>• Traffic diversions;</li> <li>• Use of safety signs;</li> <li>• Closure of excavated areas after works have been completed;</li> <li>• Community Involvement;</li> <li>• Sensitisation;</li> <li>• Reclamation after digging;</li> <li>• Temporary source of water;</li> <li>• Employment of local people and use of local material; and</li> </ul>



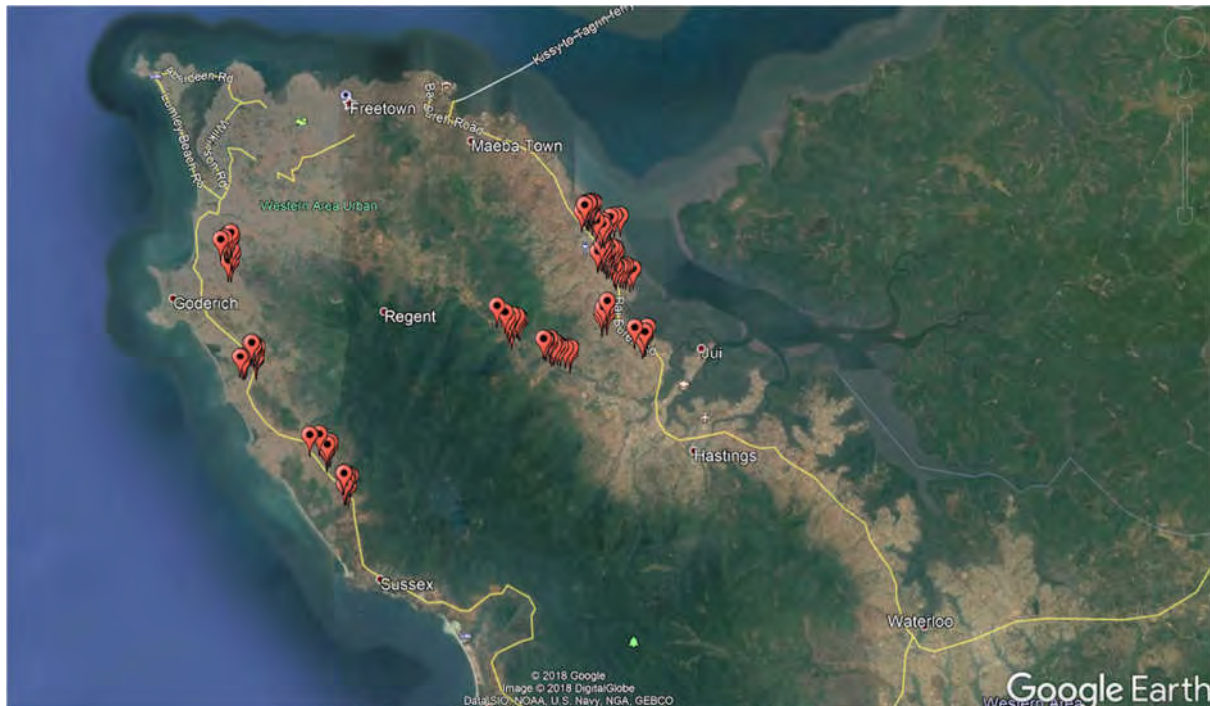
Communities	Characteristic	Positive impact as perceived by the community	Negative impact as perceived by the community	Mitigation Measures as perceived by the community
			<ul style="list-style-type: none"> <li>• Reduction in water</li> <li>• Loss of private lands;</li> <li>• Reduction in flora.</li> </ul>	<ul style="list-style-type: none"> <li>• Control noise, waste, and air pollution.</li> </ul>
<b>Southern Section to Mile 13</b>	<p>The main agricultural activities include stone and sand mining, petty trading, agriculture and fishing</p> <p>The main environmental issues identified by each group were flooding and high winds and the main diseases were diarrhoea, typhoid and malaria mainly caused by poor sanitation and lack of clean water.</p> <p>Poor water facilities were seen as the biggest infrastructural challenge. Women and children also face the following water issues; distance, antisocial behaviours, lateness to children to school.</p> <p>Women and Community Leaders had heard of the project and thought out important as their community is expanding.</p>	<ul style="list-style-type: none"> <li>• Reduction of water related diseases;</li> <li>• Local employment;</li> <li>• Reduced costs of running a water business;</li> <li>• Saved time;</li> <li>• Improved school attendance, and learning quality;</li> <li>• Increase sales of food during Construction;</li> <li>• Reduces Illegal connections;</li> <li>• No child labour;</li> <li>• Protect the environment;</li> <li>• Compensate resettlement</li> <li>• Less distance to access water.</li> </ul>	<ul style="list-style-type: none"> <li>• Resettlement</li> <li>• Increase in dust, noise and poor air quality;</li> <li>• Less income to water vendors;</li> <li>• Water cut off during construction;</li> <li>• Risk of accidents;</li> <li>• Increase in traffic</li> <li>• Breeding place for mosquitos</li> </ul>	<ul style="list-style-type: none"> <li>• Improves local sources of water during the project implementation;</li> <li>• Bury pipes;</li> <li>• Traffic Diversions</li> <li>• Appropriate Signs and other safety measures;</li> <li>• Relocation and compensation</li> <li>• Community involvement.</li> <li>• Use of community labour and local material;</li> <li>• Alternative water Sources during construction;</li> <li>• Reclamation after digging;</li> <li>• Sensitisation of the community and community monitoring.</li> </ul>





### 8.2.2 Socio-Economic Surveys

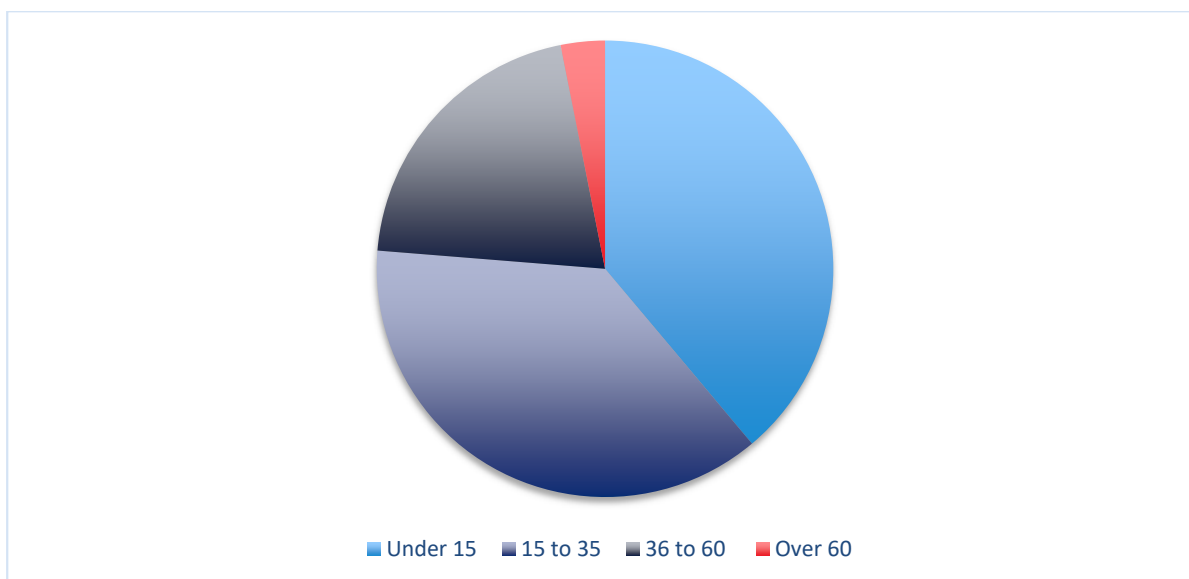
We undertook a survey of 380 people throughout the project area, Figure 57; this included the Southern Section (Mile 13, Mambo, Ougoo Farm), Wellington, Orugu, Mortem, Mongegba, Marjay, Goderich, Calaba Town, Angola Town and Allen Town. However, after data cleaning 377 records were used for analysis. Participants were also not forced to answer all question and therefore some of the questions have lower response rate (n) than others.



**Figure 57: Area surveyed by the socio-economic assessment (without points where GPS points failed)**

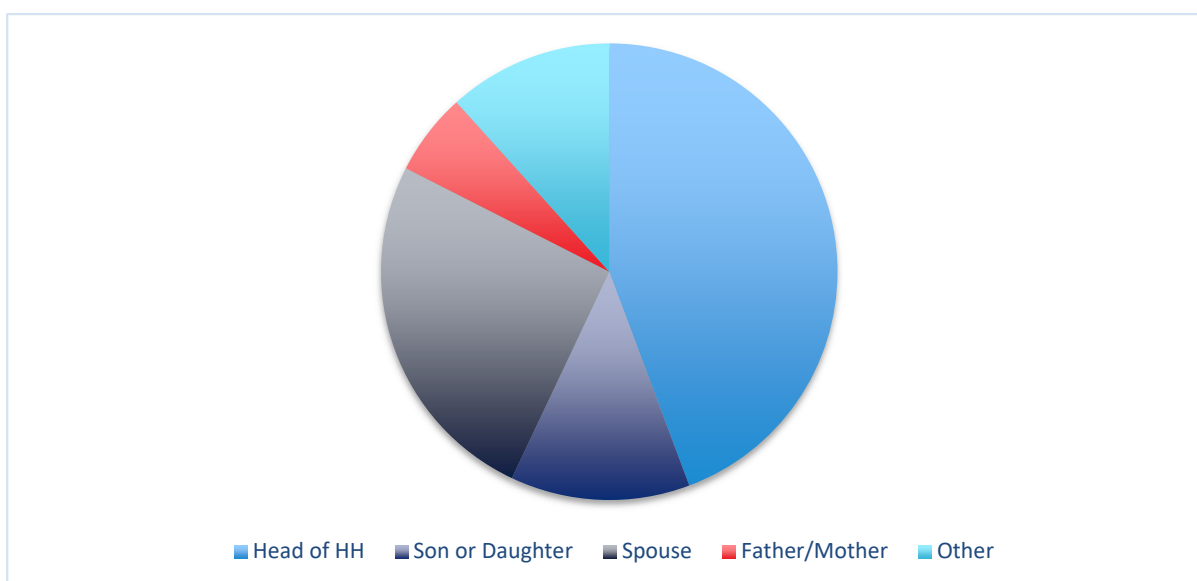
#### *Household Characteristics*

The demographics of the houses are an important factor to understand; helping improve the effectiveness of future communications, ensures a fair representation and add context to the rest of the information gathered in this survey. The vast majority of households are either 15 to 35 or children (under 15) and therefore fairly young.



**Figure 58: HH Members by Age Group (n- 377)**

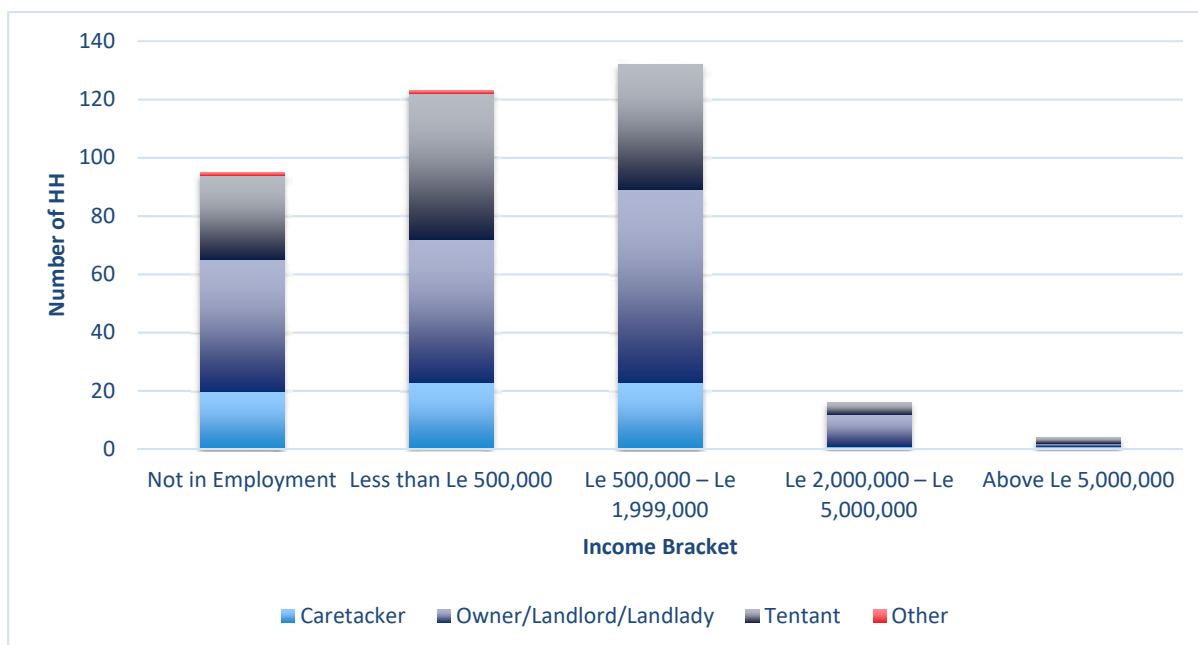
Head of the households are often the focal point for the decision making. About 44% of the people spoken to be the head of household. This ensures a good representation of people are engaged. The majority of households had a male head of household (76% of households were male where gender was known).



**Figure 59: Who was the Head of HH in relation to the survey undertaker (n=377)**

The majority of people earn less than Le 2,000,000 (£196/\$260)<sup>22</sup> and are owners of their own property. Generally, the proportion of house tenure and ownership does not change except in the case of caretakers. Caretakers do not commonly earn above Le 2,000,000. Generally, unemployment, the household income or tenure did not change depending on gender of participants except for female headed households where there was about 6% higher rate of unemployment.

<sup>22</sup> L10,000 = \$1.30 and £0.98



**Figure 60: Income bracket per Occupant Status (n=370)**

They hold a range of occupations, Table 18, mainly petty trading (27%), Construction and Building (12%), Business and Office Workers (11%) and not in employment or other (13%). Most of them live less than 1km from where they work (46%). The rest have to travel between 1 and 5 km (25%) or over 5km (28%). There is not enough data to say which type of occupation travels furthest.

Females, particularly female heads of households, are much more likely to work in the service industry, petty trading, and agriculture. While drivers, building and construction and engineering sectors were almost exclusive to male headed HHs.

**Table 18: Occupation Type and Distance to Work (n=274)**

Job Positions	Less than 1km	1km to 5km	More Than 5km	Total
Armed Forces	1			1
Building and Construction	14	12	12	33
Business/ Office Worker	15	4	11	30
Service Industry	5	2	2	8
Civil Servant		3	5	8
Driver	3	4	9	16
Engineer		1	1	2
Agriculture	6	2	4	12
Mechanic/Technician	3	3	3	8
Petty Trading	41	22	11	74
Police, Security	1		2	3
Social Worker and Nurse	1	1	2	4
Stone Breaker	6	4	4	14

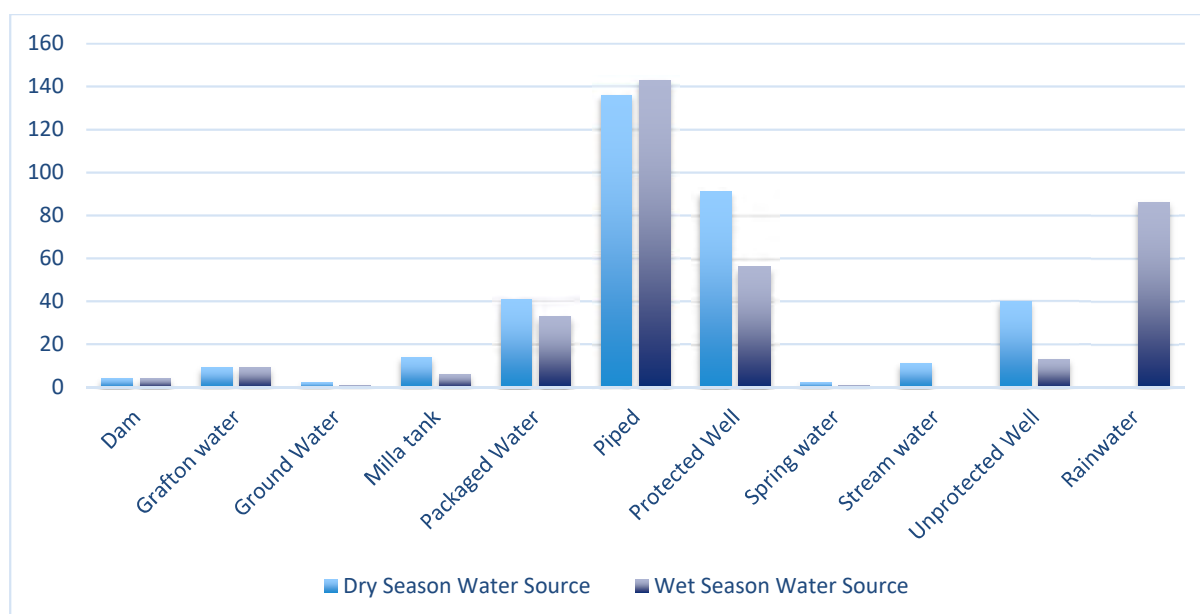


Education (Teacher, Student, Lecturer)	5	8	3	16
Leader	1		1	2
Other, Not in Employment or N/A	25	3	8	36
<b>Grand Total</b>	<b>127</b>	<b>69</b>	<b>78</b>	<b>274</b>

### Water Sources and Quality

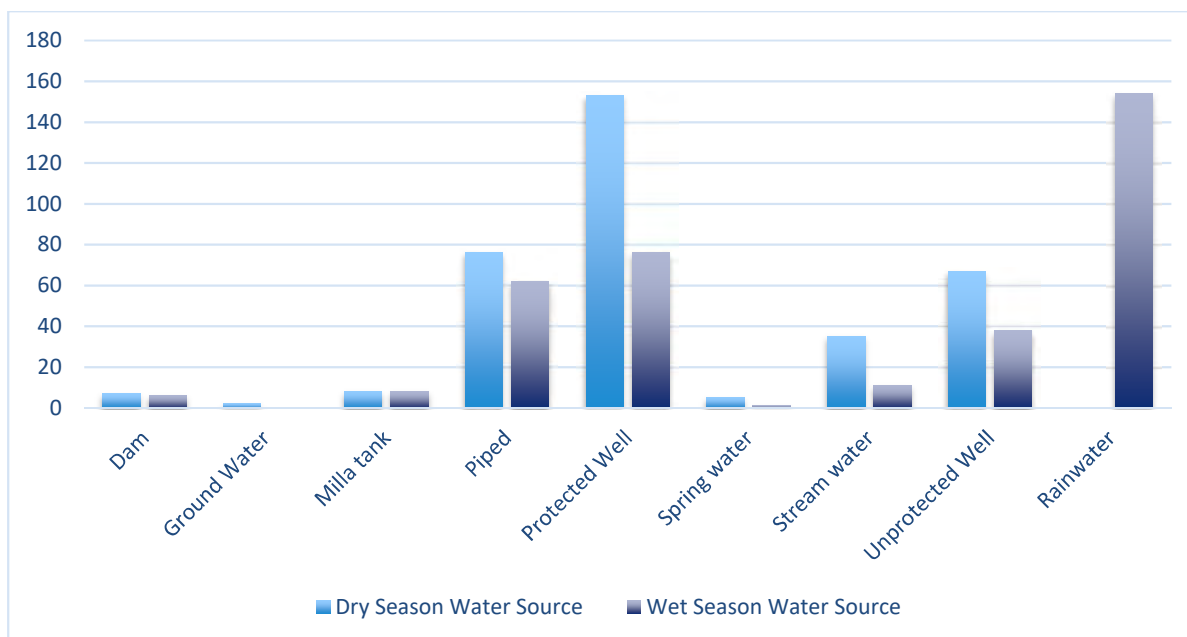
Currently piped water is the main source of water (39% in Dry and 41% in Wet). Protected wells are the second most common in dry season (26%) whereas rainwater is the second most common (25%) in wet season. As you can expect, rainwater is not used in dry season.

Female headed HH were less likely to have a safe source of drinking water in the wet (14% less use of safe water sources in comparison to male head of HHs) and dry season (10% less). Female heads of households are less likely to have piped water, more likely to have to rely on protected wells, unprotected wells and on rainwater.



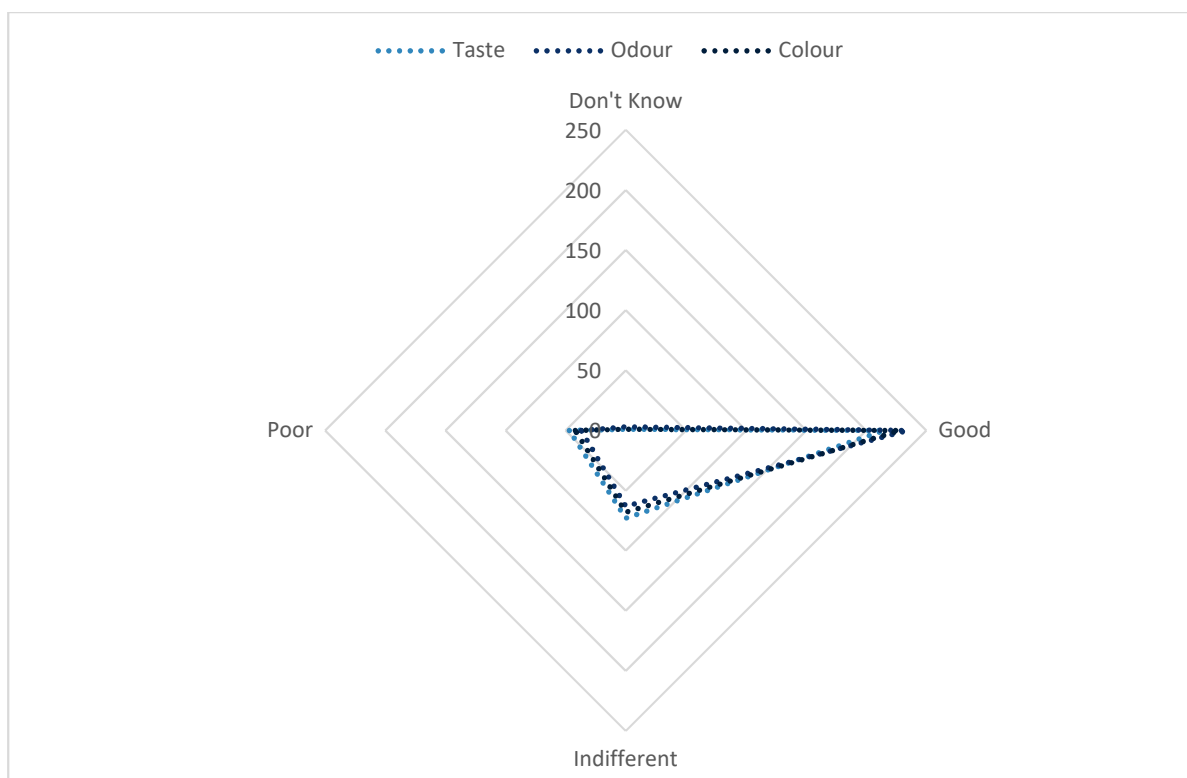
**Figure 61: Drinking Water Sources in Wet and Dry Season (n=373)**

Domestic water sources have less reliance on piped water (21% in dry; 17% in wet). In dry season the most common water source is the protected well (43%) but in wet season it is rainwater (43%).



**Figure 62: Domestic Water Sources in Wet and Dry Season (n=373)**

Below, Figure 63, the radar graph illustrates the overall quality of the drinking water; the majority of people rated the water as good in terms of taste, odour and colour. However, there was also a number of people who didn't answer as they didn't know. This was a surprising result.



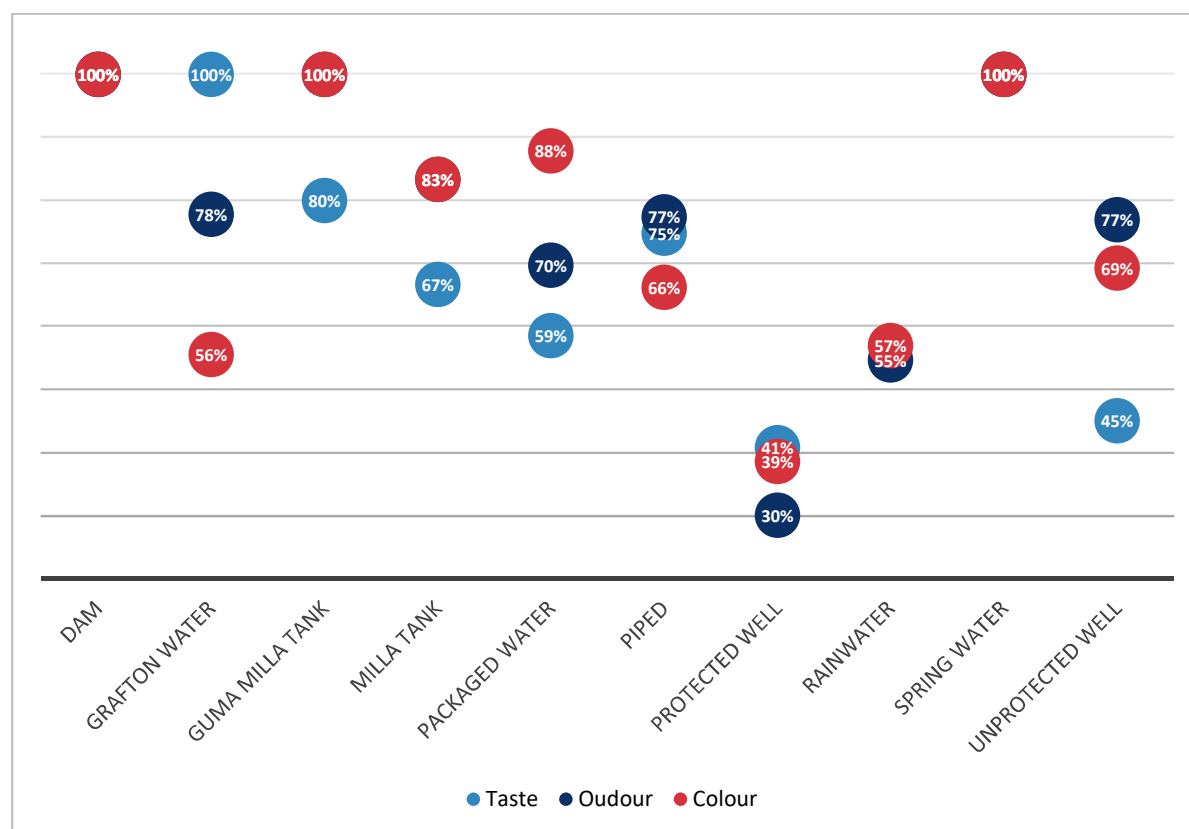
**Figure 63: Overall Water Quality for all Water Sources (n=357)**

Below, Figure 64, shows the proportion of people who rated the quality of water good by source in the wet season. Spring water is the best overall and protected wells are the lowest in terms of taste, odour



and colour. Most sources rated above 50% in terms of good quality. The graph for dry season was very similar so was not included.

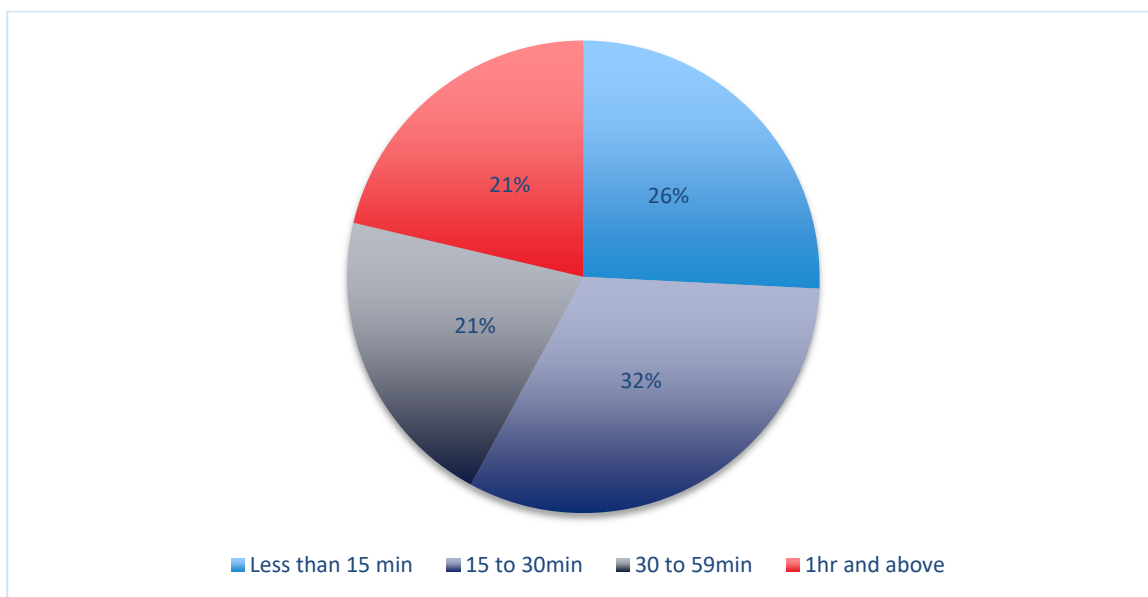
Rainwater was not rated in terms of taste.



**Figure 64: Good Quality of the Water by Water Source during the Wet Season (n=357)**

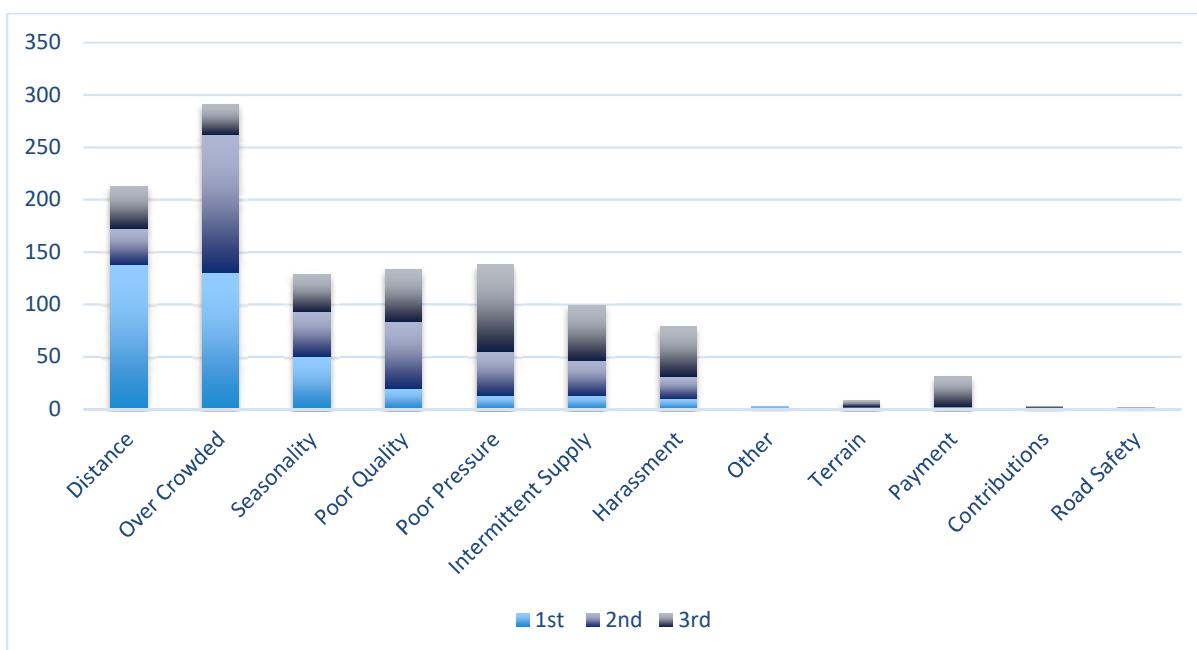
The majority of people took 15 to 30 minutes to collect water (32%) however there is still 21% of people taking over a 1 hour. This is mostly collected by women and/or children (84%). For female headed households the women and/or children were had the responsibility to collect water 89% of the time.





**Figure 65: Collection Time (n=257)**

The main issues faced in terms of collecting water is overcrowding and distance. However other issues occur, such as seasonality, poor quality, poor pressure, intermediate supply and harassment. There are limited differences between the main issues in accessing drinking water and accessing domestic water.



**Figure 66: Biggest Issues around accessing Drinking Water (n=362)**

Female headed households highlighted overcrowding, distance, poor pressure, poor quality then harassment as the key issues. Male headed households focused on overcrowding, distance, seasonality, poor quality and poor pressure. Overcrowding, distance, pressure and quality are issues facing all and female headed HH more commonly picked up on the issue of harassment.

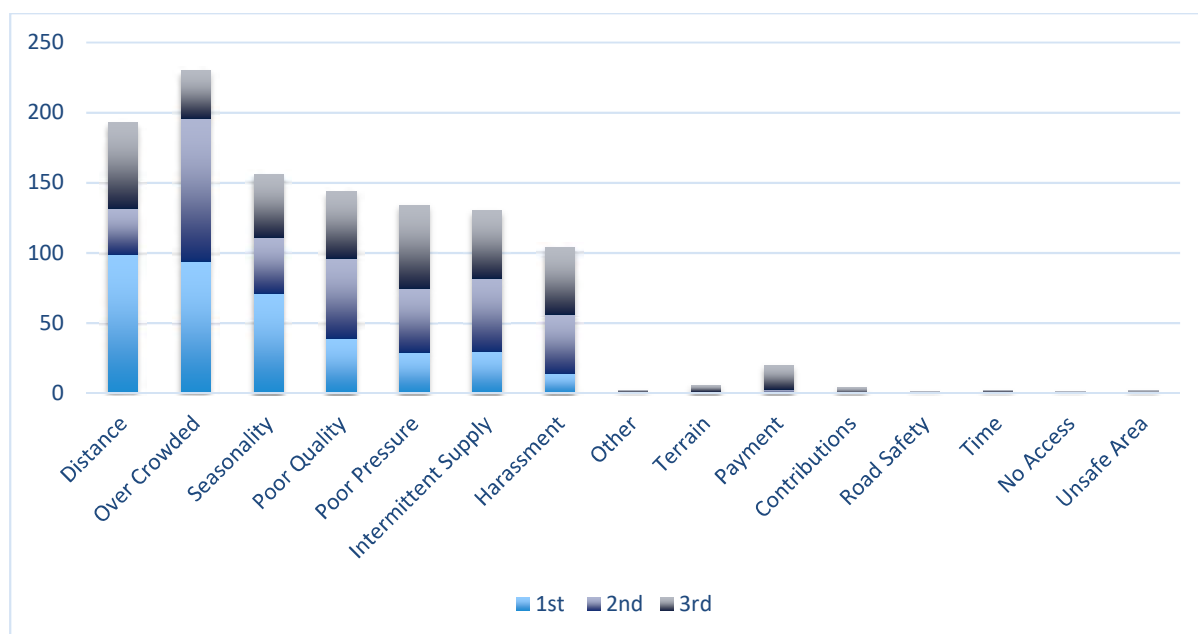


Figure 67: Biggest Issues Assessing Domestic Water (n=362)

### Potential Project Impact

Only about 40% of the participants were aware of the project, Figure 68. The highest impacts were seen as increased access to clean water with 69% of people noting this. Figure 69 shows that other key positive issues were employment opportunities, boosting the local economy and improved sanitation and hygiene (lower disease). However, people also identified a range of negative impacts. The main one was communication network (generally they were talking about this based on disturbing the network of communication cables, electricity and other utilities) and roads (disruptions and closures).

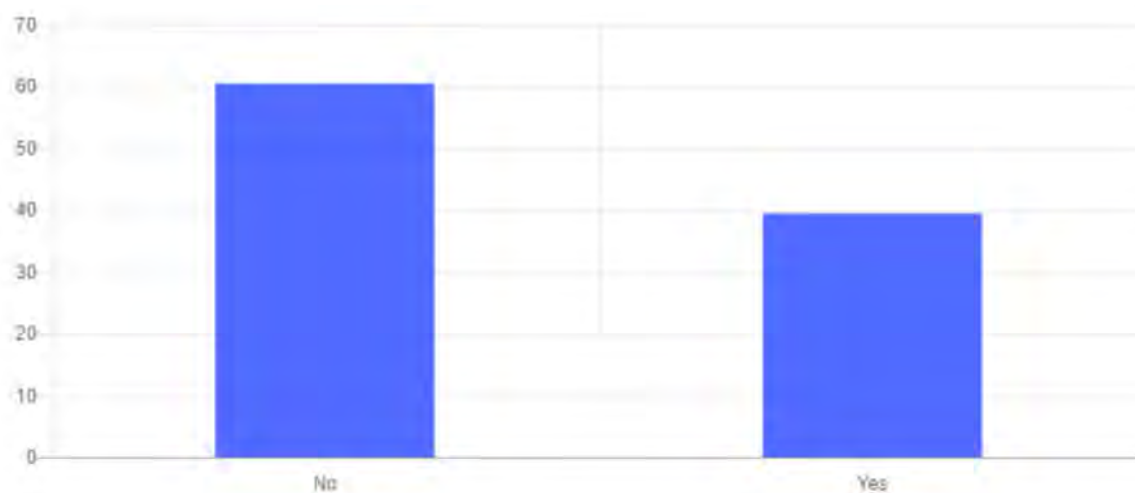
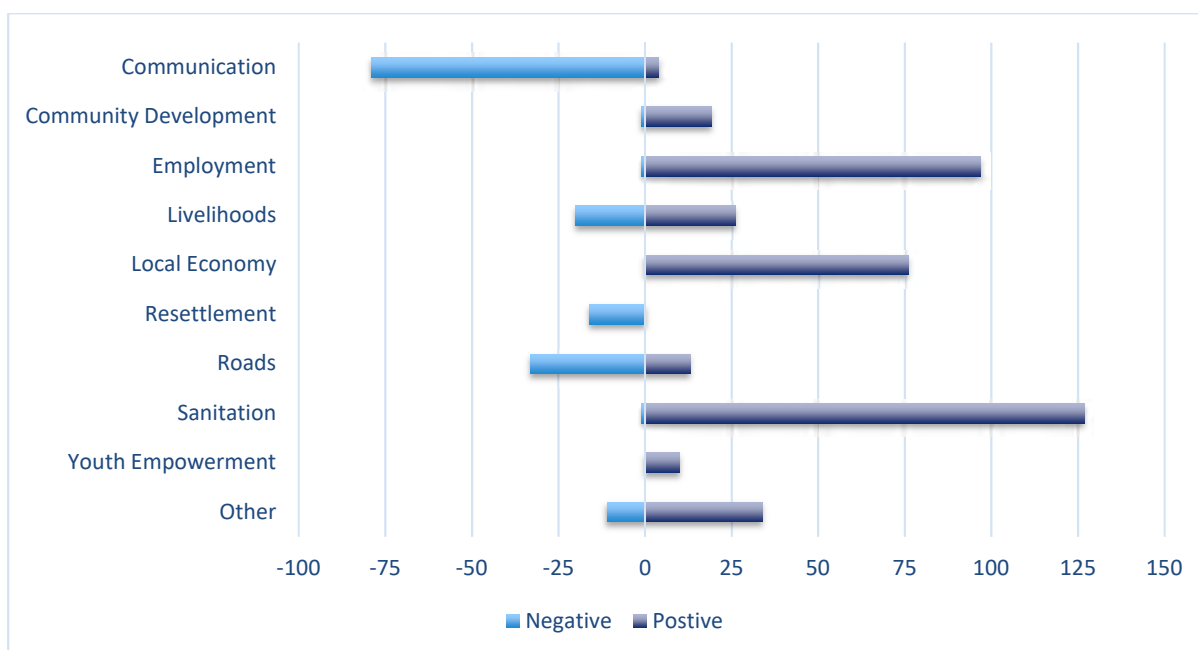


Figure 68: Are the Participants aware of the project (n=377)

Female headed HH were generally more positive in their responses; more focused on the potential improvements in water quality and the potential employment opportunities but also more worried about the temporary disturbance in the water supply and household resettlement. Male focused on the increase in access to water and the potential to boost income and the community but more worried about the traffic disruptions, resettlement of businesses and disturbance of businesses.



**Figure 69: Key impacts identified by participants (n=309)**

Although these were the main impacts others also mentioned the positive and negative effects on water vendors, the added value to the community that water access can bring and saving money. Generally, some of the negative or indifferent comments seem as though they have no belief in the water system and that no changes will occur.

### Mitigation Measures

A range of mitigation measures are included. Most state options to protect or avoid certain areas or aspects, whilst still wanting the same benefits, noting that these measures would prevent accidents or environmental damage. The focus on communication also suggests that the questions could have been misunderstood as the comments are surprising. Another element that is surprising is that 137 said to ensure excavated holes are closed, although a given outcome it is unusual that some many people thought to suggest this.

**Table 19: List of mitigation measures and frequency that the participants suggested**

Mitigation Measures	Frequency	Importance
Close excavated areas	137	22%
Employ community people	130	21%
Protect the communication network	121	19%
Employ community people, especially youths	33	5%
Protect the roads	30	5%
Community involvement	20	3%
Boost local economy	19	3%
Needs to be maintained	12	2%
Protect pipes from leakages	11	2%
Empower the community	8	1%
Ensure a good water supply and pressure	7	1%
Cover pipes to prevent leakages	6	1%



<b>Needs to be Monitored</b>	5	1%
<b>Alternative water sources</b>	4	1%
<b>Ensure safe good quality drinking water</b>	4	1%
<b>Don't use metal pipes</b>	3	0%
<b>Ensure a good drainage system</b>	3	0%
<b>Increase water accessibility</b>	3	0%
<b>Reduce bureaucracy</b>	3	0%
<b>Apply local content policy</b>	2	0%
<b>Buy goods or materials from the community</b>	2	0%
<b>Ensure community access/crossing points</b>	2	0%
<b>Ensure People are Compensated</b>	2	0%
<b>Good quality pipes</b>	2	0%
<b>Increase road maintenance</b>	2	0%
<b>Limit antisocial behaviours</b>	2	0%
<b>Limit school lateness</b>	2	0%
<b>Limit the cutting of pipes</b>	2	0%
<b>Make sure that the community people enjoy the facility</b>	2	0%
<b>Prevent road accidents through protecting the roads</b>	2	0%
<b>Safe disposal of Rubbish</b>	2	0%
<b>Safe disposal of Sewage</b>	2	0%
<b>Well-constructed</b>	2	0%
<b>Acceptable and Affordable to Communities</b>	1	0%
<b>Appropriate laying of tertiary pipes</b>	1	0%
<b>Availability of water</b>	1	0%
<b>Avoid environmental disease</b>	1	0%
<b>Avoid hollow places</b>	1	0%
<b>Avoid leaving stagnated water</b>	1	0%
<b>Avoid the use of spaghetti connections</b>	1	0%
<b>Boost community livelihoods</b>	1	0%
<b>Construction of good buildings</b>	1	0%
<b>Construction of Houses</b>	1	0%
<b>Construction should be well organised</b>	1	0%
<b>Create more work for GVWC</b>	1	0%
<b>Cutting illegal connection/bad pipes</b>	1	0%
<b>Cutting of pipes</b>	1	0%
<b>Cutting of spaghetti pipes</b>	1	0%
<b>Do not divert water ways</b>	1	0%
<b>Ensure good water supply coverages</b>	1	0%
<b>Flexibility of work plans</b>	1	0%
<b>Free from environmental problems</b>	1	0%
<b>Illegal connection must not be encouraged</b>	1	0%
<b>Improve the communication network</b>	1	0%
<b>Keep the community clean</b>	1	0%
<b>Maintenance of Supporting Water Infrastructure</b>	1	0%
<b>More deification of water, sanitation and hygiene is needed</b>	1	0%



More work for GVWC	1	0%
No Bad manner	1	0%
Prevent risk	1	0%
Promote community development	1	0%
Protect electrical and community installations	1	0%
Protect installations	1	0%
Protect the trees	1	0%
Provide better service	1	0%
Provision of clean water	1	0%
Raise awareness of Sanitation within the Communities	1	0%
Reclamation must be considered	1	0%
Reduce risk of accidents	1	0%
Reduced of cutting of pipe	1	0%
Reduced of teenage pregnancy	1	0%
Restrictions of buildings	1	0%
Road construction	1	0%
Stop 'bad' areas of water supply	1	0%
To make them feel good in the community	1	0%
United the community	1	0%
<b>Total Measures</b>	<b>628</b>	<b>100%</b>

Issues surrounding existing water collection, potential project impacts and mitigation measures did vary between the gender and were more apparent in female headed HHs. Men more often focused on the business and monetary side while females were much more focused on community and impacts on their household.

### 8.2.3 Key Informant Interviews

Thirteen key informant interviews have been undertaken so far; they were asked a range of questions related to the potential project impacts that will impact their mandate or area of interest and learn and access relevant data from them.

The transcripts in the Appendix 8 and summarised below. The table below does not cover how we have responded to and considered the potential positive and negative impacts raised and any recommendation suggested. Impacts and recommendation within the scope of this ESHIA and the wide project have been considered in the impact section and ESMP.



Key stakeholder	Impact on stakeholders from EPC project	Positive impact	Negative impact	Recommendations
<b>Citizen's Protection Agency</b>	The Citizen's Protection Agency looks to education consumers regarding to commodities & food hygiene and as 'Water is food', this is an important aspect of their work.	Water is important, and consumers should be educated on the benefits	Damage and corrosion of the pipes. Is it sustainable?	Can share information on the communities  Engage with GVWC
<b>Freetown City Council</b>	Water is one the key priorities under the four year transformation plan. They are aware of the project as the FCC helped set up the project terms of reference and get it approved by the government.  The FCC is working on flood mitigation policies and conducting a ward by ward questionnaire to see what the city-wide priorities are. The mayor expects that water will be high up on the city wide priorities.	Gives GVWC an opportunity to receive feedback on their policies. It also allows for collaboration between EDSA, GVWC, SLRA and other utilities.	There will still be leakages from the spaghetti pipes.  The project does not address the high levels of ecocline in the water and GVWC's ability to maintain a customer database and collect revenue.	If the project can provide a list of traders affected, then the FCC can take them into account in their current activities to move street traders to a temporary location.  The FCC suggests that a joint plan for waste disposal with GVWC to address this.
<b>MASADA</b>	MASADA handles construction waste which for the most parts is dumped at the existing dumpsites with no special arrangements. No separate process for handling soil waste.  MASADA works with other companies, sometimes overseas, to appropriately deal with hazardous waste.	Uncertain of any direct effect.	Uncertain of any direct effect	





Key stakeholder	Impact on stakeholders from EPC project	Positive impact	Negative impact	Recommendations
<b>Ministry of Health</b>	As the project seeks to improve health through access to safer water, the project aligns with much of the work the ministry carries out.	Burying the distribution network will reduce the incidence of contamination through proximity to waste. A 'sealed' system will help guarantee the quality of water. Reducing waterborne diseases; raising living standards; increased economic activity	It was made clear that the project must make a conscious decision and effort to involve communities to ensure they feel involved and have a strong sense of ownership over the rehabilitation works. This will help to mitigate vandalism in the long term.	Freetown City Council need to be engaged.
<b>Ministry of Lands, Planning and Environment</b>	<p>The Ministry works in areas that will be affected by this project. Through managing land registrations and environmental issues there is a natural link between the two. Water supply has a direct link with forestation and henceforth the ministry feels it has a vital role to play.</p> <p>You cannot design a major rehabilitation without considering the environment – it needs a holistic approach. This is where the ministry feels it can add real value to the project.</p> <p>It is mentioned that the project needs to plan the network system in line with their planning regulations.</p>	<p>This will of course benefit people if they are able to have better access to safe water supplies.</p> <p>Information sharing could benefit the ministry e.g. a thorough audit of GVWC's assets including GIS data. In addition, the collection of GIS information in areas in which the project will be active.</p>	Deforestation; human encroachment. GVWC must ensure that they have environmental safeguards in place around their facilities.	



Key stakeholder	Impact on stakeholders from EPC project	Positive impact	Negative impact	Recommendations
<b>Ministry of Water Resources</b>	<p>The ministry is directly affected by this project as it is mandated to manage the country's water resources. The Minister makes it clear that at present GVWC reports to the National Privatisation Commission (NPC) and not to the ministry itself. This is something the government seeks to change, placing it back under supervision of the state and not private sector. This is addressed in the 2017 Guma Valley Water Company Act, which mandates the ministry with some oversight responsibilities for GVWC.</p> <p>The Minister further mentioned that they are looking at alternative sources of water supplies outside of GVWC - potentially a source from Rokel River to help supply water to the East. This project is at pre-feasibility stage &amp; is at least 3 years away from implementation.</p> <p>The ministry indeed supports GVWC and would like to see it reach a financial situation where it can pay for itself.</p>	<p>The ministry is ultimately responsible for the supply of water across Sierra Leone, therefore this project is undoubtedly seen as a positive for the people of Freetown as well as the ministry itself.</p> <p>Dry season shortages, in particular, may be addressed.</p>	<p>The Minister perceives no real negative – water supply is a serious concern and hence this project is a necessity.</p> <p>The increased supply of water may have effects with regard to waste water.</p>	<p>We mentioned the possibility of bringing together Ministers from the key infrastructural Ministries (Energy; Transport; Works&amp; Public Assets; Water Resources) to discuss the project across the board to ensure collaboration and communication is occurring within government. The Minister responded saying he would be keen to discuss the project at Cabinet Level first.</p>
<b>Ministry of Works and</b>	<p>The Ministry stated that it is fundamentally important that the project engages with them on three key areas:</p>	<p>Water is a necessity for humans and so any project</p>	<p>Lack of communication could become a real issue. It is suggested the project engages with the Ministry of Information</p>	<p>Ensure communication with the relevant ministries.</p>



Key stakeholder	Impact on stakeholders from EPC project	Positive impact	Negative impact	Recommendations
<b>Public Assets</b>	<p>Communities: FWRP must formally inform the ministry in regard to resettlement.</p> <p>Procurement &amp; Quality of materials: The ministry must ensure quality of materials that are being utilised in the project. They are currently working with Angelique International – an Engineering Procurement Construction Company whom deal with the ministries procurement processes.</p> <p>Compensation: The ministry is in charge of evaluating and issuing compensation to civilians. Henceforth, when it comes to resettlement they will need to be involved.</p>	that aims to increase access is a positive.	<p>in order to create real awareness amongst communities. This will in turn help to mitigate vandalism in the long term and improve sustainability.</p> <p>It is also noted that in order to mitigate conflict across government ministries and increase collaboration, the project should hold a meeting with the key infrastructure-related departments. This will also help to clarify everybody's role.</p>	
<b>National Protected Areas Authority</b>	<p>The NPAA will be engaged in oversight with regard to works. The NPAA works to promote biodiversity conservation, wildlife management, research and provides for the sale of ecosystems services in the National Protected Areas. Henceforth, the work of the FWRP overlaps extensively with the NPAA in terms of the socio-environmental impacts of the works.</p> <p>A primary concern of the NPAA is deforestation.</p>	<p>This will of course benefit people if they are able to have better access to safe water supplies.</p> <p>Information sharing could benefit the ministry e.g. a thorough audit of GVWC's assets including GIS data. Also, the collection of GIS information in areas in which the project will be active.</p>	Deforestation; human encroachment. GVWC must ensure that they have environmental safeguards in place around their facilities.	



Key stakeholder	Impact on stakeholders from EPC project	Positive impact	Negative impact	Recommendations
<b>Police</b>	<p>Role includes public order management, and this includes community consultation and traffic diversion support. Traffic and general duty police officers can be deployed to support traffic management.</p> <p>Rush hours are 0500-1000 &amp; 1600-2200. Main affected areas are Lumley, Juba &amp; Main Motor Road Congo Cross</p>	No direct effect- good for development of the city	<p>Disruption caused by construction. Information has not been forthcoming to the communities (<i>unlikely to be aware of the FGD, KIIs, Questionnaires, Public Disclosures and other non-ESHIA communications</i>)</p>	Works could be undertaken at night to avoid disruption
<b>Sierra Leone Electricity and Water Regulatory Commission</b>	<p>The Commission state that this project intertwines with their work in a significant way as it addresses much of the issues the Commission have been working on. For example, as the project seeks to improve distribution, the Commission are focused on improving the quality of water supply for consumers. Furthermore, they note consumers' dissatisfaction with GVWC/utility companies' lack of response to issues and thus hope this project will address some of these problems.</p>	<p>As the quality of service improves the consumer will be more willing to pay and therefore GVWC will begin to accumulate capital for future investment.</p> <p>Illegally connected consumers will be brought into the formal sector.</p>	<p>As works progress, issues will arise around disruption to water supply and resettlement. To mitigate these risks, it is a necessity to continually communicate effectively to communities about what is happening.</p> <p>There was also mention that while the project seeks to increase effectiveness, GVWC must work to build capacity in order to manage and maintain the network.</p>	<p>It was suggested that a baseline study be conducted, so as to allow for measurement of benefits accruing from works.</p> <p>The project must seek to include the informal sector both as a moral obligation as well as being an economic benefit in the long run.</p>
<b>Tacugama Rangers</b>	<p>The project extensively overlaps with the work that Tacugama carries out. One of the key aims of the conservation park is to protect the catchment areas and therefore</p>	<p>This project is seen as a real step in the right direction towards rehabilitation, environmental protection and</p>	<p>A potential negative impact could be the damage caused by taking equipment to and from the sites, but this should</p>	<p>It is put forward that GVWC need to liaise more with the National Protected Area Authority (NPAA). The</p>



Key stakeholder	Impact on stakeholders from EPC project	Positive impact	Negative impact	Recommendations
	Tacugama sees this project as an opportunity to continue environmental protection.	community engagement in and around the National Park. Work on additional weirs could provide an excuse for increased protection activity. It is perceived as only a positive.	be minimal. There is also concern that opening up pathways could encourage encroachment, which could be addressed by closing & re-routing access post works.	NPAA is under-funded and therefore does not have all the resources required to guard the necessary areas. However, if GVWC were to provide some additional funding this would increase the chances of protection and limit encroachment into the National Park.
<b>WASH Net</b>	WASH-Net's mission is to contribute to the development of Sierra-Leone by supporting the poor and marginalized groups to access safe water, improved sanitation and hygiene as a human right, engage government and other stakeholders to ensure that these services are delivered effectively to all. They do this by advocating for increasing numbers of poor households and vulnerable groups to be able to enjoy the benefits of safe water and sanitation services for domestic and productive use that is reducing poverty.	Positive on the lives of people in a general sense. Providing water to certain areas will help alleviate certain social vices e.g. sexual predation & extortion at public water points. Reduction of leakages will help guarantee supply. A long-term strategy is preferable over quick fixes.	As supply is assured, so demand will rise. Capacity needs to be increased to manage it. Has GVWC the structures in place to deal with aggrieved consumers? Robust customer relations will be required to meet increased expectations.	<p>Many perceive that the WASH sector needs to be people-centred work.</p> <p>WASH Net state the importance of engaging and involving communities from the grass-roots level. In doing so, it is noted that behaviours and practices are more likely to shift in relation to services of this nature.</p> <p>It needs to be a people-centred approach.</p>



Key stakeholder	Impact on stakeholders from EPC project	Positive impact	Negative impact	Recommendations
<b>Western Rural District Council</b>	<p>Some of the works will be undertaken within Western Rural District and any project that will help move away from boreholes and streams as water sources are seen as positive. This fits within their development plans.</p> <p>There are no landfill or waste processing sites for construction waste. Only one depositing site.</p> <p>Can help relocate street traders in conjunction with the Ministry of Lands</p>	The potential for increasing customers leading to more revenue collection and higher customer satisfaction. Please to see consideration of dry season being considered in the works.	The construction will lead to road works.	<p>SLRA should be consulted.</p> <p>The Council should be consulted to help raise awareness and engagement.</p>

We have, as part of the wider Rehabilitation Project engaged with ASI, African Development Bank and FCC Mayor.





#### **8.2.4 Public Disclosure**

Four public disclosures were undertaken. For each public disclosure a presentation of the ESHIA and the project was given. This was to provide context and further inform the local communities. All presentations are included in Appendix 9.

In Table 20, the attendance information is shown. In the West and Calaba Town public disclosure the gender ratio was fairly even. West had a high number of youths attending but was the only meeting with less representation from the more senior community members. At the Central Public Disclosure a few ministries, donors and other organisations attended.



**Table 20: Public Disclosure Plan and Attendance**

Public Disclosures	Date	Location	Attendance No	Communities/Organisations
<b>West</b>	20 <sup>th</sup> August 2018 10am to 12pm	Angola Town	99	<ul style="list-style-type: none"> <li>• Adonkia</li> <li>• Angola</li> </ul>
<b>East-Calaba Town</b>	22 <sup>nd</sup> August 2018 10am to 12pm	Pamuronkoh	80	<ul style="list-style-type: none"> <li>• Pamuronkoh</li> <li>• Wellington</li> <li>• Bungura</li> <li>• Bottom Oku</li> <li>• Phillip Street</li> <li>• Koya Town</li> <li>• Fullah Town</li> <li>• Peacock Farm</li> <li>• Mallion Community</li> <li>• Calaba Town</li> <li>• Old Wharf</li> <li>• Sea Side Lane</li> <li>• Kola Tree</li> <li>• Kabal Town</li> </ul>
<b>Central</b>	23 <sup>rd</sup> August 2018 10am to 12pm	British Council	22	<ul style="list-style-type: none"> <li>• GWWC</li> <li>• Njala University</li> <li>• African Development Bank</li> <li>• EPA</li> <li>• Mott MacDonald</li> <li>• ASI</li> <li>• NCP</li> <li>• Police</li> <li>• Ministry of Works and Public Assets</li> <li>• Millennium Challenge Corporation</li> </ul>
<b>East-Mongegba</b>	24 <sup>th</sup> August 2018 10am to 12pm	Mongegba	170	<ul style="list-style-type: none"> <li>• Mongegba</li> <li>• Mortem</li> <li>• Charlotte</li> </ul>

The transcripts of the disclosures have been summarised in Table 21. This only includes the key questions asked and general comments as this highlights their concerns. Questions and the full transcripts have been included in Appendix 11.



Table 21: Summary of Transcripts

Public Disclosures	General Comments and Questions	Recommendations
<b>West – Angola Town and Adonkia</b>	<ul style="list-style-type: none"> <li>Will the project directly benefit me?</li> <li>Can we move back after the construction works?</li> <li>Is there an alternative water source?</li> <li>Will the project delay me getting to work?</li> <li>How quick will the reconnection be</li> </ul>	<ul style="list-style-type: none"> <li>The project will specifically benefit this area through increased water supply and supply pressure to Angola Town and Marjay Town</li> <li>Youth will be involved by implementing the local content policy through labour and procurement</li> <li>The traffic management plan will ensure minimal traffic disruption.</li> <li>The Resettlement Action Plan will ensure people are not worse off after being relocated</li> </ul>
<b>East- Calaba Town</b>	<ul style="list-style-type: none"> <li>Who is responsible for this project / how will it be monitored after completion?</li> <li>How will the pipes be secured from cutting?</li> <li>What is the priority for schools?</li> <li>What are the impacts on Animals and Trees?</li> <li>What are the project start and end dates?</li> <li>What about water to hospitals?</li> </ul>	<ul style="list-style-type: none"> <li>GVWC as an M&amp;E system to keep track of performance.</li> <li>The rehabilitated pipes will be laid underground, which will make it very unlikely they will be cut again. That said the community will have a collective responsibility as well.</li> <li>Schools and Hospitals will be provided with water tanks by GVWC's pro-poor unit. Community Water Services can provide guidance on how to obtain services for community assets.</li> <li>There will be no damage/disruption to plants and animals in Pamuronkoh community, though elsewhere consideration has been given to replanting of trees where necessary.</li> </ul>
<b>Central</b>	<ul style="list-style-type: none"> <li>Monitoring of the Works</li> <li>Impact Significance- How were these prioritised</li> <li>What happens if contractors don't meet requirements</li> <li>Penalties for non-conformities?</li> <li>Noise impacts how will these be determined</li> <li>Who is responsible for each mitigation measure?</li> </ul>	<ul style="list-style-type: none"> <li>Mott MacDonald is providing project oversight and will monitor the management of the ESMP. EPA will also monitor and intervene/penalise in case of any breaches.</li> <li>Impacts have been rated based on magnitude, duration, scale and probability. Overall the project will have limited impact, a full ESHIA was required because of the wide geographic scope.</li> <li>Responsibilities between BAM and GVWC have been laid out in the ESMP.</li> <li>Collaborate with ASI in regard to the Kiosks.</li> </ul>



Public Disclosures	General Comments and Questions	Recommendations
East- Mongegba	<ul style="list-style-type: none"><li>• How will youths benefit?</li><li>• Duration of the project</li><li>• Benefits to my community?</li><li>• How secure will the weirs be?</li><li>• Will the communities be consulted before locating the dams?</li><li>• “Land grabbing, wood cutting and coal burning will cease in the water source areas when this project begins.”</li></ul>	<ul style="list-style-type: none"><li>• The communities will benefit by way of employment and the stakeholders will work in collaboration with the youth before and during the implementation phase of the project.</li><li>• No dams will be constructed, though the project indeed commits to collaborate with the communities, as has already been done through the FGDs and public disclosure meetings.</li><li>• The areas where weir will be constructed are not prone to landslides or eruptions.</li></ul>



## Section 9: Environmental and Social Management Plan

The Environmental and Social Management Plan forms the final phase of the ESHIA and produces a document that will assist in the implementations. The objectives are:

- Reduce the impacts on the environment, socio-economics, community and works health through well thought out mitigation measures;
- Providing monitoring measures that will ensure that the impacts are being limited and the mitigation measures enforced;
- Provide a framework for the implementation of the mitigation and monitoring measures.

This is a stand-alone document in Appendix 1 that builds on the impact and risks to create a document that can be implemented in the field. This is written for the project's key actors, those involved in constructing and operating the water supply, so that the ESMP objectives can be achieved.

### **The Structure is as follows:**

- 1- Organisational capacity and competency
- 2- Monitoring and Evaluation
- 3- The Management, Mitigation and Monitoring

### **It sets out the key actors as:**

- |  |   |
|--|---|
| • IMC Worldwide Ltd                            | • Government of Sierra Leone- Ministry of Works |
| • BAM Nuttall Ltd                              | • Environmental Protection Authority            |
| • Labour Agency                                | • Mott MacDonald                                |
| • Guma Valley Water Company                    | • Njala Environmental Technicians (NET)         |
| • Department for International Development, UK | • Atkins  |

It also sets out training, reporting and summarises the legislation.

From there we move on to the full action plan which sets out general mitigation measures for all WP and the specific mitigation measures for WP1, WP 3, WP5, WP6 and WP9. The key mitigation measures include:

- Waste Management including a plan in case of asbestos pipes
- Public and Worker Safety (see Appendix 4, Appendix 12, Appendix 13)
- Minimising cutting of vegetation;
- Toolbox briefings on a range of environmental, social and safety aspects
- Traffic Management Plan
- Stakeholder coordination



## Section 10: Conclusions

The Freetown Water project is intended to deliver improvements to the water supply infrastructure and network in Freetown. Works will improve the reliability of the treatment processes at Water Treatment Plants both at Guma Dam and in Allen Town, rehabilitate or construction extended networks in the city, improve reservoirs, and other associated infrastructure. It is expected to deliver more reliable piped supplies of water to greater portions of the population.

An ESHIA has been conducted on the impacts of the project and in general, the majority of the proposed works are expected to have minor to moderate environmental and social impacts, especially if they are designed and constructed in a manner that minimises and mitigate impacts. Examples of this include minimising the extent of above-ground pipelines, installing pipes to avoid resettlement and engaging with affected people properly, among others.

Temporary impacts may be significant in some areas though, especially in densely populated, congested, and highly trafficked areas. Many of these impacts can be mitigated by having a detailed Construction Environmental Management Plan for the project which is followed by the contract, and detailed traffic management plans. Adequate communication and community engagement is a must that GVWC must prioritise with the support of the EPC Contractor.

Works that have some significant permanent environmental impacts are associated with:

- Works relating to bat colonies at GVWC Intake Tower access tunnel;
- Works in the Western Forest National Park or its buffer zone - related to the construction of two weirs at Mortem and Mongegba;
- Works requiring handling and disposal of hazardous materials – associated with asbestos cement pipe decommissioning and replacement.

Mitigation measures are proposed and plans for all three issues as detailed: Encroachment in water catchment areas like Mongegba is an example on how an untouched area in the buffer zone can be affected by anthropogenic degradation. It is recommended GVWC and NPAA work together such that like with the conservation approach of Tacugama weir, deforested works at Mortem and Mongegba are converted into Protected Areas so the NPAA rangers can patrol and limit encroachment. Mitigation measures have been proposed for addressing bat colonies in the intake tunnel and to handle asbestos cement pipes in the ESMP in Appendix 1.

The stakeholder consultation in this project included 380 resident responses to a socio-economic survey, focus groups in seven communities and nine interviews of key organisations. In general stakeholders were positive about the project, suggested mitigation measures that the team has reviewed and considered and requested continued communication. Lack of adequate community engagement is a risk that has consistently been highlighted during focus group discussions and key informant interviews. It is therefore a must that GVWC and the EPC manage communication effectively to avoid community dissatisfaction. Inter-governmental collaboration, including parastatals is consider as being beneficial for an improved water catchment conservation and water service provision in Freetown.

In general, it is considered that the project has an overall positive impact on Freetown. Any permanent effects per the ESHIA assessment are expected to be site specific or local.





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- World Business Council for Sustainable Development (2016) Guidelines for Environmental and Social Impact Assessment. Cement Sustainability Initiative.  
<https://www.wbcsdcement.org/pdf/Guidelines%20for%20Environmental%20&%20Social%20Impact%20Assessment.pdf>



## **Appendix 1: Environmental and Social Management Plan**



# Appendix 1: Environmental and Social Management Plan

The Environmental and Social Management Plan forms the final phase of the ESHIA and produces a document that will assist in the implementations. The objectives are:

- Reduce the impacts on the environment, socio-economics, community and works health through well thought out mitigation measures;
- Providing monitoring measures that will ensure that the impacts are being limited and the mitigation measures enforced;
- Provide a framework for the implementation of the mitigation and monitoring measures.

This is a stand-alone document that builds on the impact and risks findings from the ESHIA to create a document that can be implemented in the field. This is written for the project's key actors, those involved in constructing and operating the water supply, so that the ESMP objectives can be achieved.

## 1.1 Project Overview

Between 2017 and 2019, Freetown Water, a consortium of IMC Worldwide, BAM Nuttall and Atkins will design and implement the rehabilitation and reconstruction of the water network of Freetown. The project aims to improve the living situation for the citizens of Freetown through the improved public service delivery of fresh, clean water. This will be to increase sustainable access to safe water in Freetown and reduce the risk of disease.

In December 2017, the screening decision was made by the Environmental Protection Agency (EPA) that the following work packages will require a full Environmental, Social and Health Impact Assessment (ESHIA) and an Environmental and Social Management Plan (ESMP):

- 1- Guma Dam and Water Treatment Work;
- 3- Transmission Network Improvements and Services Reservoirs;
- 5- Distribution Improvements;
- 6- Rehabilitation of Transmission and Distribution Main in Charlotte to Allen Town Area; and
- 9- Enhance Water Supply to Wilberforce and Other Communities.

IMC Worldwide and Njala Environmental Technicians have partnered up to produce the full ESHIA process for these work packages and to obtain the environmental license.

## 1.2 Environmental and Social Management Plan

The ESMP is a plan of monitoring and mitigation measures that reduces impacts and manages residual effects and risk that are identified during the ESHIA. The ESHIA study identified potential risks and impacts to the Environment, Socio-Economics and Health that need to be addressed. From there, the ESMP forms a standalone action plan for mitigations and monitoring; mobilize organizational capacity and resources to implement these measures; and scheduling the resources.

This process is based on the PDCA: Plan – Do – Check – Act cycle, Figure 1. The impacts are assessed during the ESHIA and a Plan is put together to respond to impacts identified (plan stage). You then implement the mitigation measures identified in the plan (Do). Monitor or review the mitigation measures and the impacts identified (Check). Then you implement any changes due to non-conformant and respond to newly identified risk (Act). From there you can improve the ESMP (back to Plan).

The impacts were identified and assessed during the ESHIA to give them a significance rating. This rating defines their management priority for the ESMP:



Figure 1: PDCA Cycle

- Major Negative Impact- Priority for mitigation and monitoring measures- the monitoring is likely to be extensive such as further survey work after construction;
- Moderate Negative Impact- Mitigation and monitoring measures required;
- Minor Negative Impact- Mitigation measures should be in place where available and monitoring measures should ensure the enforcement;
- Negligible Impact- No measures are likely required. However, mitigation measure will still be included if they are low in resources, dismisses any risk or creates a positive impact;
- Positive Impact- Monitoring measures could occur to ensure that the positive impacts occur.

These mitigation measures will follow the mitigation measures hierarchy and be feasible. The mitigation hierarchy, Figure 2, sets out the preferable order of mitigations measures with preventing and minimising the impact, rehabilitating the environment and lastly offsetting and compensating any harm. However, the mitigation measures also need to be possible within the capacity and capabilities of the key actors. Without this it will not be achievable.



Figure 2: Mitigation Hierarchy

The monitoring programme also needs to be appropriate and clear. The monitoring will look at indicators that show whether the mitigation measure is being enforced and where appropriate measures the residual impacts on the receptors.

Both mitigation and monitoring measures will be SMART to ensure that they are implementable and appropriate, see Figure 3. This requires clear responsibilities, reporting measures, timescales and monitoring instructions. The measures should also be possible and achievable in limiting negative impacts and maximising positive impacts.



Figure 3: SMART Objectives



### 1.3 ESMP Structure

The Structure is as follows:

- **Organisational capacity and competency-** This looks at the organisation structure and commitment so that the roles are clearly defined; the capacity building and training required to implement the ESMP; and the resources and costs associated with implementation.
- **Monitoring and Evaluation-** How the monitoring and mitigation will be reported and how it will be reviewed as well as the legal compliance and the penalties for non-compliance.
- **The Management, Mitigation and Monitoring-** this is the action plan for how to respond to each impact and risks. This covers the impact, mitigation measure, action party (responsible party), when by, monitoring, reporting, resources and cost, evidence of completion and status of completion. This starts with general mitigation measures and then is organised by work package for usability.

### 1.4 Organisational Capacity and Competency

This project involves a lot of key actors which are summarised in the Figure 4. The responsibilities, resources, capacity and resources are important to understand so that the ESMP can be implemented

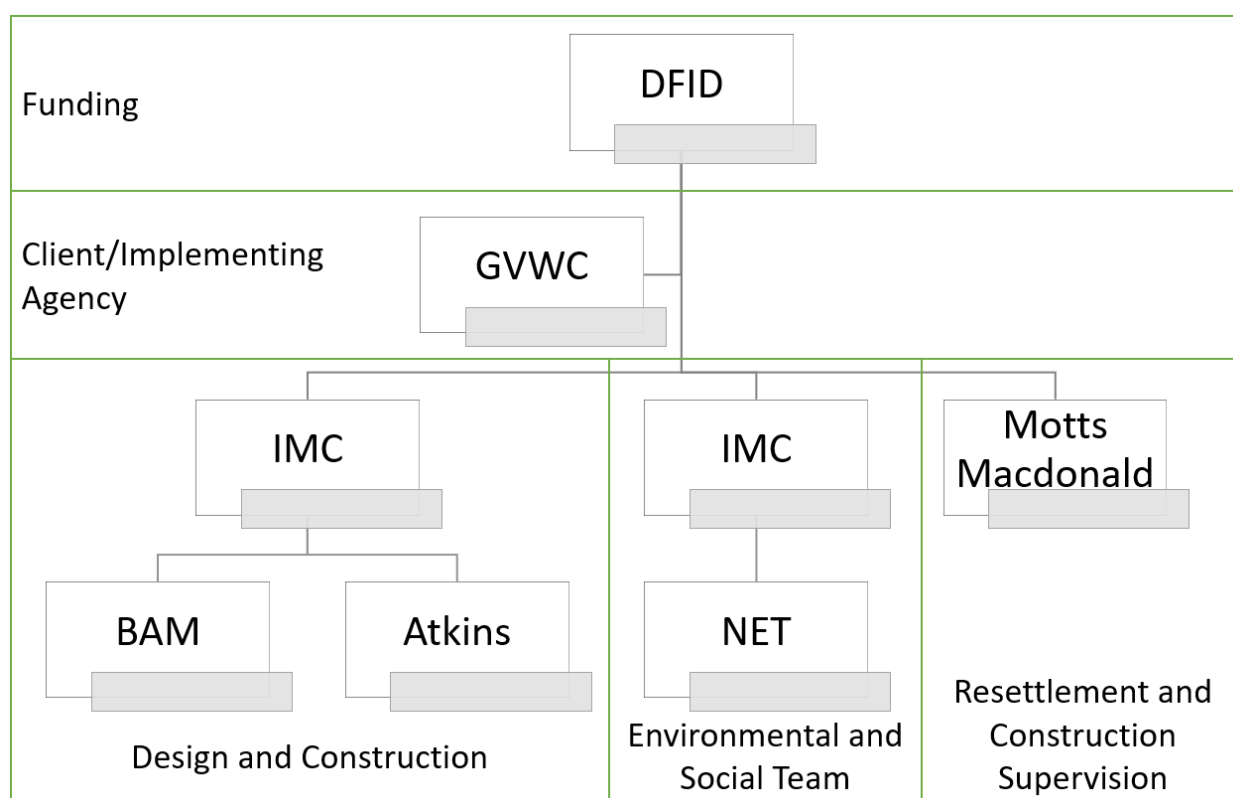


Figure 4: Organogram





#### **1.4.1 Key actors:**

##### *IMC Worldwide Ltd*

Manages the NEC contract Freetown Water Project. Has brought in Atkins Acuity Ltd for the Design and BAM Nuttall Ltd for Construction. IMC is also producing the ESHIA and ESMP with the support from Njala Environmental Technicians.

##### *BAM Nuttall Ltd*

UK Construction Contractor that will construct the works. As the Contractor, it is their responsibility to undertake the mitigation and monitoring measures specified in the ESMP and are committed to;

- Complying fully with the Environmental Licenses issues by the EPA
- Complying with Sierra Leone laws relevant to the employment of labour, health and safety, Environment and other safeguarding policies relevant to the project
- Abiding by the contractual requirements regarding Environmental protection and social responsiveness
- Minimizing the effects of construction on the environment and social aspects by ensuring implementation of the required mitigation and monitoring measures and undertaking period reviews and reporting
- Integrating good environmental and social principles into all aspects of the construction works
- Promoting a high level of environmental and social awareness within BAM, suppliers, subcontractors and labour agencies
- Ensure that the EPA has access to the site and monitoring data when required for monitoring and enforcement.

##### *Labour Agency*

Finding and employing of the labour workforce required for this project. The workers employed by this agency will need to follow the instruction of the ESMP, however BAM will communicate this to them through the measures included in the ESMP. BAM will need to ensure that the contracts covers health and safety, social and environmental aspects.

Their responsibilities:

- Following the directions and advice issued to them by BAM
  - This includes information from the toolbox meetings and signs;
- Abiding by the contractual requirements regarding Environmental protection and social responsiveness
- Minimizing the effects of construction on the environment and social aspects by ensuring implementation of the required mitigation and monitoring measures and undertaking period reviews and reporting as per directed by BAM
- Integrating good environmental and social principles into all aspects of the construction works
- Ensure a high level of environmental and social awareness
- Attend toolbox meetings

##### *Guma Valley Water Company*

Implementing Agent and Client. Supporting the ESHIA and ESMP process. Will be take over use, management and maintenance after the contract has been completed. Their responsibilities include:



- Ensure adequate environmental and social mitigation measures are respected
- Ensure adequate community engagement is undertaken at all times
- Liaise with key stakeholders at government and CSO level throughout the project

#### *Department for International Development, UK*

Funding the rehabilitation of the water supply project which does not include funding for resettlement. Providing the oversight and supervision of the overall NEC contract. Also hold responsibility for the supervision of the resettlement action plan and construction supervision.

#### *Government of Sierra Leone*

Funding the compensation of any resettlement due to the project construction and rehabilitation activities.

#### *Environmental Protection Authority*

Approval of the ESHIA and ESMP documentation and in charge of issuing Environmental Licences as well as ensuring compliance with the ESMP.

Will undertake auditing and enforcement of the licenses and may require access to the sites and monitoring data.

#### *Mott MacDonald*

Holds a contract with DFID to deliver the Resettlement Action Plan (RAP) and Construction Supervision. As the Resident Engineering they will hold the responsibility for the ensure the correct implementation of the ESMP.

#### *Njala Environmental Technicians*

Part of the Njala University, supporting the ESHIA and ESMP development.

#### *Atkins*

The engineering firm that is in charge of the design phase of the project which is meant to consider the environmental and social aspects in their detailed designs.

### **1.4.2 Influencers:**

- **National Protected Areas Authority** – Manages and controls works that are undertaken within the Protected Area and Buffer Zone.
- **Sierra Leone Roads Authority** – Manages the roads and right of way (RoW) which includes any resettlement in the RoW.
- **Sierra Leone Police** – Manages traffic in Freetown.

### **1.4.3 Relevant Training**

Everyone responsible for undertaking work must be trained on the contents of the ESMP so that they have a basic level of understanding about the environmental and social factors. This should include:

- What the ESMP is and what the objective is:



- The environment and social elements around the work package areas:
- The potential impacts:
- Potential mitigate measures- what they can do:
  - This should include the general mitigation measures such as preventing inappropriate interactions with the local communities.
- Why mitigation is important: and
- Any procedures relating to health and safety.

All staff visiting site will go through a site induction and that will include an introduction to the ESMP. All work packages will include method statements detailing the ESMP measures and staff will sign off.

#### **1.4.4 Toolbox Meetings**

Site specific measures should be covered in the toolbox meetings before the work at the site begins. This also should reiterate the initial training measures.

#### **1.4.5 Specific Training**

Environmental training on project specific environmental aspects will be given where required to assist staff and labour to carry out their specific tasks within the ESMP.

#### **1.4.6 Resources- Timings and Costs**

Costing's will be submitted once design is complete and ESMP has been approved.

### **1.5 Monitoring and Evaluation**

#### **1.5.1 Legal Compliance**

All relevant acts, regulations, policies and strategies need to be considered when undertaking the project.

#### **The Environmental Protection Agency Act 2008/2010**

<b>Summary of key aspects of the Acts</b>	<b>Project links</b>	<b>Responsible stakeholders</b>
Large infrastructure projects require an EIA	<ul style="list-style-type: none"><li>• ESHIA submitted to the EPA</li><li>• Impacts identified and mitigated</li><li>• Stakeholders consulted</li></ul>	<ul style="list-style-type: none"><li>• Guma Valley Water Company</li><li>• EPA</li><li>• Freetown Consortium (IMC, BAM and Atkins)</li></ul>
Key auditors of any environmental projects	<ul style="list-style-type: none"><li>• Environmental Impact Assessment (EIA) approval</li><li>• Environmental Management Reporting</li><li>• Access to site and project data when required</li></ul>	<ul style="list-style-type: none"><li>• EPA</li><li>• GVWC</li><li>• Freetown Consortium</li></ul>



### The Forest Act 1988

Summary of key aspects of the Acts	Project links	Responsible stakeholders
Conservation for Forest ecology and landscape	<ul style="list-style-type: none"> <li>Excavation and trenching for pipelines installation</li> <li>Bush clearing and machinery movement</li> </ul>	<ul style="list-style-type: none"> <li>EPA</li> <li>Forestry Division</li> <li>Freetown Consortium</li> </ul>

### The Forest Regulations 1989

Summary of key aspects of the Acts	Project links	Responsible stakeholders
Enforcing and upholding the cultural links of forest in Sierra Leone	<ul style="list-style-type: none"> <li>Pipeline and weir installation</li> </ul>	<ul style="list-style-type: none"> <li>EPA</li> <li>NPAA</li> <li>Chief Conservator of the Forest</li> <li>Freetown Consortium</li> <li>GVWC</li> </ul>

### The Natural Water Resources Management Agency Act 2017 [No. 5 of 2017]

Summary of key aspects of the Act	Project links	Responsible stakeholders
Equitable distribution of drinking water	<ul style="list-style-type: none"> <li>Extension to the water supply</li> <li>Temporary disruptions</li> </ul>	<ul style="list-style-type: none"> <li>Community Leadership</li> <li>GVWC</li> <li>Freetown Consortium</li> </ul>
Water resources quality management and control	<ul style="list-style-type: none"> <li>Contamination management during construction</li> </ul>	<ul style="list-style-type: none"> <li>Freetown Consortium</li> <li>GVWC</li> <li>EPA</li> </ul>

### The Sierra Leone Local Content Agency Act 2016 [No.3 of 2016]

Summary of key aspects of the Act	Project links	Responsible stakeholders
Enforced national youth and labour involvement in works and construction where possible and appropriate	<ul style="list-style-type: none"> <li>Recruitment of laborers into the project</li> </ul>	<ul style="list-style-type: none"> <li>Freetown Consortium</li> <li>Community Leadership</li> <li>GVWC</li> <li>Ministry of Labour</li> </ul>
Use of Sierra Leone business and produce when available and appropriate	<ul style="list-style-type: none"> <li>Use of material and equipment</li> </ul>	<ul style="list-style-type: none"> <li>Freetown Consortium</li> <li>GVWC</li> </ul>

### The Public Health Amendment Act 2014 [No.10 of 2014]



Summary of key aspects of the Act	Project links	Responsible stakeholders
Waste management	<ul style="list-style-type: none"> <li>Production of waste during project works</li> <li>Use of fossil fuel and oil- risk of spilt</li> </ul>	<ul style="list-style-type: none"> <li>GVWC</li> <li>EPA</li> <li>Freetown Consortium</li> </ul>
Sanitation and hygiene facility management at work place	<ul style="list-style-type: none"> <li>Sanitation requirements by workers during project activities</li> <li>Congestions at project accommodation and littering</li> </ul>	<ul style="list-style-type: none"> <li>GVWC</li> <li>EPA</li> <li>Freetown Consortium</li> </ul>

#### The National Protected Area Authority and Conservation Trust Fund Act 2012 [No.11 of 2012]

Summary of key aspects of the Act	Project links	Responsible stakeholders
Protect the use of natural resources especially in protected areas	<ul style="list-style-type: none"> <li>Process of bush clearing and excavation within and nearby protected areas</li> <li>Presence of human at the time of work</li> </ul>	<ul style="list-style-type: none"> <li>Freetown Consortium</li> <li>GVWC</li> <li>NPAA</li> </ul>

#### Wildlife Conservation Act 1972

Summary of key aspects of the Act	Project links	Responsible stakeholders
Minimise the disturbance and prevent degradation of the National Park.	<ul style="list-style-type: none"> <li>Works being undertaken in or around the National Park</li> </ul>	<ul style="list-style-type: none"> <li>NPAA</li> <li>GVWC</li> <li>Freetown Consortium</li> </ul>

#### Regulation of Wages and Industrial Relations Act 1971

Summary of key aspects of the Act	Project links	Responsible stakeholders
Contracting staff employed on the project	<ul style="list-style-type: none"> <li>Employing workers for construction</li> </ul>	<ul style="list-style-type: none"> <li>Ministry of Labour</li> <li>Freetown Consortium</li> </ul>
Ensuring contract enforces the national standards	<ul style="list-style-type: none"> <li>Employing workers for construction</li> </ul>	<ul style="list-style-type: none"> <li>Ministry of Labour</li> <li>Freetown Consortium</li> </ul>

#### The National Water and Sanitation Policy 2010

Summary of key aspects of the Act	Project links	Responsible stakeholders



Improve water supply coverage in urban areas	<ul style="list-style-type: none"> <li>• Extends and improves the network</li> </ul>	<ul style="list-style-type: none"> <li>• Freetown Consortium</li> <li>• GVWC</li> </ul>
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### Conservation and Wildlife Policy 2010

Summary of key aspects of the Act	Project links	Responsible stakeholders
Minimise and prevents impacts on protected areas	<ul style="list-style-type: none"> <li>• Works within or near the National Park and Protected Area</li> </ul>	<ul style="list-style-type: none"> <li>• Freetown Consortium</li> <li>• NPAA</li> <li>• GVWC</li> </ul>

### The National Environmental Policy 1990

Summary of key aspects of the Act	Project links	Responsible stakeholders
Conserve the environment	<ul style="list-style-type: none"> <li>• Works to be undertaken in the natural environment</li> </ul>	<ul style="list-style-type: none"> <li>• Freetown Consortium</li> <li>• NPAA</li> <li>• GVWC</li> </ul>

### The Agenda for Prosperity: Sierra Leone's Third Generation Poverty Reduction Strategy Paper 2013

Summary of key aspects of the Act	Project links	Responsible stakeholders
Pillar 2- Managing natural resources-increasing access to water, protect land ownership and sustainable manage forests	<ul style="list-style-type: none"> <li>• Improve access to water</li> <li>• Some of the work packages are undertaken in forested areas</li> <li>• Land acquisition will occur</li> </ul>	<ul style="list-style-type: none"> <li>• Freetown Consortium</li> <li>• GVWC</li> <li>• Ministry of Lands, Country Planning and Environment</li> <li>• Mott MacDonald</li> </ul>
Pillar 5 – Labour and Employment: Equal Opportunities and employment.	<ul style="list-style-type: none"> <li>• The project will employ construction workers</li> </ul>	<ul style="list-style-type: none"> <li>• Freetown Consortium</li> <li>• GVWC</li> </ul>

### National Biodiversity Strategy and Action Plan 2017

Summary of key aspects of the Act	Project links	Responsible stakeholders
Ensure compliance with legislation and policy	<ul style="list-style-type: none"> <li>• Project is aligned and follows several environmental laws.</li> </ul>	<ul style="list-style-type: none"> <li>• Freetown Consortium</li> <li>• GVWC</li> </ul>





Conserve the natural environment where possible	<ul style="list-style-type: none"> <li>Project will have an effect on the natural environment</li> </ul>	<ul style="list-style-type: none"> <li>Freetown Consortium</li> <li>GVWC</li> </ul>
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## National Policy Roadmap on Integrated Waste Management 2015

Summary of key aspects of the Act	Project links	Responsible stakeholders
Minimise, reuse and recycle waste	<ul style="list-style-type: none"> <li>Waste will be produced throughout the project</li> </ul>	<ul style="list-style-type: none"> <li>Freetown Consortium</li> <li>GVWC</li> </ul>
Ensure safe storage and collection	<ul style="list-style-type: none"> <li>Waste will be produced throughout the project</li> </ul>	<ul style="list-style-type: none"> <li>Freetown Consortium</li> <li>GVWC</li> </ul>

## Forestry Policy 2010

Summary of key aspects of the Act	Project links	Responsible stakeholders
Conserve the environment and protect the economic benefits of the forest	<ul style="list-style-type: none"> <li>Works to be undertaken in the natural environment</li> </ul>	<ul style="list-style-type: none"> <li>Freetown Consortium</li> <li>NPAA</li> <li>GVWC</li> </ul>
Follow Appropriate planning procedures	<ul style="list-style-type: none"> <li>Project is undertaking this ESHIA</li> </ul>	<ul style="list-style-type: none"> <li>Freetown Consortium</li> <li>GVWC</li> <li>EPA</li> </ul>

### 1.5.2 Reporting

- Weekly BAM Team meeting with a section on HSQE Meetings – escalate to Programme Board, escalate to Programme Board

To discuss any issues, non-conformities and risk. This should be a BAM internal meeting where they can invite other key actors where required.

- Programme Meetings

To summarise any environmental or social issues, non-conformities, risks and also all the mitigation and monitoring information from that period. This should be between BAM, Motts, GVWC and DFID, however other key actors can be invited where required.

- Quarterly Reports

As part of EPA guidelines, a quarterly monitoring reports should be produced by BAM and submitted to the EPA and IMC. This should contain an outline of the work undertaken, their associated mitigation measures relevant to construction and the monitoring data from the past 3 months. This is to show EPA that we are complying with the ESHIA Licence.

- Annual Meeting

This will be undertaken with the aim of:



- Review progress on Action Plan;
- Make any necessary improvements to the Action Plan;
- Review compliance with laws and policy;
- Review the environmental and social performance;
- Discuss future activities;
- Review resources; and
- Identify training needs.

### 1.5.3 Non-Conformities and Penalties

EPC Contracts and GVWC will commit to comply with the terms of the Environmental License. The consequences of not resolving these non-conformities or other serious failures to comply to the EIA licenses can lead to US \$10,000 and/or 2 years imprisonment. However there have been cases that have led to deportation and the company expelled.

## 1.6 The Management, Mitigation and Monitoring Plan

### 1.6.1 Action Plan

The action plan sets out how the mitigation and monitoring can be implemented. The first eleven columns are filled out but the last two, in green, needs to be filled out during the process of the ESMP implementation.

- **Work Package-** The project work package where the impact will occur.
- **Impact-** These are the impacts identified during the ESHIA study.
- **Categorisation-** This groups the impact together that make the document easier to navigate and reduce reputation
- **Impact Duration-** The impact duration: temporary, short term, medium term, long term or permanent.
- **Significance Rating-** This is the significance scoring of the impact based on duration, scale, magnitude and probability.
- **Mitigation-** Measures that should be in placed to mitigate the impact.
- **Action Party-** The responsible position that will implement (or is in charge of implementing) the mitigation and monitoring.
- **Schedule-** Time scale over which mitigation and monitoring measures is required.
- **Monitoring-** What monitoring measures are required.
- **Reporting-** How this will be reported?
- **Resources and Cost-** *Undertaken at final construction costings-* What are the resourcing requirements for the mitigation and monitoring measure.
- **Evidence of Completion-** *Undertaken during implementation-* How have you measured that these mitigation measures are complete. This should build off the reporting stage
- **Status of Completion-** *Undertaken during implementation-* This should be: yet to start, implementing or completed.

WP	Category	Impacts	Duration	Significance Register	Mitigations	Action Party	Schedule	Monitoring Part	Reporting	Resources and Cost	Evidence of Completion	Status of Completion
3.1, 3.2, 5.2, 5.9, 6.9	Worker and Public Safety	Risk of injury on site  Road Traffic Accidents	Temporary	Moderate negative impact	<ul style="list-style-type: none"> <li>• Health and Safety Plan and a First Aid and Emergency Preparedness plan should be produced.</li> <li>• Safety conditions in the trenches during construction phase shall be ensured through the use of appropriate battering, shoring systems and dewatering.</li> <li>• Workers should not enter a trench without appropriate safety precautions.</li> <li>• Safe access and thoroughfare must be provided on site at all times.</li> <li>• Trenches and excavated areas shall be clearly identified and temporary fencing, drainage crossing, access routes and signage provided to improve access and avoid accidental falls into these areas.</li> <li>• Clearly understandable warning signs, barriers and signals shall be placed at strategic locations in sufficient number and spacing for all prominent access ways to the sites.</li> <li>• Warning signs and other protective barriers shall be erected to prevent accidents to citizens due to open ditches, heavy machinery and construction vehicles etc.</li> <li>• The entrance to the site should be gated or similarly securable.</li> <li>• Sites should be suitable secured when not in use.</li> <li>• Security at formal compounds when necessary.</li> <li>• Use and enforcement of appropriate PPE.</li> <li>• Manage the fatigue of the staff through limiting individuals working time to 12 hours.</li> <li>• Snake bites and other negative biodiversity interactions need to be covered in the First Aid and Emergency Preparedness Plan.</li> <li>• Construction sites need to be properly closed with removal of all waste material and the area reinstated</li> <li>• Alcohol and Drugs- No alcohol or drugs on site; No using machinery, equipment and driving well under the influence of drugs or over the 0.08% blood-alcohol concentration legal drinking limit (Sierra Leone Road Traffic Act 2007).</li> </ul>	BAM	Through out the works	• Visual inspection, construction documents review (H&S plan)	Weekly and 'near-misses'			
3.1, 3.2, 5.2, 5.9, 6.9	Disruption of Public Utilities and Service due to relocation and damage	The works proposed will necessitate some road cuts, excavation of trenches which in some cases produces the following impacts: - Relocation of existing public utilities resulting in the interruption of water and electricity services for a period of time. - Accidental damages to existing services might occur during excavation;	Temporary	Moderate negative impact	<ul style="list-style-type: none"> <li>• Area of works well demarcated following consultations with utility companies to determine the locations and alignments of electrical cables, water mains and communication cables.</li> <li>• Keep utilities informed prior to excavations within the 20 m of their respective alignments</li> <li>• Produce a detailed works' planning and construction phasing schedule to reduce disruption time, and coordinate service interruption with public utilities and FCC/Wards.</li> <li>• Advise affected people at least 3 days (preferable 5 days) in advance regarding schedule interruptions in water and electricity services.</li> <li>• Notification to affected people should include timeframe of the disruptions, what will happen and how they will be reconnected</li> <li>• Repair any accidental damage to electrical cables as soon as possible.</li> </ul>	GVWC-connecting, disconnecting and reconnecting BAM	Through out the works	• Visual inspection, construction documents review	Weekly during periods of disturbance			
1.4, 1.5, 1.8, 3.1, 3.2, 5.2, 5.9, 6.9	Water discharges	Potential for Water Pollution  Changes in local hydrology e.g. Run off  Soil Erosion	Temporary	Moderate negative impact	The Contractor may need to extract storm waters from the trenches and other construction works to ensure safe working conditions.	BAM	Particularly during site set up and through out the works	• Visual inspection, construction documents review . If temporary drainage was required then take pictures of its installation.	Weekly and 'near-misses'			

WP	Category	Impacts	Duration	Significance Register	Mitigations	Action Party	Schedule	Monitoring Part	Reporting	Resources and Cost	Evidence of Completion	Status of Completion
3.1, 3.2, 5.2, 5.9, 6.9, 9.1	Traffic Disturbance	Traffic congestion and temporary road closures: - Increased risk of accidents - Materials supply and disposal will generate circulation of trucks on the Peninsular Highway Reagent Road	Temporary	Moderate negative impact	<ul style="list-style-type: none"> <li>• Prepare and implement a traffic management plan</li> <li>• Coordinate all traffic arrangements with Police, SLRA and FCC, Ministry of Works, Wards and other authorities as relevant</li> <li>• Advise affected people in advance regarding road closures and rerouting of vehicle and pedestrian traffic</li> <li>• Outside of working hours, especially at night, all barriers and signs will remain at sites, with lighting and / or lighted signs placed as required to warn both vehicular and pedestrian traffic</li> <li>• Flagmen shall be used, where appropriate, to warn and direct vehicle traffic around construction sites and hazards during working hours</li> <li>• Restore or improve the project environment to the state to which it was prior to construction.</li> <li>• Where safety/isolating barriers, etc., cannot be installed sufficient trained staff shall always be present to manage construction-related activities and public movement (consider use of 2-way radios).</li> <li>• GVWC will inform community leaders of local work before works commence.</li> </ul>	BAM & GVWC & Motts	Throughout any diversions	<ul style="list-style-type: none"> <li>• Evidence of consultation (meeting notes and meeting calendar set ups) with the police:</li> <li>• Evidence of informing the chiefs where possible (I.e. SMS):</li> <li>• Reports/notes and other information on the route diversions and traffic management plans.</li> </ul>	Weekly during periods of disturbance and near misses			
3.1, 3.2, 5.2, 5.9, 6.9	Excavation of Trenches and Road Cuts for installation of water mains/pipelines	Reduced access to homes and businesses	Temporary	Moderate negative impact	<ul style="list-style-type: none"> <li>• Most works will be carried out in short sessions so that it should not disrupt access. However, if a longer length is required to limit disruption and disturbance then consideration should be given to cross points.</li> <li>• Trenches and excavated areas shall be clearly identified and temporary fencing, drainage crossing, access routes and signage provided to improve access and avoid accidental falls into these areas.</li> <li>• GVWC to give prior consultation and notification to affected people is required.</li> </ul>	BAM/GVWC	Through out the works	<ul style="list-style-type: none"> <li>• Inspection and documentary review</li> </ul>	Weekly during periods of disturbance and near misses			
1.5, 1.6, 1.7, 1.8, 3.1, 3.2, 5.2, 5.9, 6.9, 9.1	Air pollution due to dust and emissions generated from construction activities  Greenhouse Gases Emissions	Respiratory health impacts caused by motorised vehicles on pedestrians, nearby residents and site workers	Temporary	Moderate negative impact	<ul style="list-style-type: none"> <li>• Appropriate use of transport and equipment - as per the official transport or equipment instructions and using the appropriately tool for the job.</li> <li>• Manage stockpiles and materials to prevent dust, slips and falls</li> <li>• Cover materials being transported.</li> <li>• If there is a large amount of dust likely to be produced from certain activities or due to adverse weather then wetting materials and equipment and screening of specific sites to prevent dust entering the atmosphere.</li> <li>• Appropriate PPE (eyes an respiratory protection) where the workers are exposed to an above normal level of dust.</li> </ul>	BAM	Through out the works	<ul style="list-style-type: none"> <li>• Visual inspection, documentary review (H&amp;S plan)</li> </ul>	Monthly			
1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 3.1, 3.2, 5.2, 5.9, 6.9, 9.1	Noise generation	Noise produced by excavation and concrete and rock breaking from powered mechanical equipment and other sources of noise from regular construction activities  Noise Disturbance on local communities, wildlife and workers	Temporary	Moderate negative impact	<ul style="list-style-type: none"> <li>• Hearing protection equipment for workers where the noise level is expected to reach hazardous levels.</li> <li>• Noise disturbance will normally be limited to working hours.</li> <li>• Where the work will be undertaken night time consideration will be given to local residents. If the residents are unfairly effected then compensation should be considered.</li> <li>• Proper maintenance of vehicles and machinery following maintenance requirements</li> <li>• Take into consideration noise suppression capability in the procurement of vehicle and powered mechanical equipment</li> <li>• Consideration of the location of the generator at Mile 13</li> <li>• If the noise level which will disturb the nearby residence at a level that is considered damaging to their health (globally considered to be 90dB within the residency) then temporarily removal or compensation should be investigated.</li> <li>• Consideration of location where tools should be used, in particularly generators.</li> <li>• Sensitive receptors (e.g. schools) should be identified and extra consideration should be undertaken to ensure that they will not cause undue disruption.</li> </ul>	BAM	Through out the works	<ul style="list-style-type: none"> <li>• Inspection and documentary review</li> </ul>	Weekly during periods of disturbance			

WP	Category	Impacts	Duration	Significance Register	Mitigations	Action Party	Schedule	Monitoring Part	Reporting	Resources and Cost	Evidence of Completion	Status of Completion
All Work Items	Non-Hazardous Construction Waste	Environmental degradation in adjacent properties, drainage channels, nearby streets, due to improper management of construction materials and wastes	Temporary	Moderate negative impact	<ul style="list-style-type: none"> <li>• Proper storage of materials and wastes (not overfilling bins or use bins with covers)</li> <li>• According to the law in Sierra Leone the Contractor should coordinate with the FCC on the disposal and handling of construction waste in areas that are suitable. These locations should then be included in the contractors Waste Management Plan.</li> <li>• In case of accidentally dumping waste the contractor should inform EPA/relevant authorities and spill clean up measures will be triggered. The excavated materials in the vicinity of the worksite should be kept on flat stripped land when possible to avoid dispersion and sedimentation of drainage channels to nearby streets and adjacent properties.</li> </ul>	BAM	Through out the works	• Visual inspection and documentary control (Waste Management Plan)	Monthly and near misses			
1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 3.1, 3.2, 5.2, 5.9, 6.9, 9.1	Use and Storage of fuels and Hazardous materials	Contamination of soil and water sources due to spills or leaks.  Risk of fire.  Potential for Water Pollution	Temporary	Moderate negative impact	<ul style="list-style-type: none"> <li>• Secondary containment for fuels to avoid spill contamination and inspection during operation</li> <li>• Toolbox training including training in fuel and waste handling</li> <li>• Maintain the COSHH (Control of Substances Hazardous to Health) Sheets for hazardous materials on site.</li> <li>• Fire safety equipment, designated trained staff and contact details of fire &amp; rescue service should be available on all sites</li> <li>• Designate an area within the construction sites to keep non-hazardous construction waste</li> <li>• Manage the collection of the construction waste by an approved waste removal company</li> <li>• Ensure that the waste is disposed of in a safe and appropriate location (i.e. no risk of leachate from the waste causing harm to humans or the environment)</li> </ul>	BAM	Through out the works	<ul style="list-style-type: none"> <li>• Visual inspection and documentary control (COSHH/H&amp;S and Emergency Response plan).</li> <li>• Evidence of what hazardous waste was disposed off.</li> <li>• Ensure the waste is appropriately disposed off.</li> </ul>	Weekly and 'near-misses'			
3.1, 3.2, 5.2, 5.9, 6.9	Resettlement	Relocation of houses and business	Permanent	Moderate negative impact	<ul style="list-style-type: none"> <li>• Stakeholder engagement plan</li> <li>• Communication plan</li> <li>• Adapted communication</li> <li>• Permission to lay pipes inside the Row</li> <li>• Timely mobilization of funds required for acquisition and compensation</li> <li>• Rapid follow up on land titling process once Valuation Report(s) approved and payment made</li> <li>• Where possible design to avoid resettlement</li> </ul>	MM, SLRA, GVWC	Through out the works	• RAP monitoring plan	Weekly before and during resettlement			
All Work Items	Temporary workers	Temporary workers influence and interaction with the communities leading to increase conflict and disease	Temporary	Moderate negative impact	<ul style="list-style-type: none"> <li>• Education and Awareness of the risks of HIV or other diseases through clear signs in the entrance and recreational areas.</li> <li>• Training workshop for all workers. This should define acceptable behaviour, risk of HIV, gender based violence and other measures required for positive interactions with the local communities.</li> <li>• Enforce a zero tolerance procedure on sexual misconduct for all staff.</li> <li>• Socail Conflict needs to be managed in line with the SEP</li> </ul>	BAM	Throughout Construction	<ul style="list-style-type: none"> <li>• Training records for workers</li> <li>• Training Content Recorded</li> </ul>	On file, report if requested			
All Work Items	Disturbance	Light produced from securing the site	Temporary	Moderate negative impact	<ul style="list-style-type: none"> <li>• Ensure that lights on site are not unnecessarily left on (i.e. if it is not clearly required for health and safety or security)</li> <li>• Consideration of the light during site setup, e.g. shining the lights toward the important work areas and away from the communities</li> </ul>	BAM	Through out the works	• Site Photographs				
WP1, 6.5	Disturbance	Disturbance of Wildlife	Temporary	Moderate negative impact	• Toolbox meeting on basic actions on respecting wildlife	BAM	Through out the works	• Evidence of toolbox meeting agenda	Weekly			
1.5, 1.6, 6.5	Water quality	Cement powder containing water	Temporary	Minor Negative Impact	<ul style="list-style-type: none"> <li>• Appropriately store cement powder so that it is not exposed to the environment.</li> <li>• Isolate the area from any water where the work is being undertaken.</li> </ul>	BAM	During concrete usage	• Photographs of how the concrete is stored.	Photos of storage of cement			
All Work Items	Water discharges	Pooling of water leading mosquitoes breeding	Permanent	Minor Negative Impact	<ul style="list-style-type: none"> <li>• Design and construction need to be carried out with the consideration of preventing stagnant water.</li> <li>• Site clean up and site reinstatement after construction has finished.</li> </ul>	Atkins-design BAM-construction	Construction	• Visual Inspections	End of Works			



WP	Category	Impacts	Duration	Significance Register	Mitigations	Action Party	Schedule	Monitoring Part	Reporting	Resources and Cost	Evidence of Completion	Status of Completion
1.2 & 1.3	Biodiversity	Clearing overhanging branches from the access road	Temporary	Minor Negative Impact	<ul style="list-style-type: none"> <li>Minimise cutting of vegetation on the Access Road to only to where it is necessary for safe and efficient work;</li> <li>Oversee the work to ensure that vegetation cutting is minimised.</li> </ul>	BAM	During the site set up	<ul style="list-style-type: none"> <li>Check that vegetation is not being excessively cleared;</li> <li>Photos of before and after the vegetation clearing.</li> </ul>	Maintain copies of the photos			
1.2 & 1.3	Biodiversity	Light disturbance on bats in the intake tunnel	Temporary	Major Negative Impact	<ul style="list-style-type: none"> <li>Turn off Lights daily after works complete in the water intake tunnel and tower.</li> </ul>	BAM	Through out the works	<ul style="list-style-type: none"> <li>Checking the lights are off</li> </ul>	No monitoring			
1.2 & 1.3	Biodiversity	Noise disturbance on bats in the intake tunnel	Temporary	Major Negative Impact	<ul style="list-style-type: none"> <li>Instruct Workers to work in a quiet manner where possible - no music and minimise shouting.</li> </ul>	BAM	Through out the works	<ul style="list-style-type: none"> <li>Evidence that the topic is covered in the Toolbox meeting</li> </ul>	Toolbox meeting agenda			
1.2 & 1.3	Biodiversity	Reduction in the number of bats due to habitat disturbance during construction and interaction with workers	Short term	Moderate Negative Impact	<ul style="list-style-type: none"> <li>Appropriate signs provided by the ESHIA Team to be put up during construction.</li> <li>Toolbox meeting on interaction with bats- keep noise down, turning off lights, washing hands afterwards, where boots, don't touch the bat droppings, etc.</li> <li>Work will be undertaken during rainy season- If this changes then working at night, not working between December and end of March, and/or investigation of alternative roosts (as identified by an expert).</li> </ul>	BAM	Through out the works	<ul style="list-style-type: none"> <li>Evidence that topic is covered in the toolbox meeting</li> <li>Photos of signs</li> <li>Evidence of work completion before the end of the rainy season</li> <li>Monitoring signs of bat colony through simple observations such as faecal residue.</li> </ul>	Records and photos kept			
1.2 & 1.3	Worker's Safety	Working in Poor Lighting and Confined Spaces	Temporary	Moderate Negative Impact	<ul style="list-style-type: none"> <li>Appropriate signs and a safety briefing during the toolbox meeting;</li> <li>Appropriate lighting when work is being undertaken.</li> </ul>	BAM	Through out the works	<ul style="list-style-type: none"> <li>Evidence that topic is covered in the toolbox meeting</li> </ul>	Agenda of toolbox meeting			
1.5 & 1.6	Worker's Safety	Chlorine from old pipes burning workers	Permanent	Major Negative Impact	<ul style="list-style-type: none"> <li>Wash &amp; flush all items with water before starting work, Ensure appropriate PPE to prevent acid burns;</li> <li>Set up procedures so that you can respond to chlorine burns;</li> <li>The toolbox meeting should highlight the risks of chlorine and what to do if chlorine has reached the skin.</li> </ul>	BAM	Through out the works	<ul style="list-style-type: none"> <li>Evidence that topic is covered in the toolbox meeting:</li> <li>Photo of workers before the work starts:</li> <li>Copy of Chlorine procedures.</li> </ul>	Agenda of toolbox meeting: Keep photos			
1.5 & 1.6	Local Environment	Chlorine leaking into the environment from the old pipes or from construction	Short term	Moderate Negative Impact	<ul style="list-style-type: none"> <li>Waste should be securely stored on the construction before collection of the pipe. This means that the pipes are not directly on the soil, not under rain and not exposed to water.</li> <li>If the chlorinated water is leaking from the pipes isolate the pipes from the natural environment as soon as possible.</li> </ul>	BAM	Through out the works	<ul style="list-style-type: none"> <li>Evidence of secure location on site for the storage of old chlorine pipes before disposal.</li> </ul>	Photos of secure storage and evidence in reports			
1.5 & 1.6	Handling and Storage of Construction Materials and Wastes	Waste Management of Chlorine filled pipes	Temporary	Moderate Negative Impact	<ul style="list-style-type: none"> <li>Waste should be securely stored on the construction before collection of the pipe. This means that the pipes are not directly on the soil, not under rain and not exposed to water.</li> <li>Collection of the waste by an appropriate collector.</li> <li>Ensuring the collectors dispose of the pipes appropriately</li> <li>Communication with the FCC</li> </ul>	BAM	At Waste Production to Collection	<ul style="list-style-type: none"> <li>Visual inspection and documentary control (COSHH/H&amp;S and Emergency Response plan).</li> <li>Evidence of what hazardous waste was disposed off.</li> <li>Ensure the waste is appropriately disposed off.</li> </ul>	Weekly and 'near-misses'			
1.8	Handling and Storage of Construction Materials and Wastes	Waste sludge management (including faecal sludge from portable toilets)	Temporary	High negative impact	<ul style="list-style-type: none"> <li>Manage the collection of the sludge waste from portable toilets by a waste removal company;</li> <li>Ensure that the waste is disposed of in a safe and appropriate location (i.e. no risk of leachate from the waste causing harm to humans or the environment).</li> <li>Communication with the FCC</li> </ul>	BAM	Every time the waste is disposed	<ul style="list-style-type: none"> <li>Visual inspection and documentary control (COSHH/H&amp;S and Emergency Response plan).</li> <li>Evidence of what hazardous waste was disposed off.</li> <li>Ensure the waste is appropriately disposed off.</li> </ul>	Weekly and 'near-misses'			
Laydown area	Vegetation clearing	Loss of Vegetation	Short term	Minor Negative Impact	<ul style="list-style-type: none"> <li>Minimise cutting of vegetation on the Access Road to only to where it is necessary for safe and efficient work;</li> <li>Oversee the work to ensure that vegetation cutting is minimised.</li> </ul>	BAM	During the site set up	<ul style="list-style-type: none"> <li>Check that vegetation is not being excessively cleared;</li> <li>Photos of before and after the vegetation clearing.</li> </ul>	Maintain copies of the photos.			
Laydown area	Biodiversity/ Local Communities	Access to Vegetation of community importance	Long term	Minor Negative Impact	<ul style="list-style-type: none"> <li>Protect the mature Mango Trees within the Mile 13 compound.</li> </ul>	BAM	During the site set up	<ul style="list-style-type: none"> <li>Check that vegetation is not being excessively cleared:</li> <li>Photos of before and after the vegetation clearing.</li> </ul>	Maintain copies of the photos:			



WP	Category	Impacts	Duration	Significance Register	Mitigations	Action Party	Schedule	Monitoring Part	Reporting	Resources and Cost	Evidence of Completion	Status of Completion
Laydown area	Biodiversity	Clearing of scrubs and small trees	Medium term	Major Negative Impact	<ul style="list-style-type: none"><li>• Minimise cutting of vegetation only to where it is necessary for safe and efficient work.</li><li>• Implement replanting scheme once construction phase is over- like for like restoration of mature trees over 5 years.</li><li>• Protect the Trees along the entrances which are not required for access;</li><li>• Protect the Mature Mango Trees</li><li>• Tool box training on respecting wildlife</li><li>• Keep lighting and noise to a minimum where possible</li></ul>	BAM	During the site set up	<ul style="list-style-type: none"><li>• Check that vegetation is not being excessively cleared:</li><li>• Photos of before and after the vegetation clearing.</li><li>• Monitoring for Signs of vegetation or fauna of interest (e.g. protected)</li></ul>	Maintain copies of the photos:			
Laydown area	Temporary workers	Temporary workers influence and interaction with the communities leading to increase conflict and disease	Temporary	Moderate Negative Impact	<ul style="list-style-type: none"><li>• Fencing around the compound;</li></ul>	BAM	Throughout Construction	<ul style="list-style-type: none"><li>• Photos of fencing surrounding Mile 13:</li></ul>	Keep photos			

WP	Category	Impacts	Duration	Significance Register	Mitigations	Action Party	Schedule	Monitoring Part	Reporting	Resources and Cost	Evidence of Completion	Status of Completion
5.2, 5.9	Abandoned water mains/ pipes	Abandoned pipelines can create a safety hazards and environmental problems. They effectively create underground voids, which can cause subsidence, soil destabilisation, and water ingress as well as breeding space for rodents	Temporary	Moderate negative impact	<ul style="list-style-type: none"> <li>When water mains are abandoned they shall be physically severed from the network.</li> <li>Abandoned mains shall be grouted.</li> <li>In cases where AC pipes are decommissioned a joint approach as agreed with GVWC and FCC will be adopted.</li> </ul>	BAM GVWC -  GVWC should manage the FCC relationship	Through out the works	<ul style="list-style-type: none"> <li>Visual inspection,</li> <li>Construction documents review</li> <li>Construction supervision</li> </ul>	As-builts shall include decommissioned/ grouted pipes			
5.9	Asbestos cement pipes management	Removal of AC pipes involving cutting and demolition can release asbestos fibres into the air, posing risks to public health.	Temporary	Moderate negative impact	<ul style="list-style-type: none"> <li>If asbestos is located on the project site, mark clearly as hazardous material and maintain records of pipe location</li> <li>When possible the asbestos will be appropriately contained and sealed to minimize exposure</li> <li>The asbestos prior to removal (if removal is necessary) will be treated with a wetting agent to minimize asbestos dust</li> <li>Asbestos will be handled and disposed with high regard to health and safety.</li> <li>Asbestos should be disposed of in a way that does not and will not have an impact on the health of the community and the environment</li> <li>If asbestos material is to be stored temporarily, the wastes should be securely enclosed inside closed containments and marked appropriately</li> <li>The removed asbestos will not be reused.</li> <li>Joint Asbestos Management approach between FCC, GVWC and the EPC</li> </ul>	EPC/ GVWC/ FCC	Through out the works	<ul style="list-style-type: none"> <li>Visual inspection, construction documents review, H&amp; S plan, post-decommissioning survey/monitoring programme</li> </ul>	As-builts shall include decommissioned/ grouted pipes			

WP	Category	Impacts	Duration	Significance Register	Mitigations	Action Party	Schedule	Monitoring Part	Reporting	Resources and Cost	Evidence of Completion	Status of Completion
6.5	Workers Safety	Install DN150 transmission lines from weir sites to road	Temporary	Moderate negative impact	<ul style="list-style-type: none"> <li>Temporary works systems to be developed to minimise the effects of manual handling through difficult terrain. Mechanical lifting to be utilised when working in accessible areas.</li> </ul>	BAM	Throughout the works	<ul style="list-style-type: none"> <li>Visual inspection,</li> <li>Construction documents review (H&amp;S plan)</li> </ul>	Weekly and 'near-misses'			
6.5	Clearing path from weir site to the road	The clearance of the existing path allowing materials and equipment to be taken to the weir site can increase risk of encroachment	Temporary	Moderate negative impact	<ul style="list-style-type: none"> <li>Monitoring of the signage of the vegetation of interest</li> <li>Control of the final plantation control of the defined environmental restoration.</li> <li>MoWR, EPA and NPAA Rangers to convert the buffer zone into Protected area to ensure the water source at the weir is not at risk of pollution from encroachers EPA to monitor the track during and after BAM works.</li> </ul>	EPA/ NPAA/ GVWC	Throughout the works	<ul style="list-style-type: none"> <li>Visual inspection,</li> <li>Construction documents review</li> </ul>	Weekly during clearing			
6.5	Water Pollution from construction	Risk of downstream contamination from construction materials, oil, fuels, wastes, etc.	Temporary	Moderate negative impact	<ul style="list-style-type: none"> <li>Remove all construction waste from the weir to the road.</li> <li>Manage the use of concrete and construction materials so that material doesn't flow downstream</li> </ul>	ATK/BAM	Throughout the works	<ul style="list-style-type: none"> <li>Visual inspection,</li> <li>Construction documents review</li> <li>Water quality testing downstream if known pollution events have occurred</li> </ul>	Weekly and 'near-misses'			
6.5	Encroachment	Land grabbing in the catchment area at Mortem and Mongegba can generate pollution at the water source	Medium term	Moderate negative impact	<ul style="list-style-type: none"> <li>Inter-governmental collaboration between, MoWR, NPAA, MoLP, EPA and GVWC to modify land use at the weir area from buffer zone to protected area.</li> <li>GVWC to collaborate with Tacugama Rangers to protect the area</li> <li>Gated access from the road to limit encroachment</li> <li>Community engagement with neighbouring communities to reduce encroachment</li> <li>The project must ensure that care is taken to protect valuable tree species to prevent the loss of these trees.</li> <li>Planting local trees (like for like in terms of number) on the deforested path to Mongegba is recommended to replace the mature (over 5 year old trees) lost during construction work. It is not advisable to plant invasive species such as Eucalyptus or Acacia.</li> <li>Reinstatement of the site except for the required access path and site clean up- removal of waste material, etc.</li> </ul>	EPA/NPAA /GVWC	Throughout the works	<ul style="list-style-type: none"> <li>Visual inspection,</li> <li>Construction documents review</li> <li>Monitoring of the area to ensure that no encroachment occurs will working within the area</li> </ul>	Weekly			






## Appendix 2: Design Drawings and Plans



0 65 130 260 Metres



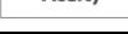


Legend

-  Bridges
-  Proposed 450mm dia Mains
-  Existing 450mm dia Mains

Rev.	Date	Description	By	Chk'd	App'd
Drawing Status			Suitability		

**WORK IN PROGRESS** **SO**

Project	  	EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone  Tel: +232 78 188040
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Client	 	P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone  Tel: +232 22 225887
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	 Member of the SNC-Lavalin Group	Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW  Tel: +44 1372 726140 www.atkinsglobal.com
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Project Title **ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY**

Drawing Title  
**PROPOSED TRANSMISSION MAINS PENINSULAR ROAD**

Scale	Designed	Drawn	Checked	Authorised
1:5,000	LS/JK	LS/MSH	RS	AC
Original Size	Date	Date	Date	Date
##	30/01/18	30/01/18	31/01/18	06/02/18

Drawing Number	Revision
FW-ATK-0301-2-DR-NE-9563	P0.1




0 0.05 0.1 0.2 0.3 0.4 Kilometers



0 65 130 260 Metres



Legend

-  Bridges
-  Proposed 450mm dia Mains
-  Existing 450mm dia Mains

Rev.	Date	Description	By	Chkd	App'd
Drawing Status			Suitability		
WORK IN PROGRESS			SO		
Project		<div><div> <b>iMC</b> worldwide  <b>Acuity</b></div><div>EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone  Tel: +232 78 188040</div></div>			
Client		<div><div> Department for International Development</div><div>P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone  Tel: +232 22 225887</div></div>			
		<div><div> Member of the SNC-Lavalin Group</div><div>Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW  Tel: +44 1372 726140 www.atkinsglobal.com</div></div>			
Project Title		ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY			
Drawing Title		PROPOSED TRANSMISSION MAINS PENINSULAR ROAD			
Scale	Designed	Drawn	Checked	Authorised	
1:5,000	LS/JK	LS/MSH	RS	AC	
Original Size	Date	Date	Date	Date	Date
##	30/01/18	30/01/18	31/01/18	06/02/18	
Drawing Number					Revision
FW-ATK-0301-2-DR-NE-9564					P0.1




0 0.05 0.1 0.2 0.3 0.4 Kilometers



0 65 130 260 Metres



## Legend

-  Bridges
-  Proposed 450mm dia Mains
-  Existing 450mm dia Mains

Rev.	Date	Description	By	Chk'd	App'd
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Drawing Status	<b>WORK IN PROGRESS</b>	Suitability	<b>SO</b>
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Project	  	EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone Tel: +232 78 188040
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Client	 	P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone Tel: +232 22 225887
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	 Member of the SNC-Lavalin Group	Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW Tel: +44 1372 726140 www.atkinsglobal.com
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Project Title	<b>ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY</b>
---------------	--

Drawing Title	<b>PROPOSED TRANSMISSION MAINS PENINSULAR ROAD</b>
---------------	--

Scale	1:5,000	Designed	LS/JK	Drawn	LS/MSH	Checked	RS	Authorised	AC
Original Size	##	Date	30/01/18	Date	30/01/18	Date	31/01/18	Date	06/02/18

Drawing Number	FW-ATK-0301-2-DR-NE-9565	Revision	P0.1
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0 0.05 0.1 0.2 0.3 0.4 Kilometers





## Legend

### 5.2 - CORE NETWORK

- Proposed DN80
- Proposed DN100
- Proposed DN150

### EXISTING NETWORK

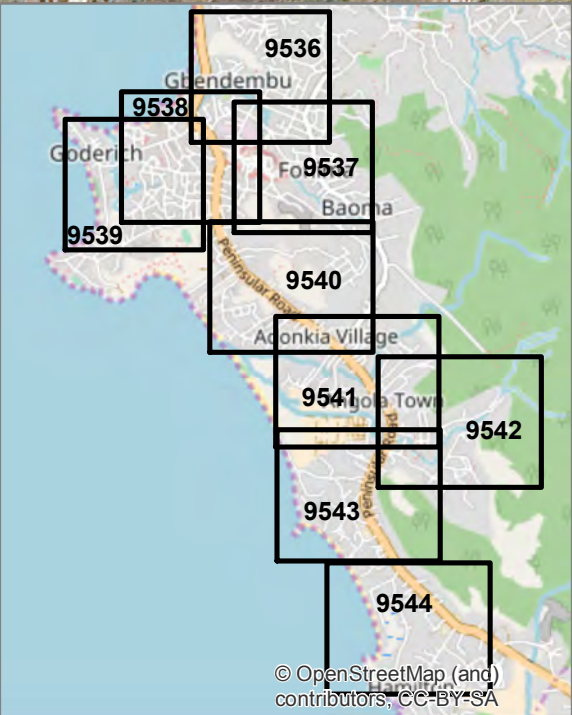
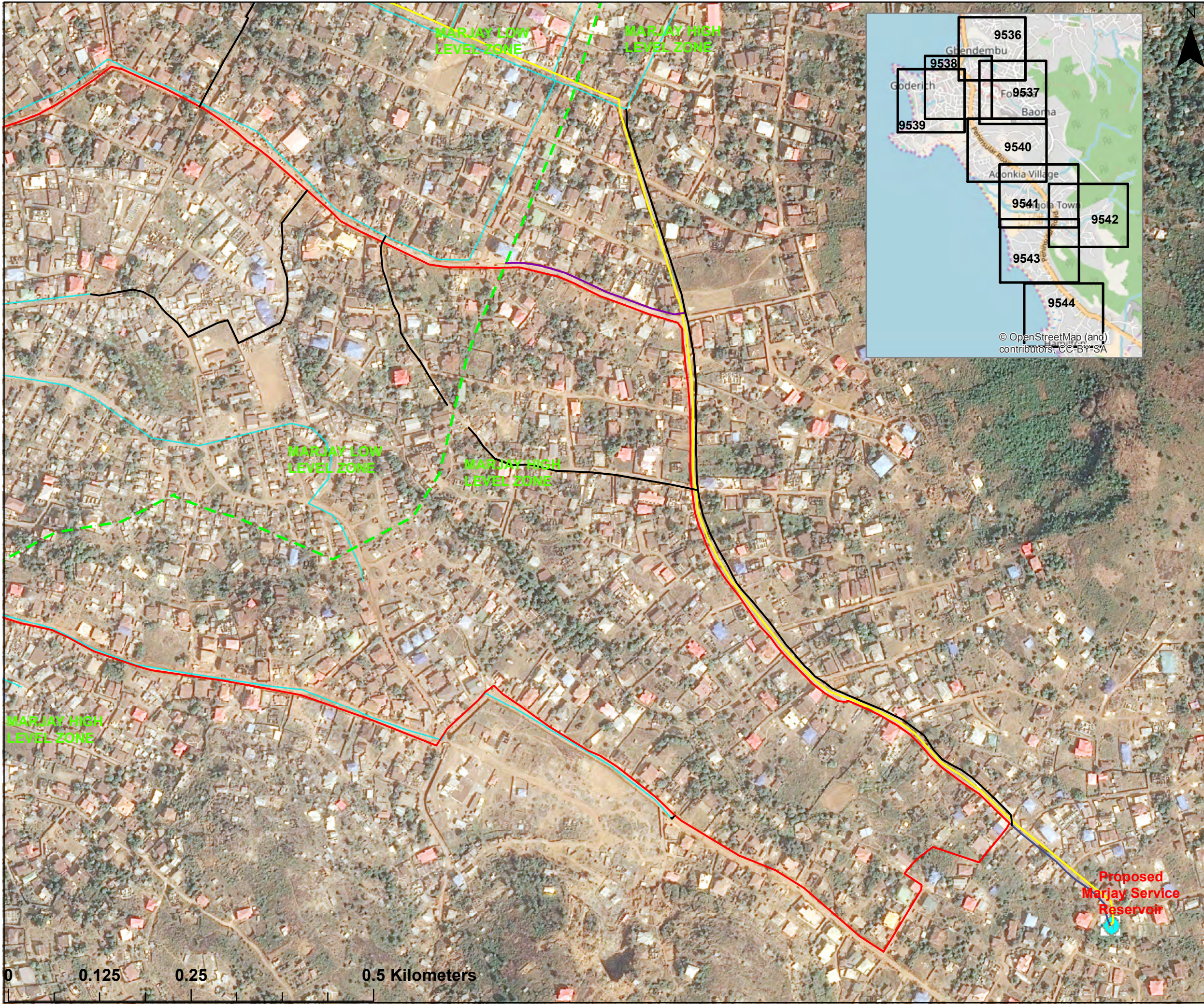
- EXISTING NETWORK

### 3.2 INLET AND OUTLET MAINS

- DN200 Outlet
- DN200 Inlet
- DN300 Outlet
- DN300 Inlet

P0.1	26/01/18	Stage 2 Issue	JNK	CC	RS/AC
Rev.	Date	Description	By	Chk'd	App'd
Drawing Status	WORK IN PROGRESS				SO
Project	   <div>EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone Tel: +232 78 188040</div>				
Client	  <div>P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone Tel: +232 22 225887</div>				
	 <div>Member of the SNC-Lavalin Group</div> <div>Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW Tel: +44 1372 726140 www.atkinsglobal.com</div>				
Project Title	ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY				
Drawing Title	5.2 CORE NETWORK WEST AND 3.2 INLET & OUTLET MAINS				
Scale	1:5,000	Designed	JNK	Drawn	JNK
Original Size	A3	Date	26/01/18	Date	26/01/18
Drawing Number	FW-ATK-0502-2-DR-NE-9536				Revision
				P0.1	





## Legend

### 5.2 - CORE NETWORK

- Proposed DN80
- Proposed DN100
- Proposed DN150

### EXISTING NETWORK

- EXISTING NETWORK

### 3.2 INLET AND OUTLET MAINS

- DN200 Outlet
- DN200 Inlet
- DN300 Outlet
- DN300 Inlet

P0.1	26/01/18	Stage 2 Issue			JNK	CC	RS/AC		
Rev.	Date	Description				By	Chkd	App'd	
Drawing Status						Suitability			
WORK IN PROGRESS						SO			
Project		  		EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone  Tel: +232 78 188040					
Client		 		P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone  Tel: +232 22 225887					
		 Member of the SNC-Lavalin Group		Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT1 8BW  Tel: +44 1372 726140 <a href="http://www.atkinsglobal.com">www.atkinsglobal.com</a>					
Project Title		ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY							
Drawing Title		5.2 CORE NETWORK WEST AND 3.2 INLET & OUTLET MAINS							
Scale	1:5,000	Designed	JNK	Drawn	JNK	Checked	CC	Authorised	RS/AC
Original Size	A3	Date	26/01/18	Date	26/01/18	Date	26/01/18	Date	26/01/18
Drawing Number								Revision	
FW-ATK-0502-2-DR-NE-9537								P0.1	





### Legend

#### 5.2 - CORE NETWORK

- Proposed DN80
- Proposed DN100
- Proposed DN150

#### EXISTING NETWORK

- EXISTING NETWORK

#### 3.2 INLET AND OUTLET MAINS

- DN200 Outlet
- DN200 Inlet
- DN300 Outlet
- DN300 Inlet

P0.1	26/01/18	Stage 2 Issue		JNK	CC	RS/AC
Rev.	Date	Description			By	Chk'd App'd
Drawing Status					Suitability	
WORK IN PROGRESS					SO	
Project		<div><div><div>imc worldwide</div></div><div><div>bam</div></div><div><div>Acuity</div></div></div>		<div>EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone Tel: +232 78 188040</div>		
Client		<div><div><div>Sierra Leone Ministry of Works and Infrastructure</div></div><div><div>Department for International Development</div></div></div>		<div>P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone Tel: +232 22 225887</div>		
		<div><div><div>Member of the SNC-Lavalin Group</div></div></div>		<div>Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW Tel: +44 1372 726140 www.atkinsglobal.com</div>		
Project Title		ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY				
Drawing Title		5.2 CORE NETWORK WEST AND 3.2 INLET & OUTLET MAINS				
Scale	Designed	Drawn	Checked	Authorised		
1:5,000	JNK	JNK	CC	RS/AC		
Original Size	Date	Date	Date	Date	Date	
A3	26/01/18	26/01/18	26/01/18	26/01/18	26/01/18	
Drawing Number				Revision		
FW-ATK-0502-2-DR-NE-9538				P0.1		





## Legend

### 5.2 - CORE NETWORK

- Proposed DN80
- Proposed DN100
- Proposed DN150

### EXISTING NETWORK

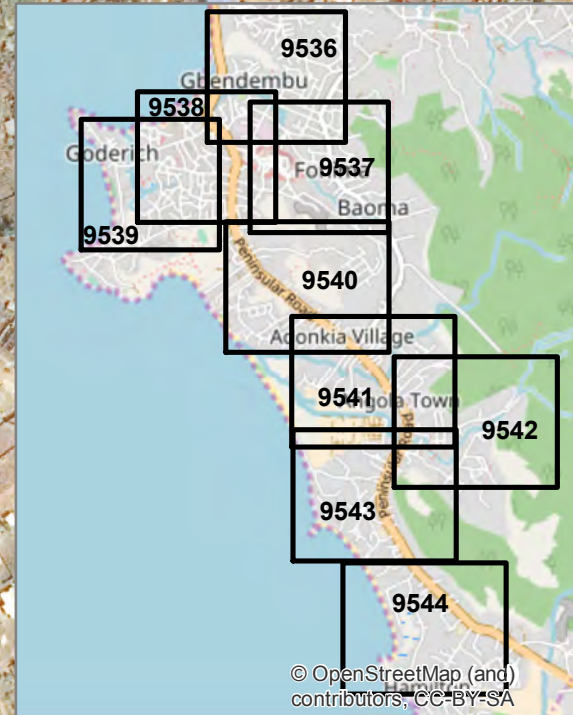
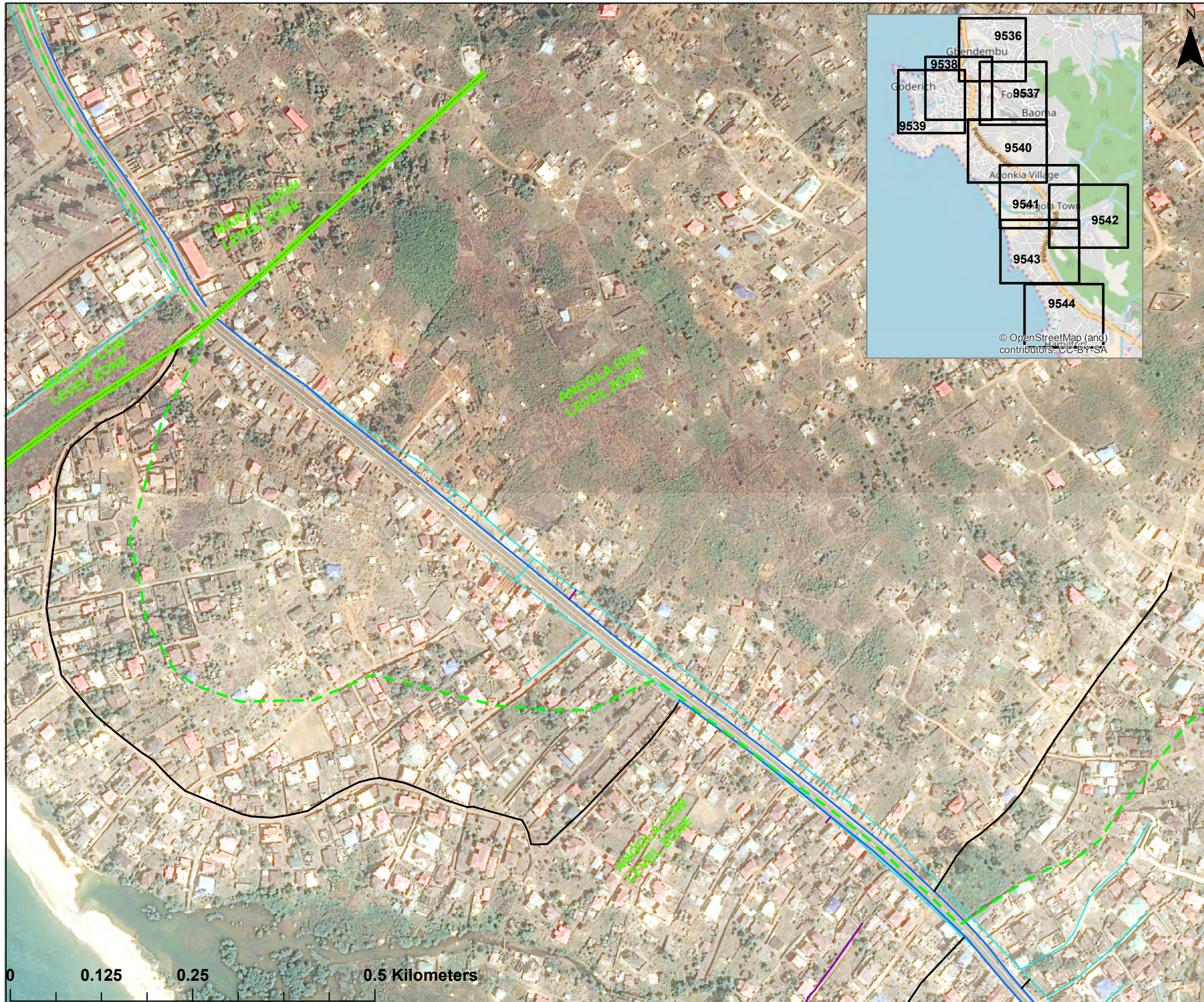
- EXISTING NETWORK

### 3.2 INLET AND OUTLET MAINS

- DN200 Outlet
- DN200 Inlet
- DN300 Outlet
- DN300 Inlet

P0.1	26/01/18	Stage 2 Issue	JNK	CC	RS/AC
Rev.	Date	Description	By	Chk'd	App'd
Drawing Status	WORK IN PROGRESS				S0
Project	<div><div></div><div>EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone Tel: +232 78 188040</div></div>				
Client	<div><div></div><div>P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone Tel: +232 22 225887</div></div>				
	<div><div><div>Member of the SNC-Lavalin Group</div></div><div>Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW Tel: +44 1372 726140 www.atkinsglobal.com</div></div>				
Project Title	ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY				
Drawing Title	5.2 CORE NETWORK WEST AND 3.2 INLET & OUTLET MAINS				
Scale	1:5,000	Designed	JNK	Drawn	JNK
Original Size	A3	Date	26/01/18	Date	26/01/18
Drawing Number	FW-ATK-0502-2-DR-NE-9539				Revision
				P0.1	





## Legend

### 5.2 - CORE NETWORK


- Proposed DN80
- Proposed DN100
- Proposed DN150

### EXISTING NETWORK

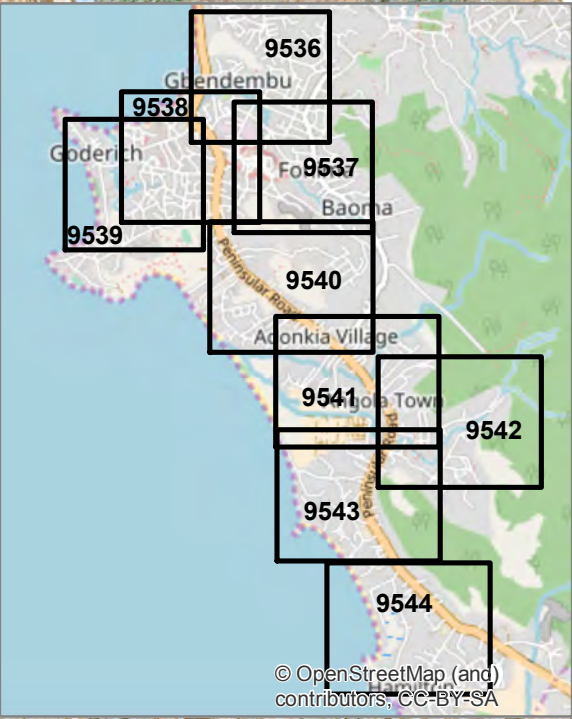
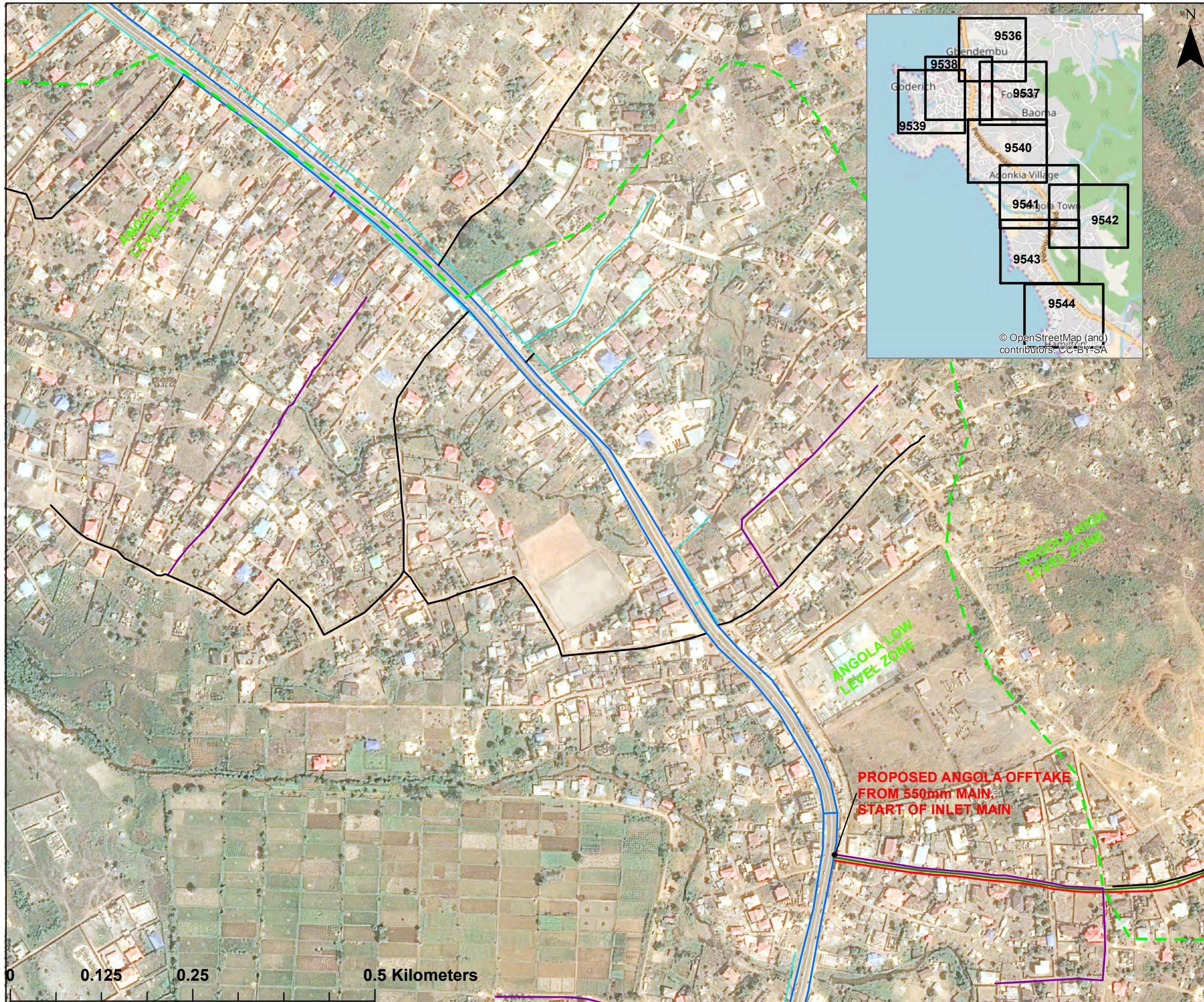
- EXISTING NETWORK

### 3.2 INLET AND OUTLET MAINS

- DN200 Outlet
- DN200 Inlet
- DN300 Outlet
- DN300 Inlet

P0.1	26/01/18	Stage 2 Issue		JNK	CC	RS/AC
Rev.	Date	Description		By	Chk'd	App'd
Drawing Status					Suitability	
WORK IN PROGRESS					SO	
Project		<div><div>IMC worldwide</div><div>bam</div><div>Acuity</div></div> <div>EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone  Tel: +232 78 188040</div>				
Client		<div><div>Sierra Leone Water Authority</div><div>Department for International Development</div></div> <div>P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone  Tel: +232 22 225887</div>				
		<div><div>Member of the SNC-Lavalin Group</div></div> <div>Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW  Tel: +44 1372 726140 www.atkinsglobal.com</div>				
Project Title		ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY				
Drawing Title		5.2 CORE NETWORK WEST AND 3.2 INLET & OUTLET MAINS				
Scale	Designed	Drawn	Checked	Authorised		
1:5,000	JNK	JNK	CC	RS/AC		
Original Size	Date	Date	Date	Date	Date	
A3	26/01/18	26/01/18	26/01/18	26/01/18	26/01/18	
Drawing Number					Revision	
FW-ATK-0502-2-DR-NE-9540					P0.1	





## Legend

### 5.2 - CORE NETWORK

- Proposed DN80
- Proposed DN100
- Proposed DN150

### EXISTING NETWORK

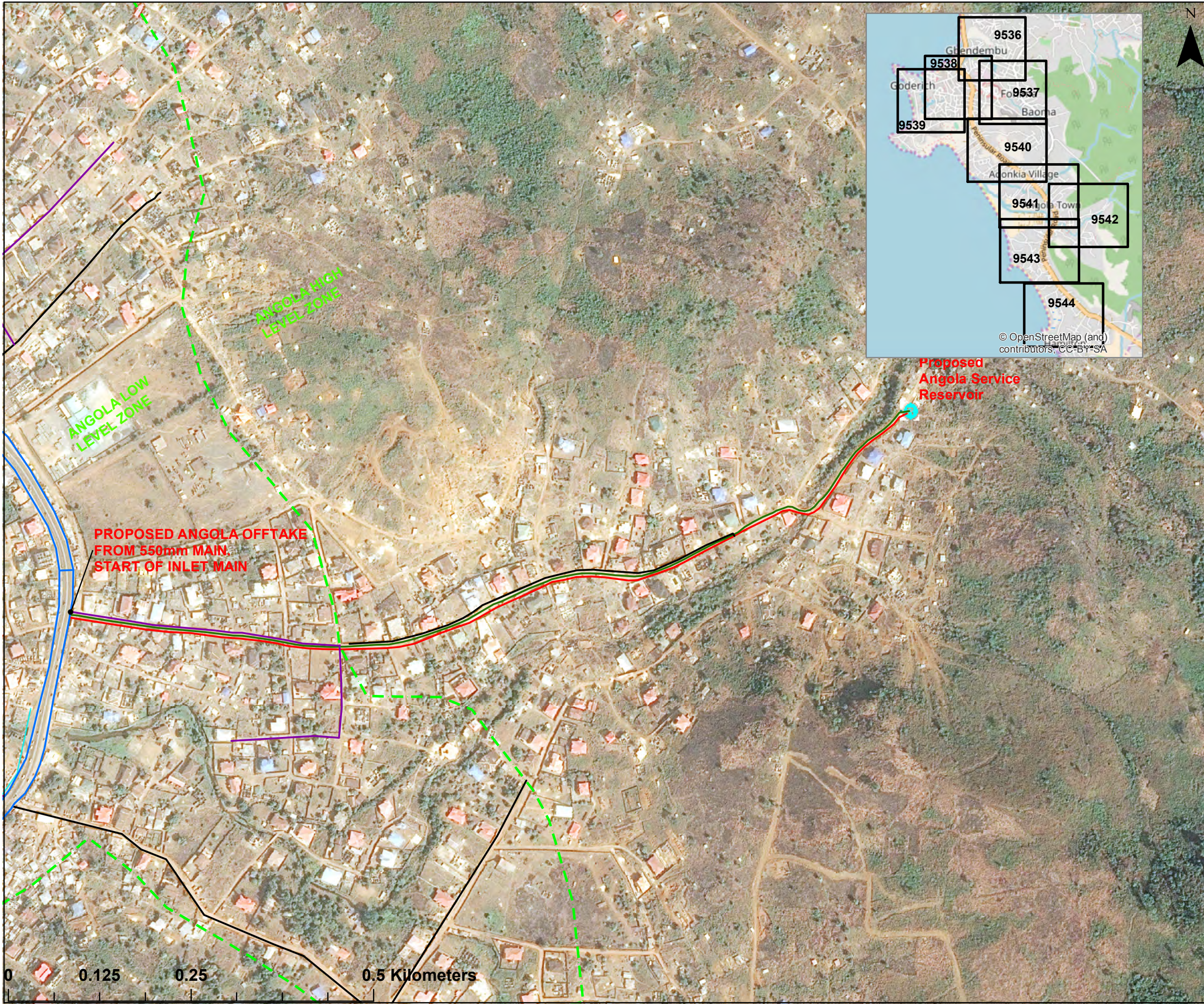
- EXISTING NETWORK

### 3.2 INLET AND OUTLET MAINS

- DN200 Outlet
- DN200 Inlet
- DN300 Outlet
- DN300 Inlet

P0.1	26/01/18	Stage 2 Issue	JNK	CC	RS/AC
Rev.	Date	Description	By	Chk'd	App'd
Drawing Status					Suitability
WORK IN PROGRESS					SO
Project	   EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone Tel: +232 78 188040				
Client	  P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone Tel: +232 22 225887				
	 Member of the SNC-Lavalin Group Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW Tel: +44 1372 726140 www.atkinsglobal.com				
Project Title	ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY				
Drawing Title	5.2 CORE NETWORK WEST AND 3.2 INLET & OUTLET MAINS				
Scale	1:5,000	Designed	JNK	Drawn	JNK
Original Size	A3	Date	26/01/18	Date	26/01/18
Drawing Number	FW-ATK-0502-2-DR-NE-9541				Revision
				P0.1	





### Legend

**5.2 - CORE NETWORK**

- Proposed DN80
- Proposed DN100
- Proposed DN150

**EXISTING NETWORK**

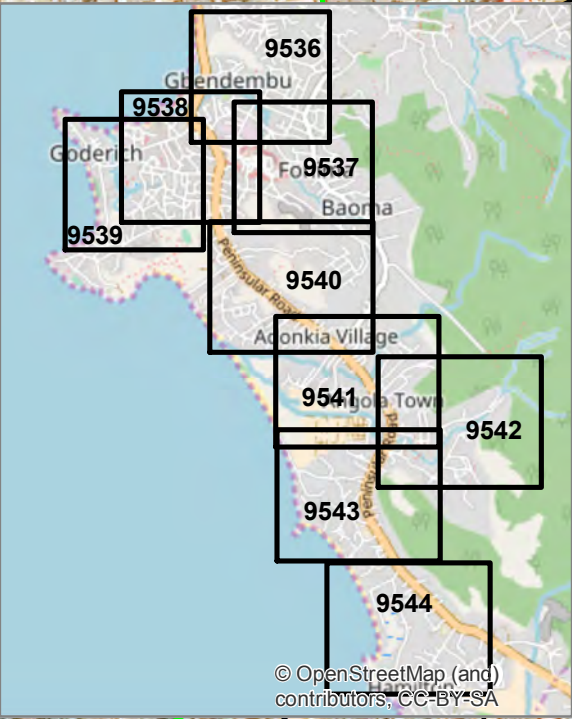
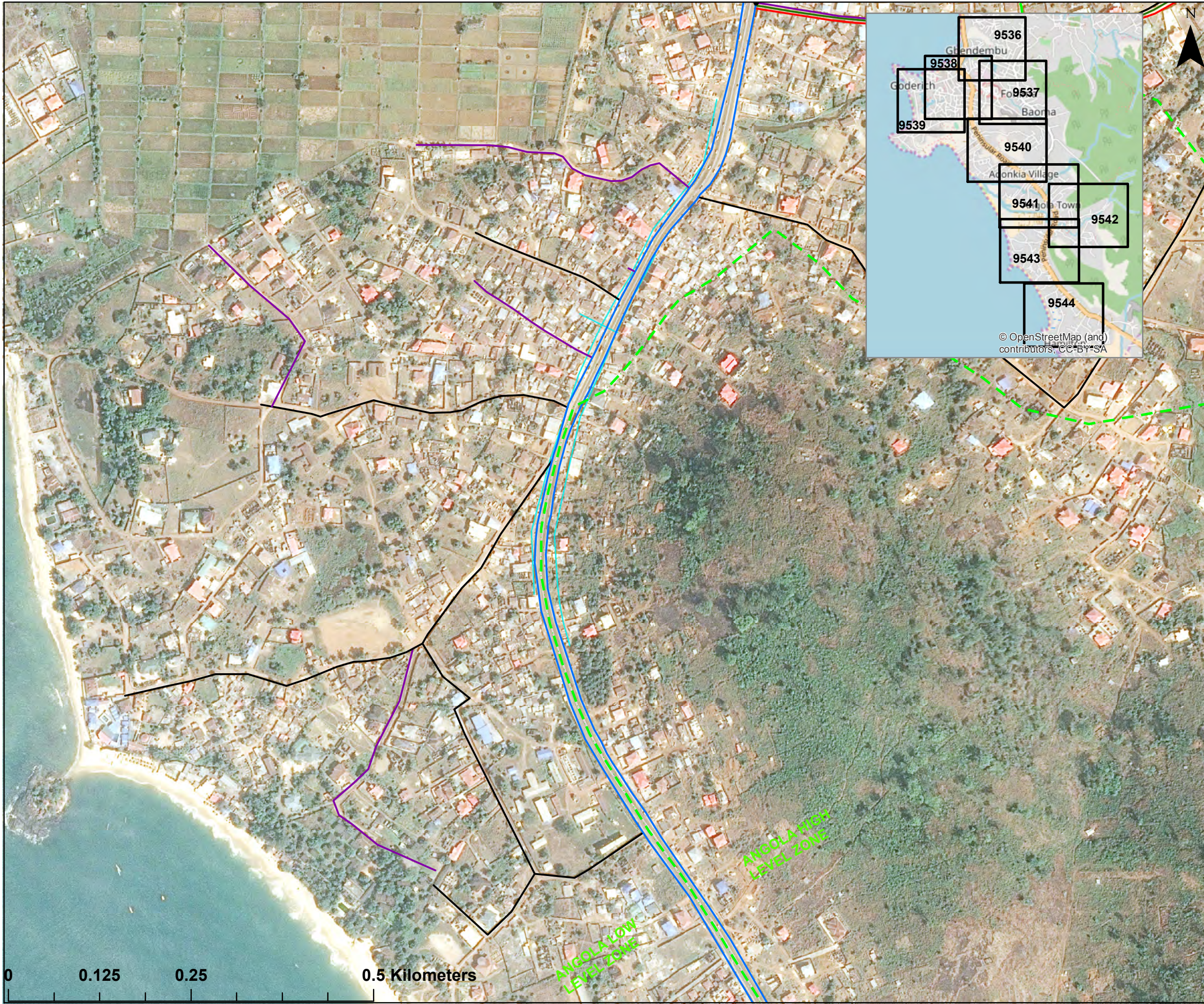
- EXISTING NETWORK

**3.2 INLET AND OUTLET MAINS**

- DN200 Outlet
- DN200 Inlet
- DN300 Outlet
- DN300 Inlet

P0.1	26/01/18	Stage 2 Issue			JNK	CC	RS/AC
Rev.	Date	Description			By	Chk'd	App'd
Drawing Status						Suitability	
WORK IN PROGRESS						SO	
Project		  			EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone  Tel: +232 78 188040		
Client		  Department for International Development			P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone  Tel: +232 22 225887		
		 Member of the SNC-Lavalin Group			Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW  Tel: +44 1372 726140 www.atkinsglobal.com		
Project Title		ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY					
Drawing Title		5.2 CORE NETWORK WEST AND 3.2 INLET & OUTLET MAINS					
Scale	Designed	Drawn	Checked	Authorised			
1:5,000	JNK	JNK	CC	RS/AC			
Original Size	Date	Date	Date	Date			
A3	26/01/18	26/01/18	26/01/18	26/01/18			
Drawing Number				Revision			
FW-ATK-0502-2-DR-NE-9542				P0.1			





## Legend

**5.2 - CORE NETWORK**

- Proposed DN80
- Proposed DN100
- Proposed DN150

**EXISTING NETWORK**

- EXISTING NETWORK

**3.2 INLET AND OUTLET MAINS**

- DN200 Outlet
- DN200 Inlet
- DN300 Outlet
- DN300 Inlet

P0.1	26/01/18	Stage 2 Issue		JNK	CC	RS/AC
Rev.	Date	Description		By	Chk'd	App'd
Drawing Status					Suitability	
WORK IN PROGRESS					SO	
Project		<div><div><div>IMCworldwide</div><div>bam</div><div>Acuity</div></div><div>EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone  Tel: +232 78 188040</div></div>				
Client		<div><div><div>Sierra Leone Ministry of Lands and Forestry</div></div><div><div>Department for International Development</div></div><div>P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone  Tel: +232 22 225887</div></div>				
		<div><div><div>Member of the SNC-Lavalin Group</div></div><div>Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW  Tel: +44 1372 726140 www.atkinsglobal.com</div></div>				
Project Title		ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY				
Drawing Title		5.2 CORE NETWORK WEST AND 3.2 INLET & OUTLET MAINS				
Scale	Designed	Drawn	Checked	Authorised		
1:5,000	JNK	JNK	CC	RS/AC		
Original Size	Date	Date	Date	Date	Date	
A3	26/01/18	26/01/18	26/01/18	26/01/18	26/01/18	
Drawing Number					Revision	
FW-ATK-0502-2-DR-NE-9543					P0.1	





## Legend

### 5.2 - CORE NETWORK

- Proposed DN80
- Proposed DN100
- Proposed DN150

### EXISTING NETWORK

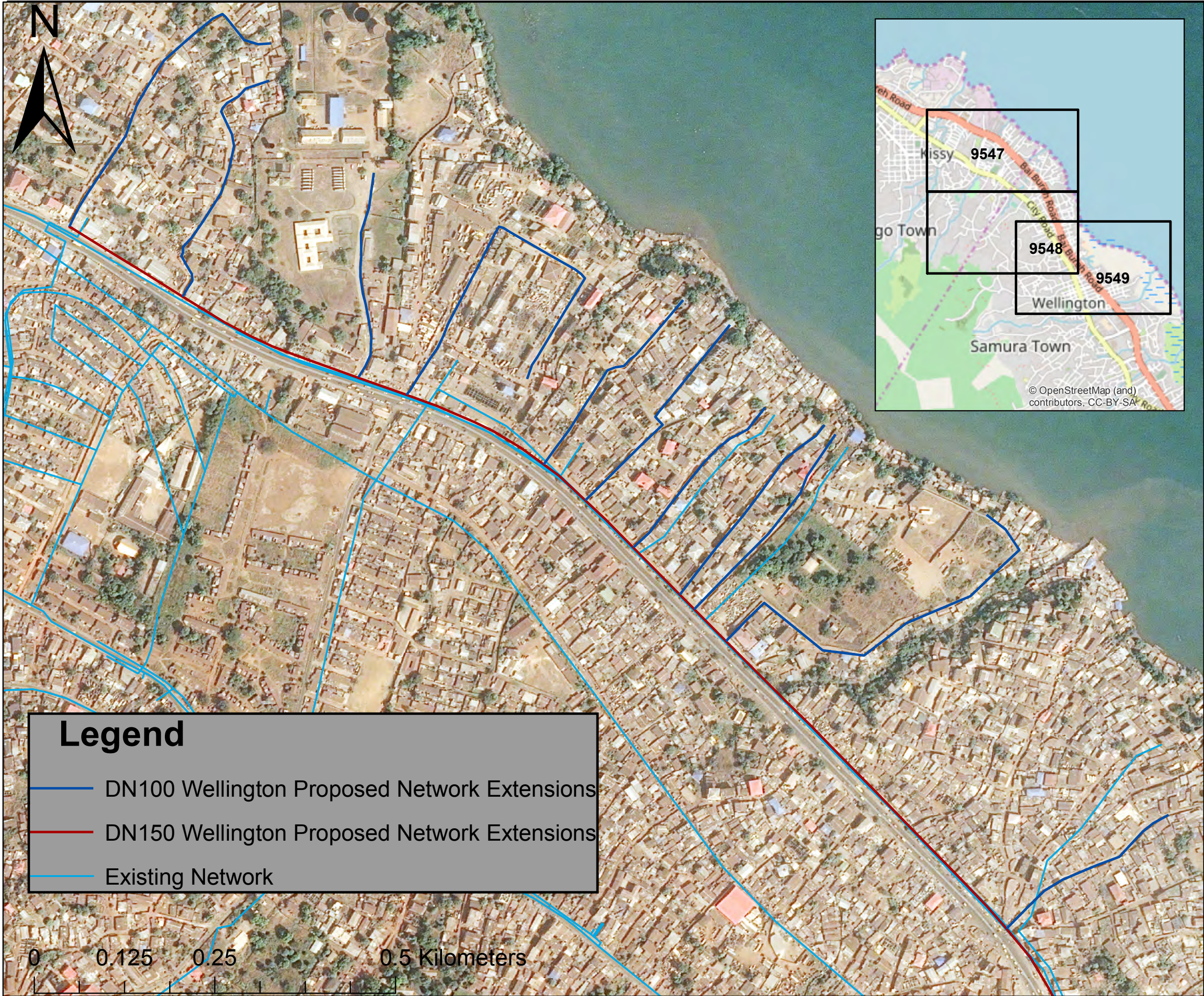
- EXISTING NETWORK

### 3.2 INLET AND OUTLET MAINS

- DN200 Outlet
- DN200 Inlet
- DN300 Outlet
- DN300 Inlet

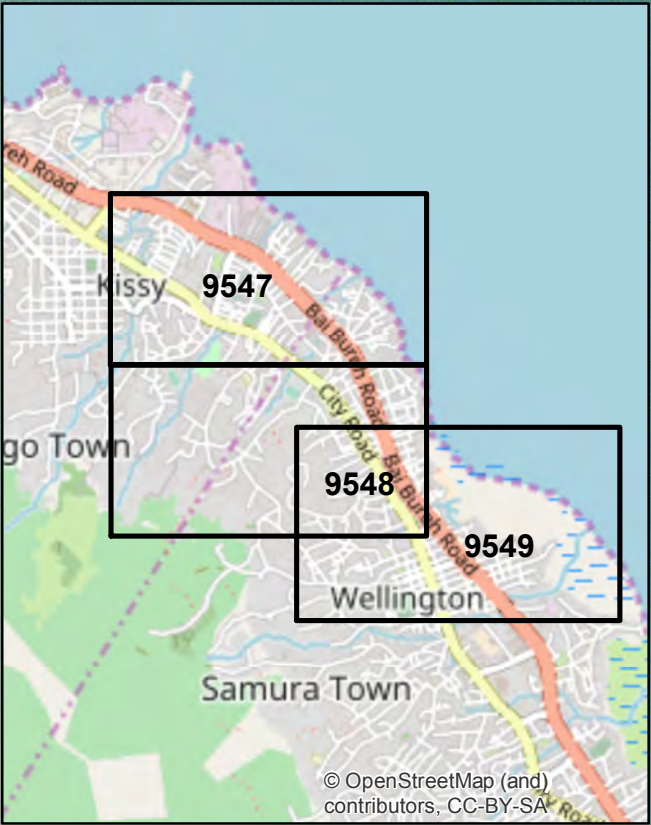
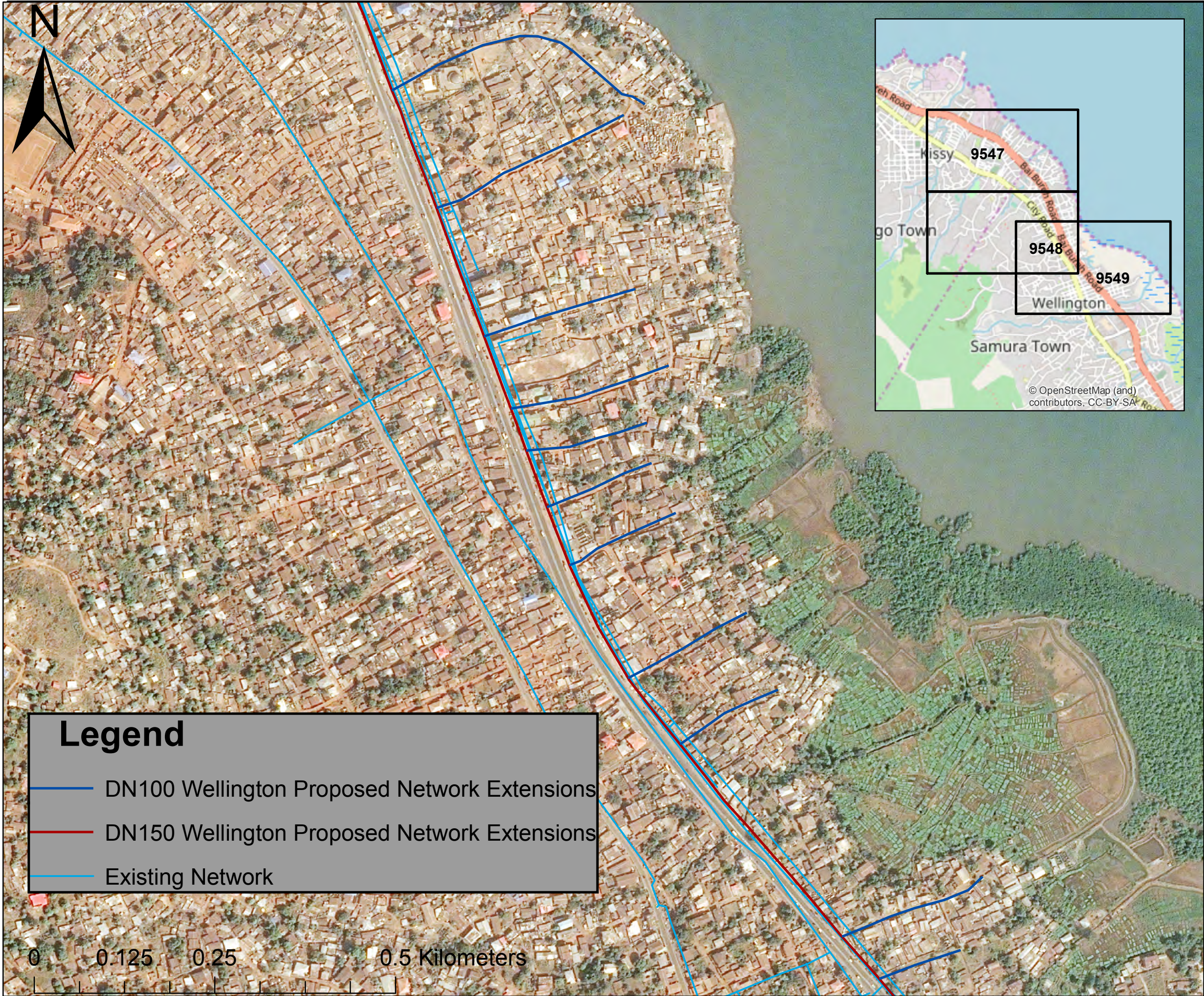
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Rev.	Date	Description		By	Chk'd	App'd
Drawing Status					Suitability	
WORK IN PROGRESS					SO	
Project		  		EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone  Tel: +232 78 188040		
Client		 <i>Sierra Leone Ministry of Works and Transport</i>		 Department for International Development  Tel: +232 22 225887		
		 Member of the SNC-Lavalin Group		Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW  Tel: +44 1372 726140 <a href="http://www.atkinsglobal.com">www.atkinsglobal.com</a>		
Project Title		ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY				
Drawing Title		5.2 CORE NETWORK WEST AND 3.2 INLET & OUTLET MAINS				
Scale	Designed	Drawn	Checked	Authorised		
1:5,000	JNK	JNK	CC	RS/AC		
Original Size	Date	Date	Date	Date	Date	
A3	26/01/18	26/01/18	26/01/18	26/01/18	26/01/18	
Drawing Number					Revision	
FW-ATK-0502-2-DR-NE-9544					P0.1	





P01.1	15/01/18	Stage 2 Issue	BS	CC	RS/AC
Rev.	Date	Description	By	Chk'd	App'd
Drawing Status					Suitability
WORK IN PROGRESS					SO
Project		<div><div></div><div>EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone Tel: +232 78 188040</div></div>			
Client		<div><div></div><div>P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone Tel: +232 22 225887</div></div>			
		<div><div><div>Member of the SNC-Lavalin Group</div></div><div>Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW Tel: +44 1372 726140 www.atkinsglobal.com</div></div>			
Project Title		ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY			
Drawing Title		5.9 e WELLINGTON PROPOSED NETWORK EXTENSIONS			
Scale	Designed	Drawn	Checked	Authorised	
1:5000	BS	BS	CC	RS/AC	
Original Size	Date	Date	Date	Date	
A3	15/01/18	15/01/18	15/01/18	15/01/18	
Drawing Number					Revision
FW-ATK-0509-2-DR-NE-9547					P01.1



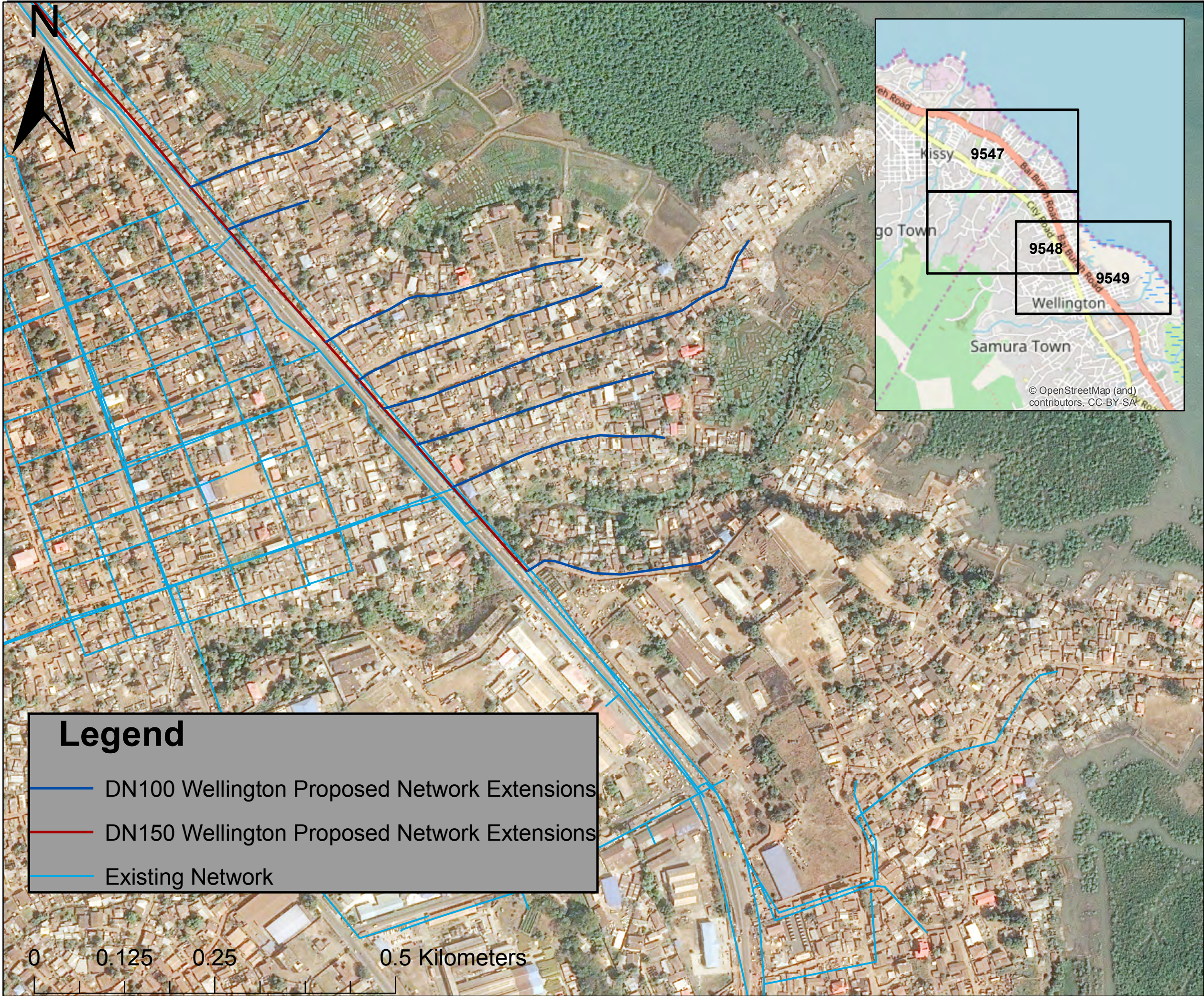


## Legend

- DN100 Wellington Proposed Network Extensions
- DN150 Wellington Proposed Network Extensions
- Existing Network

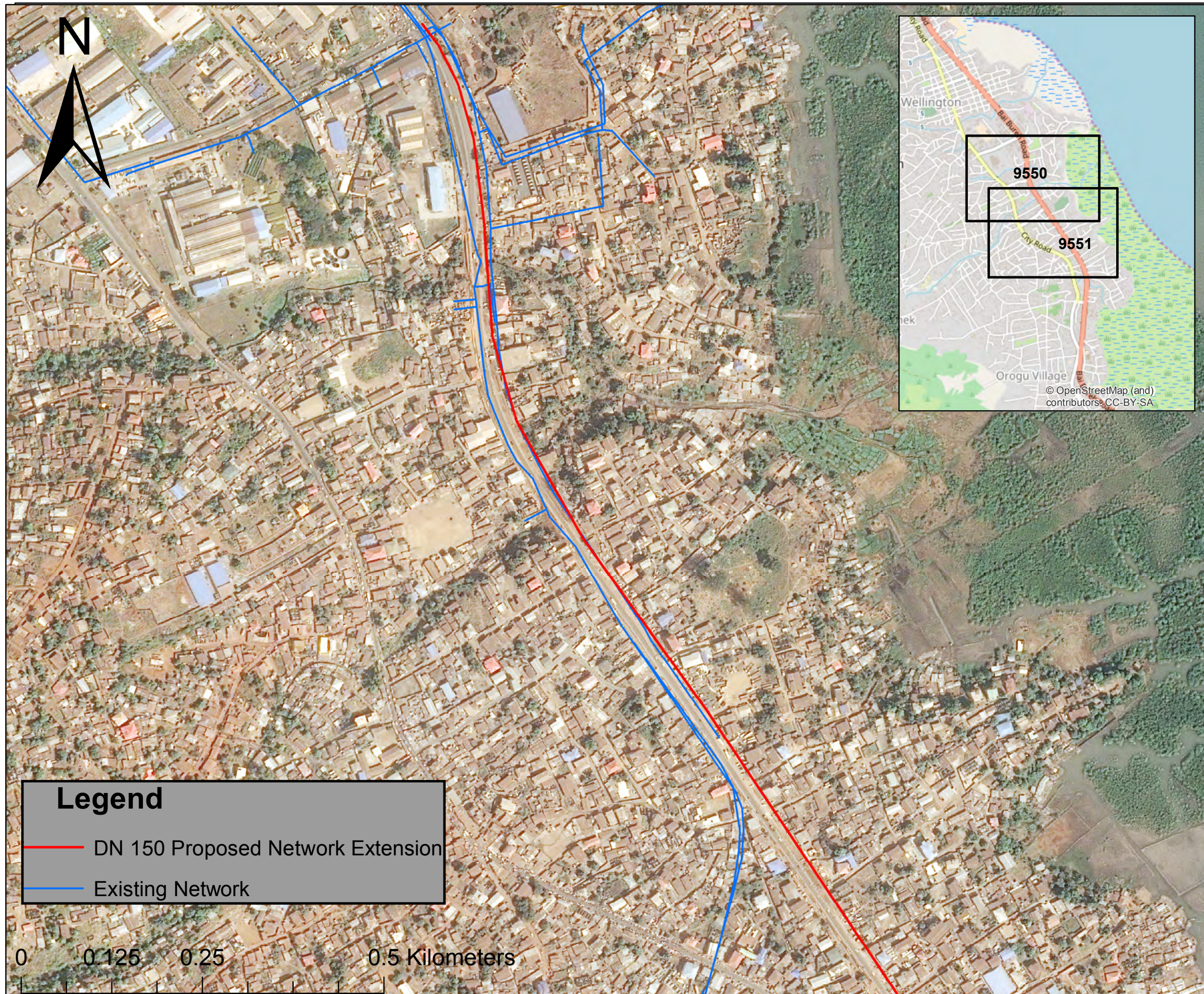
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Rev.	Date	Description		By	Chk'd	App'd
Drawing Status					Suitability	
WORK IN PROGRESS					SO	
Project						
  			EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone  Tel: +232 78 188040			
Client						
 			P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone  Tel: +232 22 225887			
 Member of the SNC-Lavalin Group			Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW Tel: +44 1372 726140 www.atkinsglobal.com			
Project Title						
ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY						
Drawing Title						
5.9 e WELLINGTON PROPOSED NETWORK EXTENSIONS						
Scale	Designed	Drawn	Checked	Authorised		
1:5000	BS	BS	CC	RS/AC		
Original Size	Date	Date	Date	Date	Date	
A3	15/01/18	15/01/18	15/01/18	15/01/18	15/01/18	
Drawing Number					Revision	
FW-ATK-0509-2-DR-NE-9548					P01.1	





P01.1	15/01/18	Stage 2 Issue	BS	CC	RS/AC
Rev.	Date	Description	By	Chk'd	App'd
Drawing Status					Suitability
WORK IN PROGRESS					SO
Project		<div><div></div><div>EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone Tel: +232 78 188040</div></div>			
Client		<div><div></div><div>P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone Tel: +232 22 225887</div></div>			
		<div><div><div>Member of the SNC-Lavalin Group</div></div><div>Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW Tel: +44 1372 726140 www.atkinsglobal.com</div></div>			
Project Title		ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY			
Drawing Title		5.9 e WELLINGTON PROPOSED NETWORK EXTENSIONS			
Scale 1:5000	Designed BS	Drawn BS	Checked CC	Authorised RS/AC	
Original Size A3	Date 15/01/18	Date 15/01/18	Date 15/01/18	Date 15/01/18	Date 15/01/18
Drawing Number FW-ATK-0509-2-DR-NE-9549					Revision P01.1

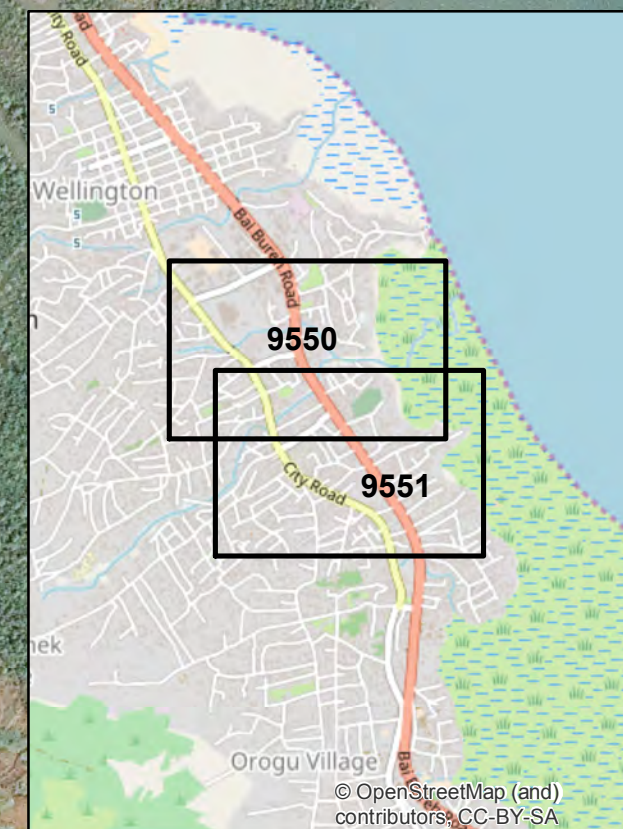










## Legend

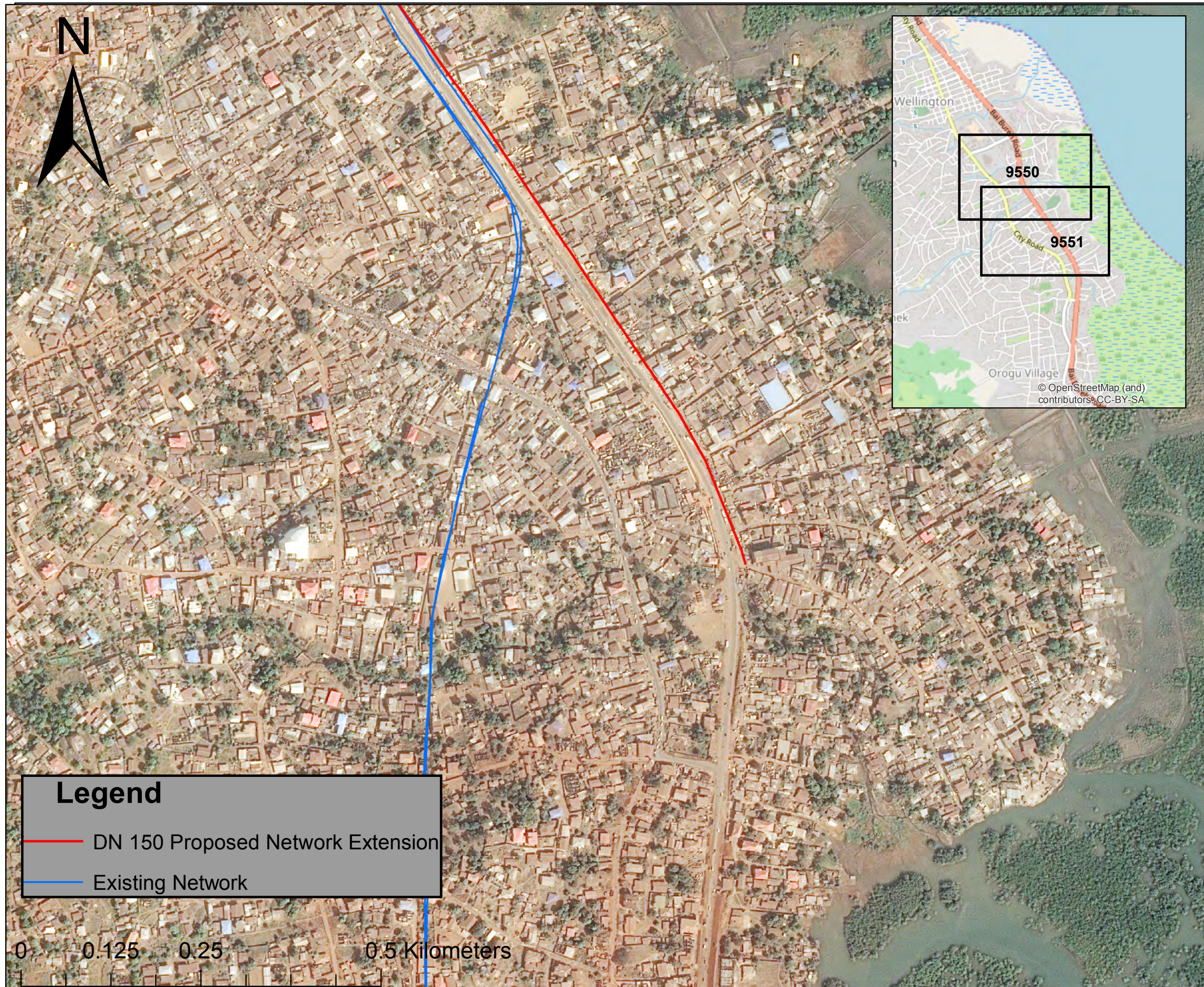
- DN 150 Proposed Network Extension
- Existing Network

0 0.125 0.25 0.5 Kilometers



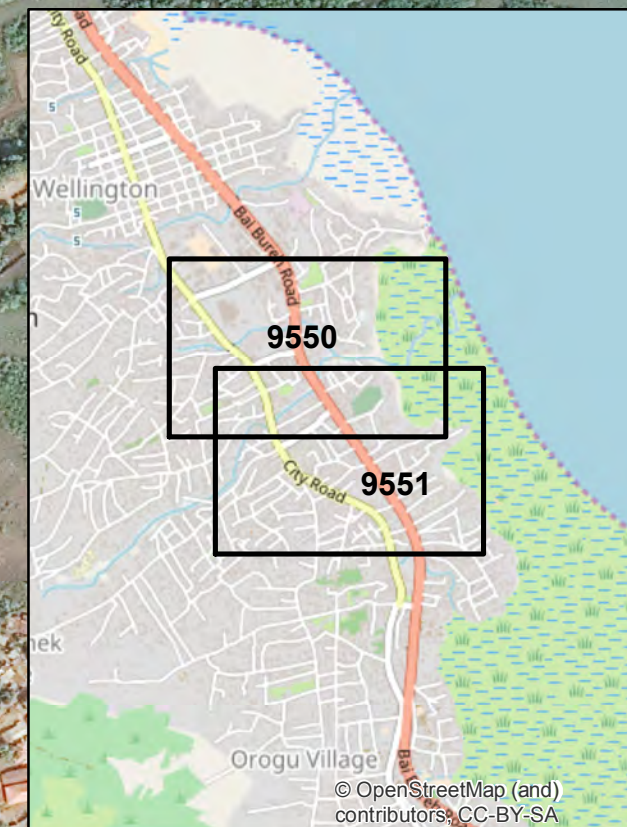
P01.1	15/01/18	Stage 2 Issue	BS	CC	RS/AC
Rev.	Date	Description	By	Chk'd	App'd
Drawing Status					Suitability
WORK IN PROGRESS					SO
Project		   EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone Tel: +232 78 188040			
Client		  P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone Tel: +232 22 225887			
		 Member of the SNC-Lavalin Group Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW Tel: +44 1372 726140 www.atkinsglobal.com			
Project Title		ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY			
Drawing Title		5.9 f WELLINGTON PROPOSED NETWORK EXTENSIONS			
Scale	Designed	Drawn	Checked	Authorised	
1:5000	BS	BS	CC	RS/AC	
Original Size	Date	Date	Date	Date	Date
A3	15/01/18	15/01/18	15/01/18	15/01/18	15/01/18
Drawing Number					Revision
FW-ATK-0509-2-DR-NE-9550					P01.1





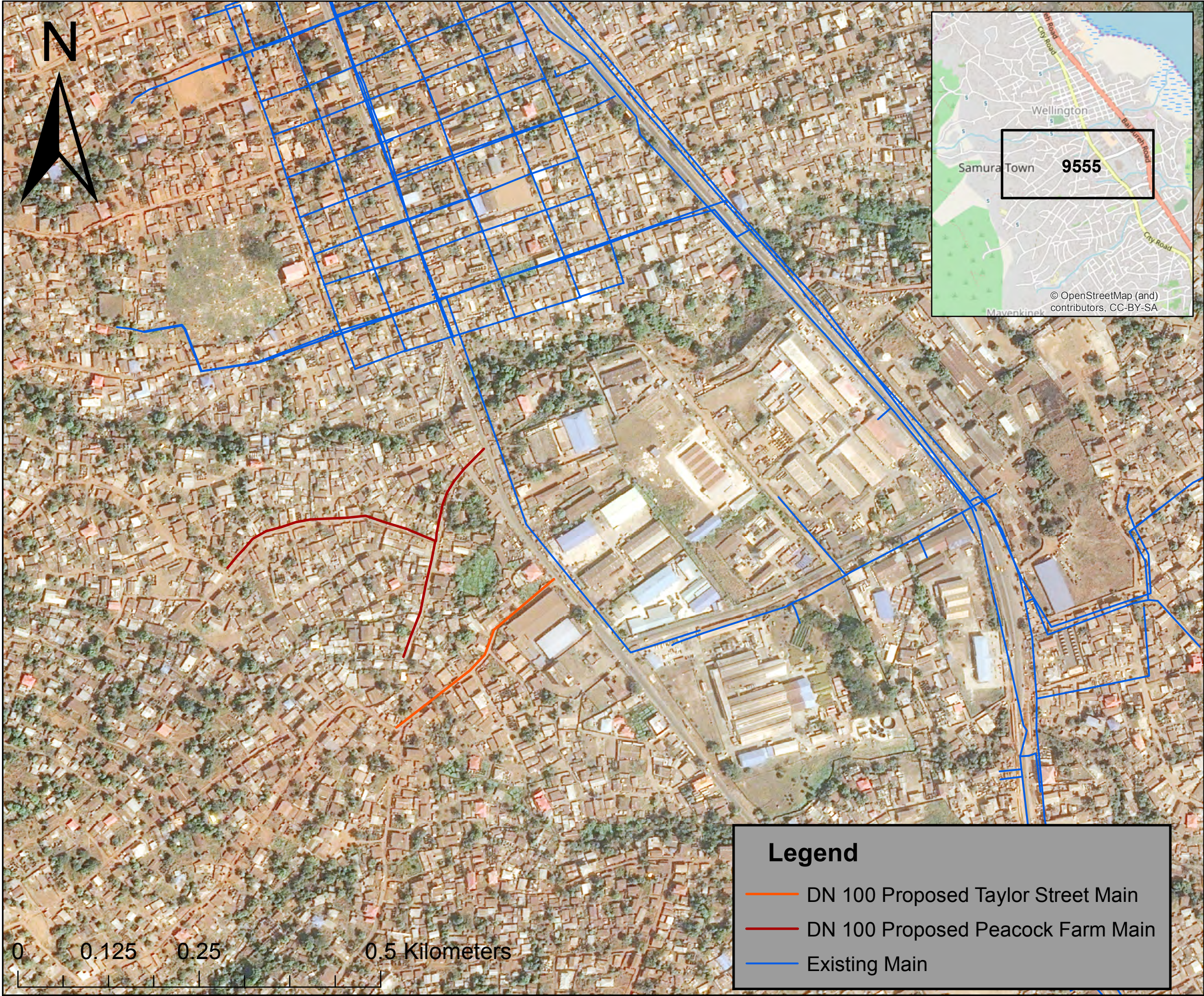
## Legend

- DN 150 Proposed Network Extension
- Existing Network



P01.1	15/01/18	Stage 2 Issue	BS	CC	RS/AC
Rev.	Date	Description	By	Chk'd	App'd
Drawing Status				Suitability	
WORK IN PROGRESS				SO	
Project					
  		EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone  Tel: +232 78 188040			
Client					
 		P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone  Tel: +232 22 225887			
 Member of the SNC-Lavalin Group		Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW  Tel: +44 1372 726140 www.atkinsglobal.com			
Project Title					
ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY					
Drawing Title					
5.9 f WELLINGTON PROPOSED NETWORK EXTENSIONS					
Scale	Designed	Drawn	Checked	Authorised	
1:5000	BS	BS	CC	RS/AC	
Original Size	Date	Date	Date	Date	Date
A3	15/01/18	15/01/18	15/01/18	15/01/18	15/01/18
Drawing Number				Revision	
FW-ATK-0509-2-DR-NE-9551				P01.1	



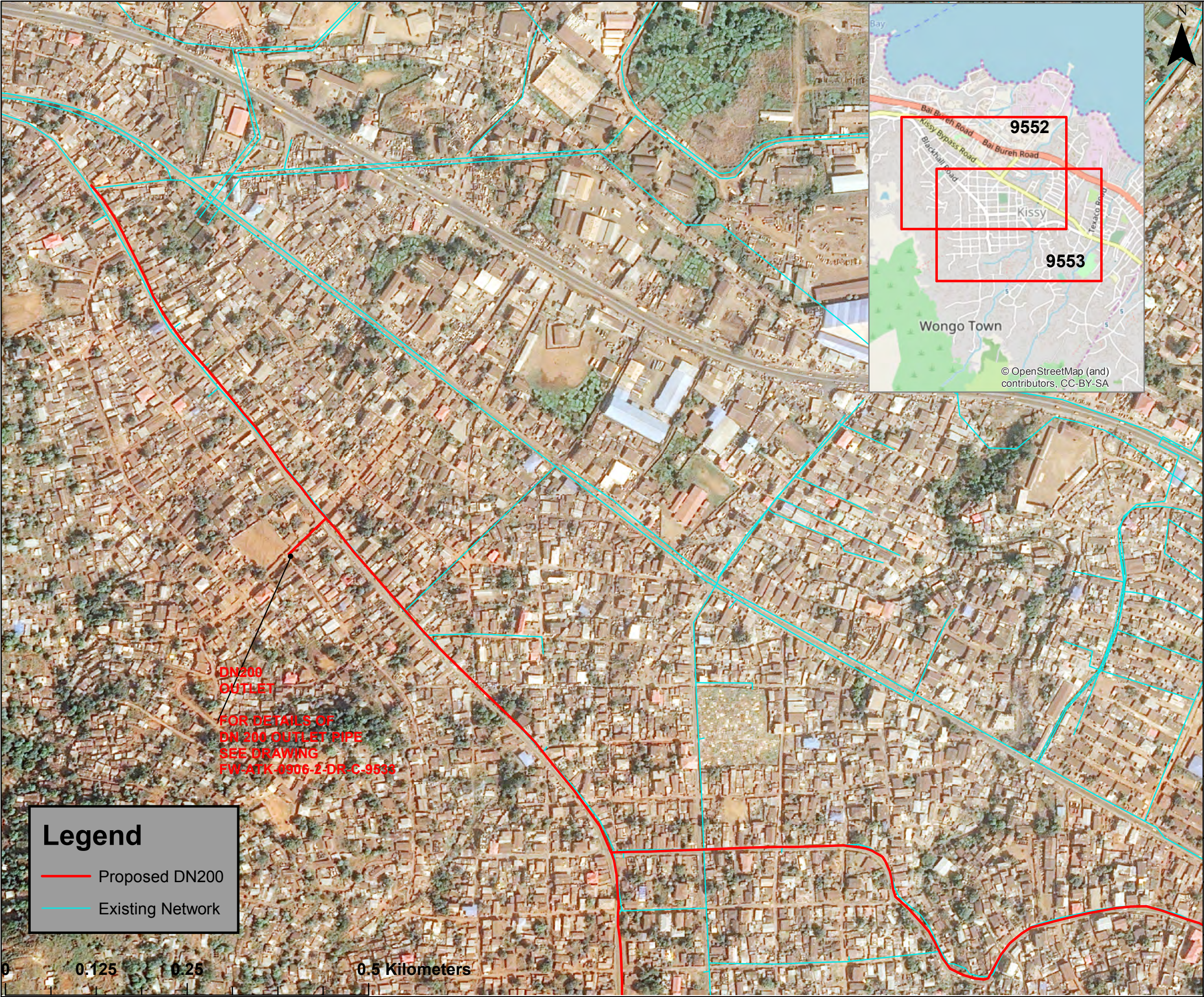


# Legend

- DN 100 Proposed Taylor Street Main
- DN 100 Proposed Peacock Farm Main
- Existing Main

P01.1	26/01/18	Stage 2 Issue			BS	CC	RS/AC
Rev.	Date	Description			By	Chkd	App'd
Drawing Status						Suitability	
WORK IN PROGRESS						SO	
Project				EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone  Tel: +232 78 188040			
Client		 <i>Government of Sierra Leone</i>   Department for International Development		P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone  Tel: +232 22 225887			
		 Member of the SNC-Lavalin Group		Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW  Tel: +44 1372 726140 <a href="http://www.atkinsglobal.com">www.atkinsglobal.com</a>			
Project Title		ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY					
Drawing Title							
5.9C PEACOCK FARM & 5.9D TAYLOR STREET MAINS REHABILITATION							
Scale	Designed	Drawn	Checked	Authorised			
1:5000	BS	BS	CC	RS/AC			
Original Size	Date	Date	Date	Date			
A3	26/01/18	26/01/18	26/01/18	26/01/18			
Drawing Number						Revision	
FW-ATK-0509-2-DR-NE-9555						P01.1	





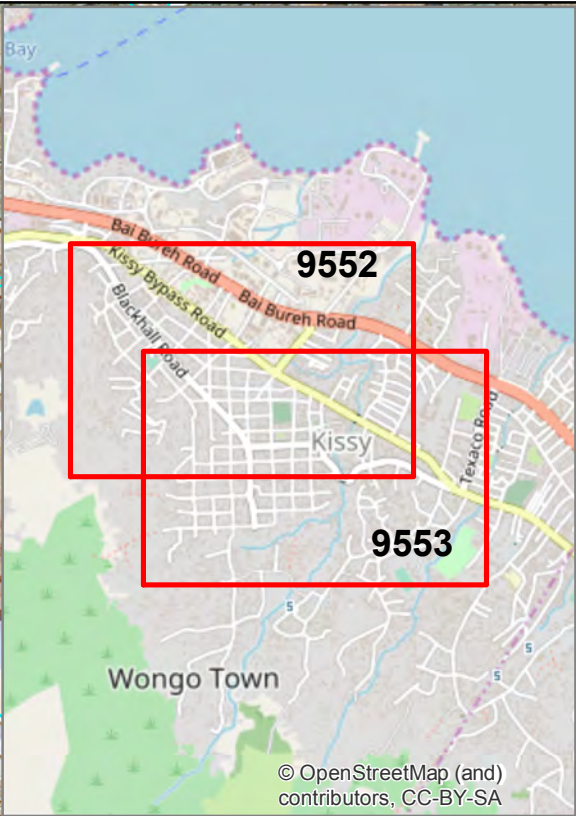
### Legend

Proposed DN200

Existing Network

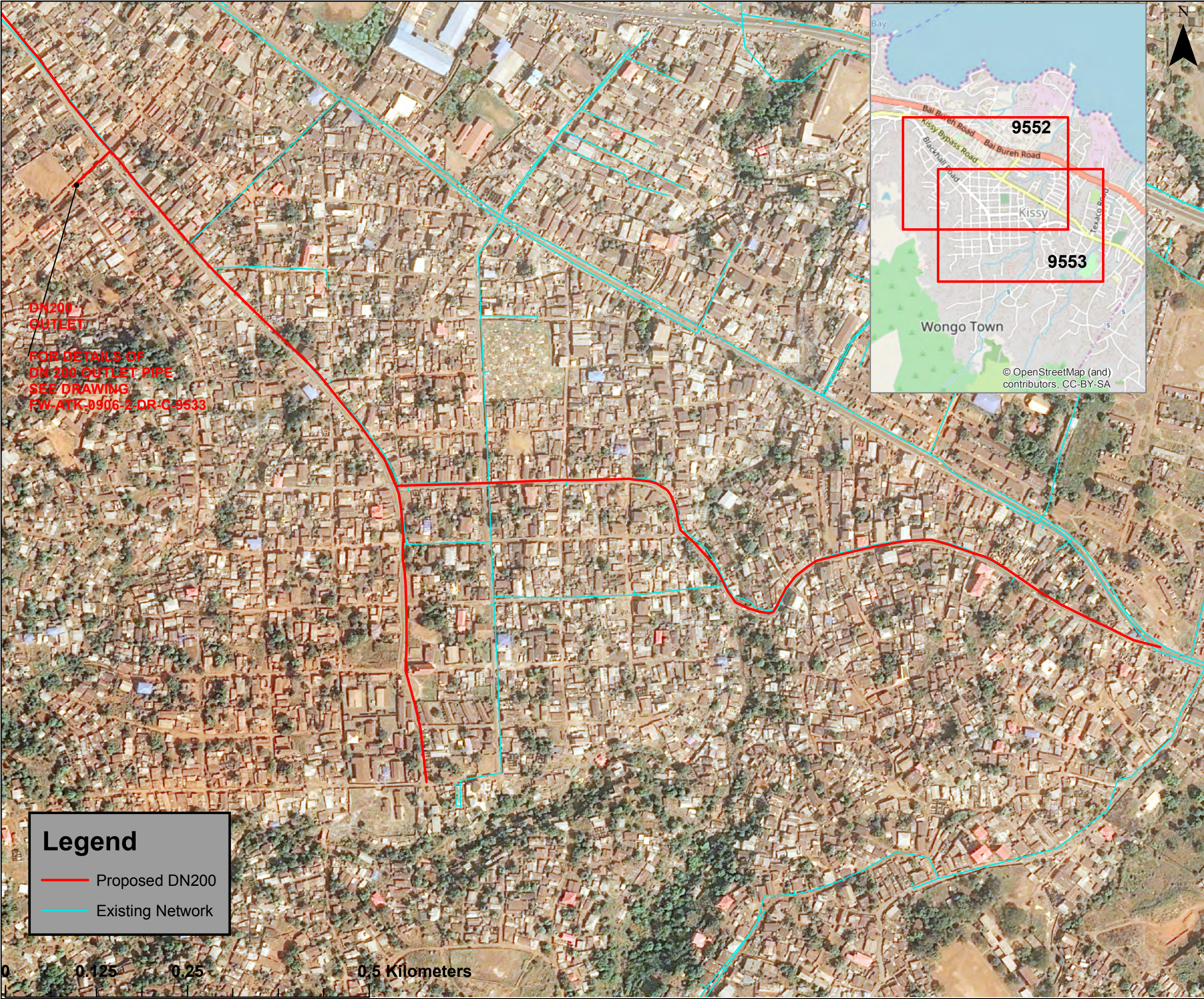
DN200  
OUTLET

FOR DETAILS OF  
DN 200 OUTLET PIPE  
SEE DRAWING  
FW-ATK-0906-2-DR-C-9533



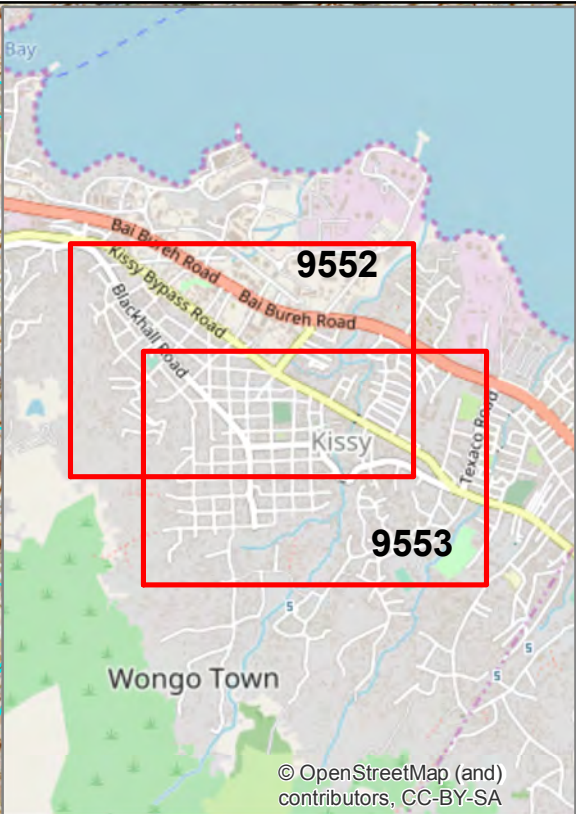
P0.1	25/01/18	Stage 2 Issue		JNK	CC	RS/AC
Rev.	Date	Description		By	Chk'd	App'd
Drawing Status					Suitability	
WORK IN PROGRESS					SO	
Project		EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone Tel: +232 78 188040				
						
Client		P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone Tel: +232 22 225887				
 <i>Sierra Leone Water Company</i>		 Department for International Development				
ATKINS		Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW Tel: +44 1372 726140 www.atkinsglobal.com				
Member of the SNC-Lavalin Group						
Project Title		ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY				
Drawing Title		5.9g KISSY HIGH LEVEL PROPOSED CORE NETWORK				
Scale	Designed	Drawn	Checked	Authorised		
1:5,000	JNK	JNK	CC	RS/AC		
Original Size	Date	Date	Date	Date	Date	
A3	25/01/18	25/01/18	25/01/18	25/01/18	25/01/18	
Drawing Number				Revision		
FW-ATK-0509-2-DR-NE-9552				P0.1		





DN200  
OUTLET

FOR DETAILS OF  
DN 200 OUTLET PIPE  
SEE DRAWING  
FW-ATK-0906-2-DR-C-9533

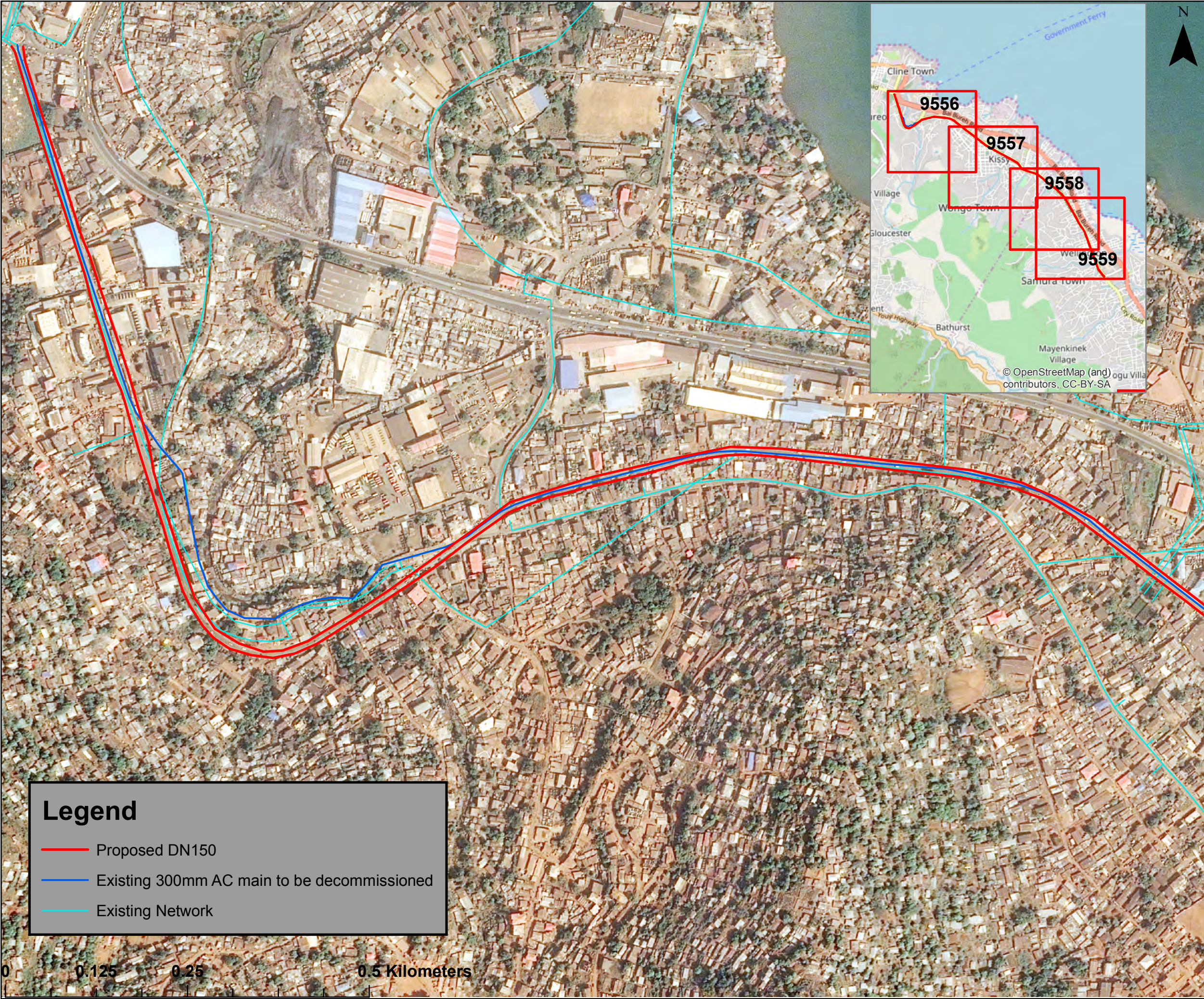


# Legend

- Proposed DN200
- Existing Network

P0.1	25/01/18	Stage 2 Issue	JNK	CC	RS/AC
Rev.	Date	Description	By	Chk'd	App'd
Drawing Status					Suitability
WORK IN PROGRESS					SO
Project		EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone Tel: +232 78 188040			
Client		P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone Tel: +232 22 225887			
Project Title		ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY			
Drawing Title		5.9g KISSY HIGH LEVEL PROPOSED CORE NETWORK			
Scale	Designed	Drawn	Checked	Authorised	
1:5,000	JNK	JNK	CC	RS/AC	
Original Size	Date	Date	Date	Date	Date
A3	25/01/18	25/01/18	25/01/18	25/01/18	25/01/18
Drawing Number					Revision
FW-ATK-0509-2-DR-NE-9553					P0.1





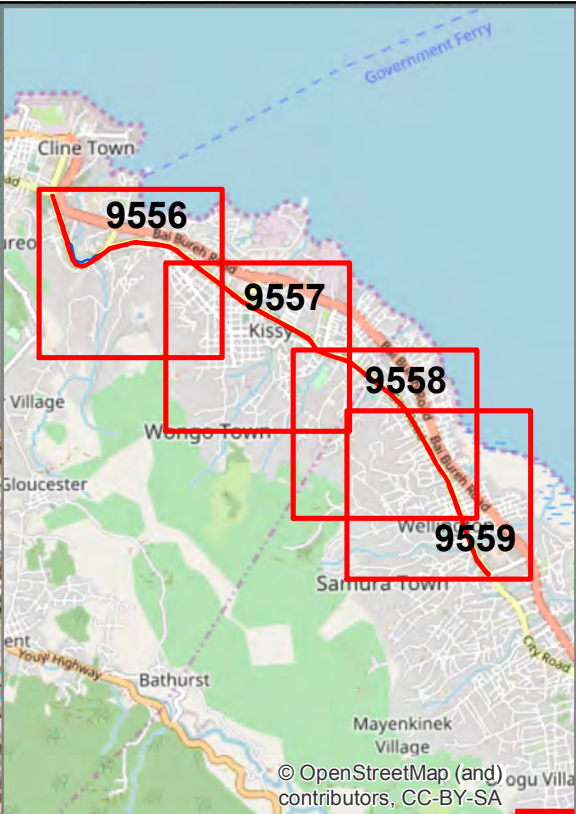
Legend




Proposed DN150

Existing 300mm AC main to be decommissioned

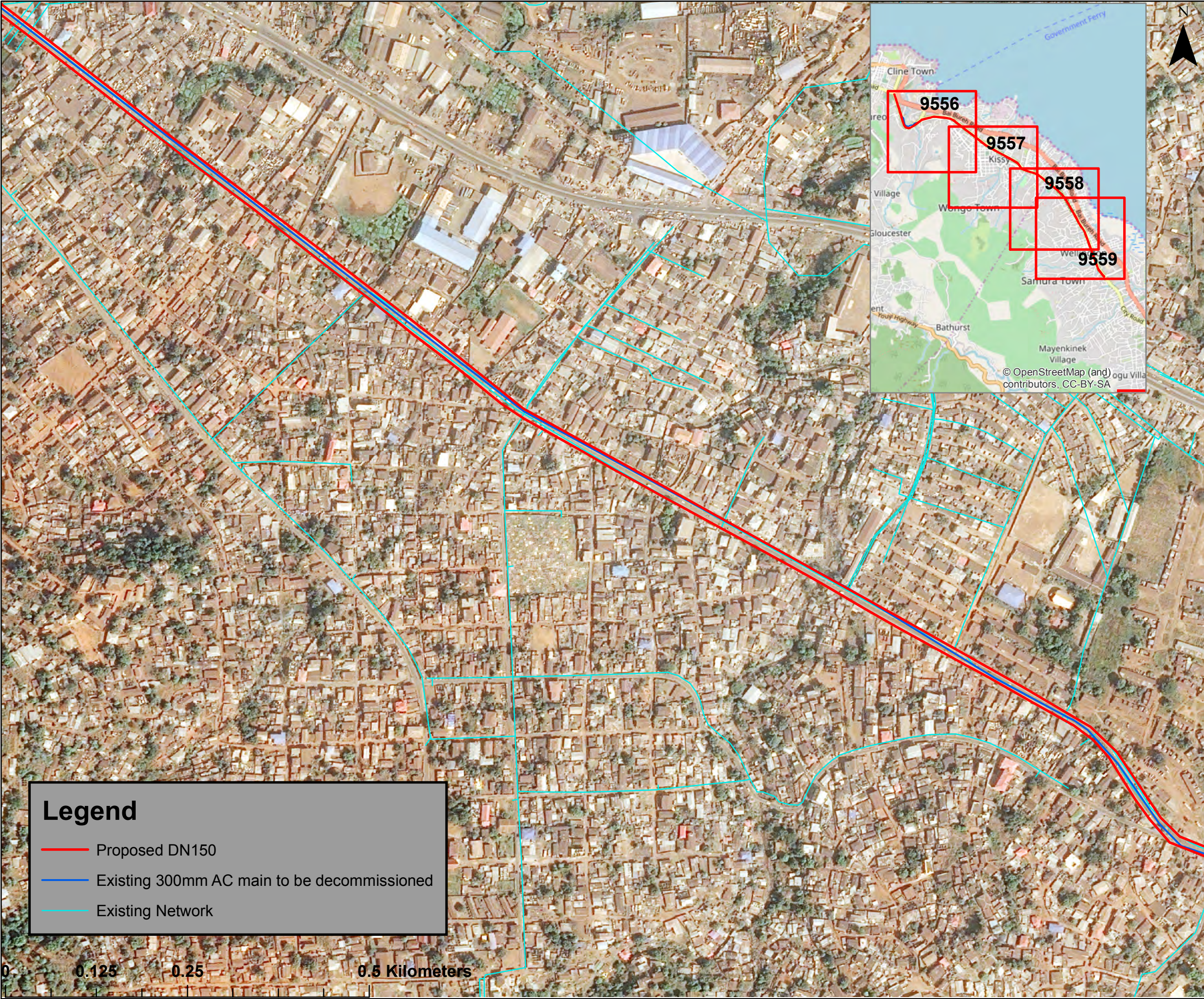
Existing Network

0 0.125 0.25 0.5 Kilometers



P0.1	30/01/18	Stage 2 Issue			JNK	CC	RS/AC
Rev.	Date	Description			By	Chk'd	App'd
Drawing Status		WORK IN PROGRESS					Subsidiary SO
Project					EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone  Tel: +232 78 188040		
Client		 Department for International Development  <i>Great Britain Water Learning</i>			P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone  Tel: +232 22 225887		
Project Title		 Member of the SNC-Lavalin Group			Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW  Tel: +44 1372 726140 www.atkinsglobal.com		
Project Title		ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY					
Drawing Title		5.9 a 300mm AC MAINS REHABILITATION					
Scale	Designed	Drawn	Checked	Authorised			
1:5,000	JNK	JNK	CC	RS/AC			
Original Size	Date	Date	Date	Date	Date		
A3	30/01/18	30/01/18	30/01/18	30/01/18	30/01/18		
Drawing Number		FW-ATK-0509-2-DR-NE-9556					Revision
							P0.1



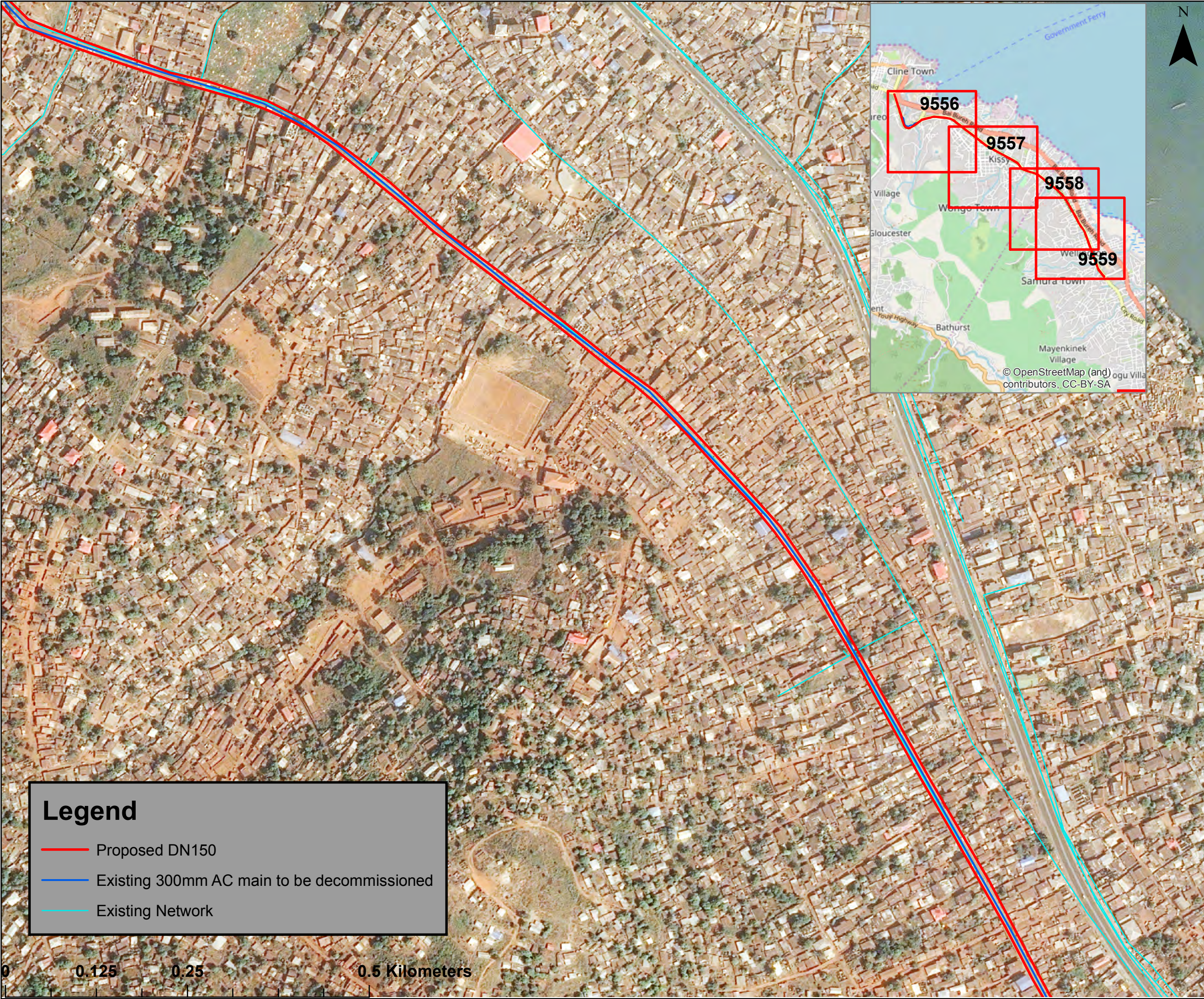


### Legend

- Proposed DN150
- Existing 300mm AC main to be decommissioned
- Existing Network

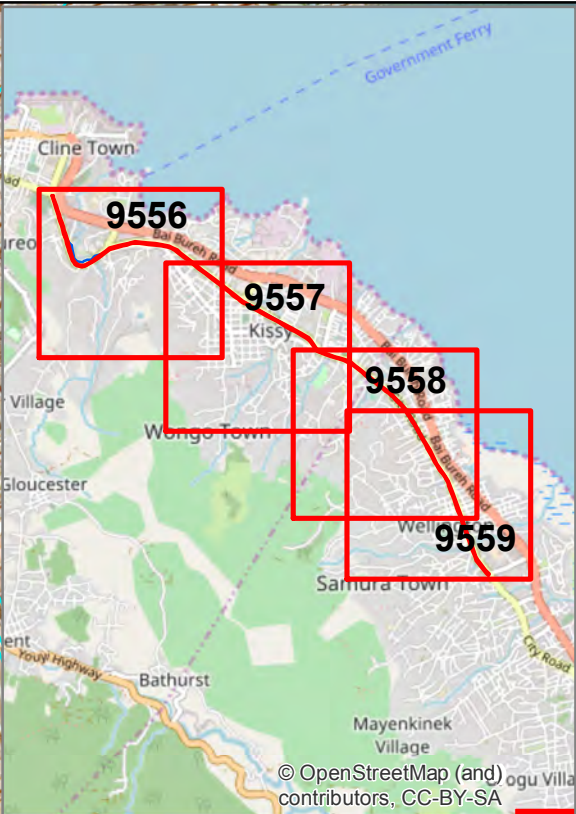
P0.1		30/01/18		Stage 2 Issue		JNK	CC	RS/AC
Rev	Date	Description				By	Chk'd	App'd
Drawing Status								Suitability
WORK IN PROGRESS								SO
Project		<div><div></div><div>EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone Tel: +232 78 188040</div></div>						
Client		<div><div></div><div>P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone Tel: +232 22 225887</div></div>						
		<div><div> Member of the SNC-Lavalin Group</div><div>Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW Tel: +44 1372 726140 www.atkinsglobal.com</div></div>						
Project Title		ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY						
Drawing Title		5.9 a 300mm AC MAINS REHABILITATION						
Scale	Designed	Drawn	Checked	Authorised				
1:5,000	JNK	JNK	CC	RS/AC				
Original Size	Date	Date	Date	Date	Date			
A3	30/01/18	30/01/18	30/01/18	30/01/18	30/01/18			
Drawing Number								Revision
FW-ATK-0509-2-DR-NE-9557								P0.1








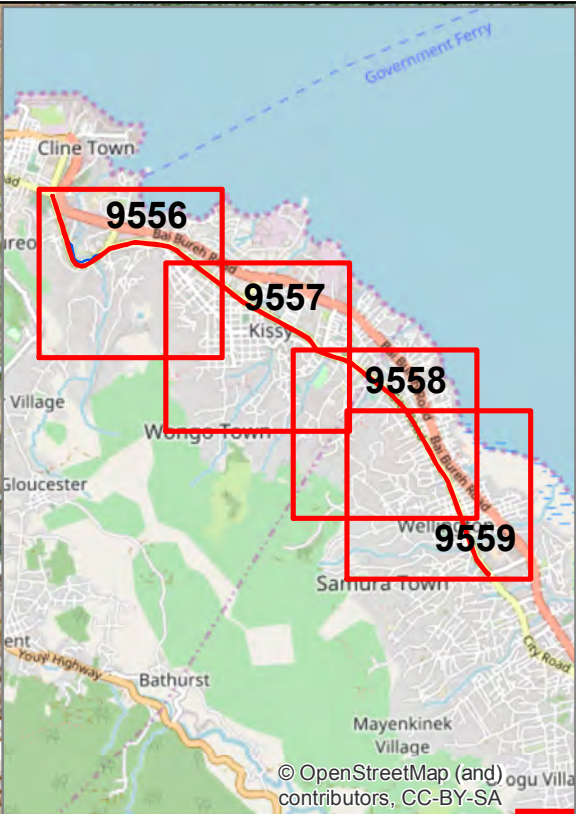
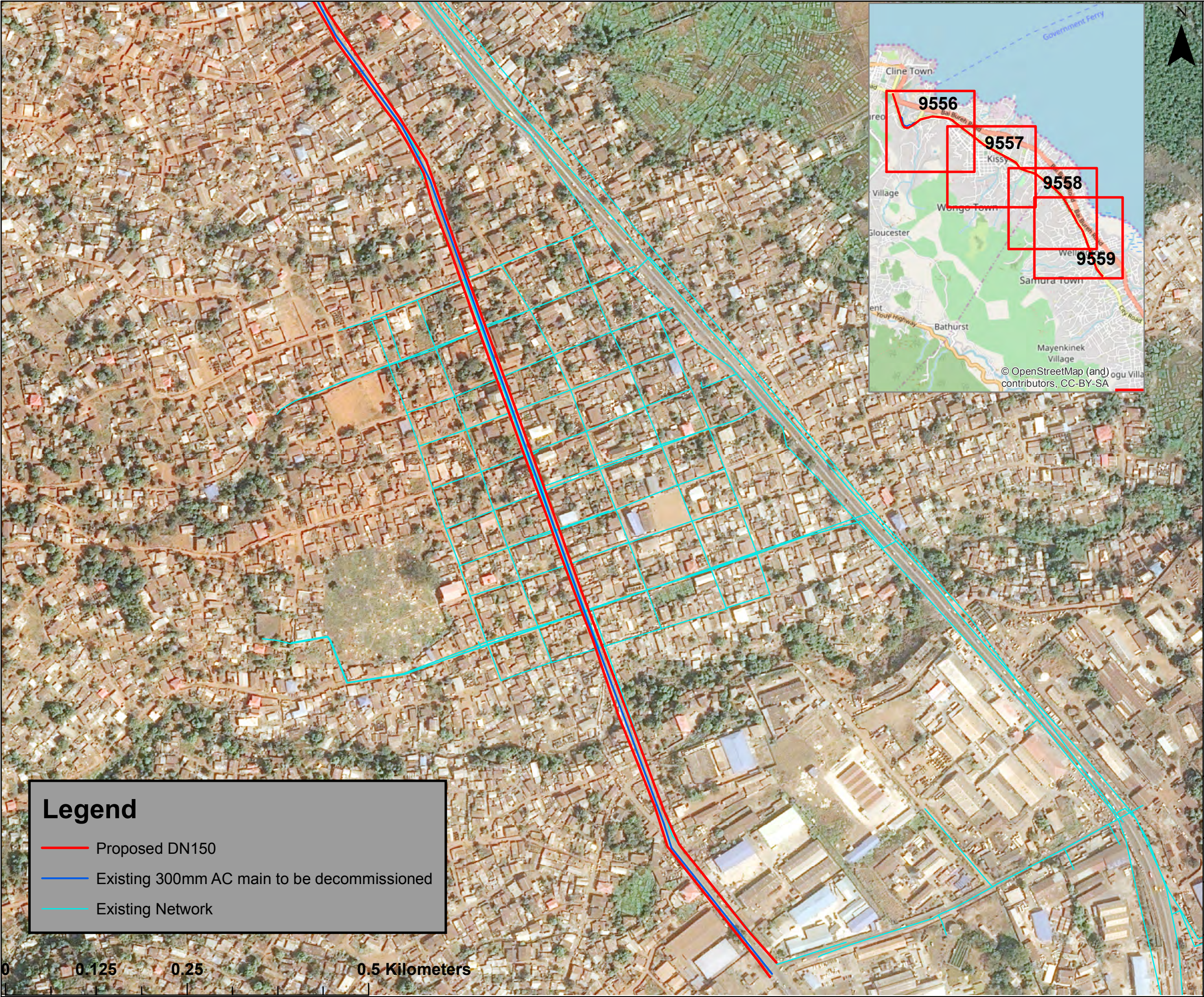
### Legend

- Proposed DN150
- Existing 300mm AC main to be decommissioned
- Existing Network



P0.1	30/01/18	Stage 2 Issue		JNK	CC	RS/AC
Rev.	Date	Description		By	Chk'd	App'd
Drawing Status					Suitability	
WORK IN PROGRESS					SO	
Project				EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone  Tel: +232 78 188040		
Client		 Department for International Development		P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone  Tel: +232 22 225887		
		 Member of the SNC-Lavalin Group		Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW  Tel: +44 1372 726140 www.atkinsglobal.com		
Project Title		ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY				
Drawing Title		5.9 a 300mm AC MAINS REHABILITATION				
Scale	Designed	Drawn	Checked	Authorised		
1:5,000	JNK	JNK	CC	RS/AC		
Original Size	Date	Date	Date	Date	Date	
A3	30/01/18	30/01/18	30/01/18	30/01/18	30/01/18	
Drawing Number				Revision		
FW-ATK-0509-2-DR-NE-9558				P0.1		





Legend

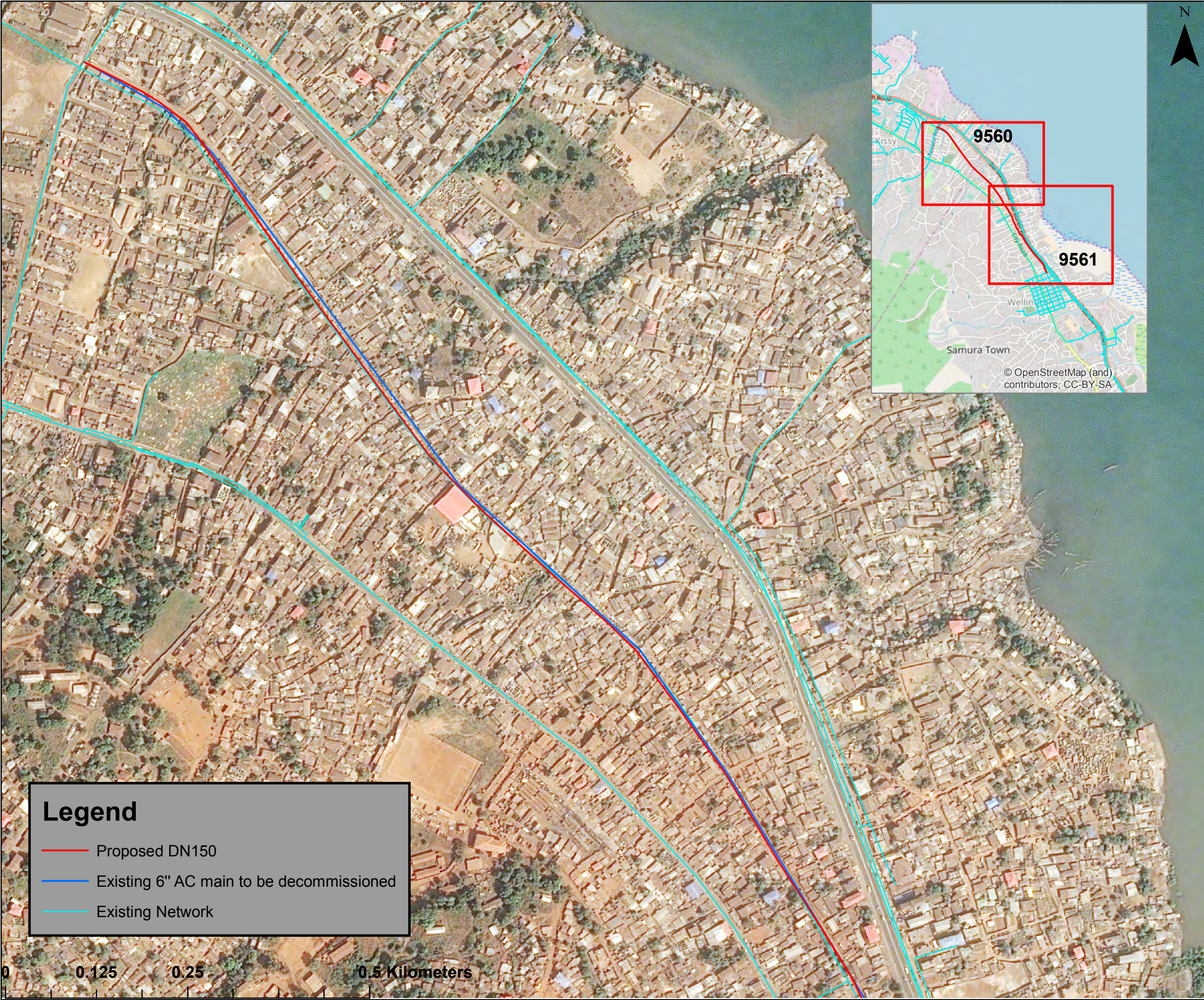
Proposed DN150

Existing 300mm AC main to be decommissioned

Existing Network

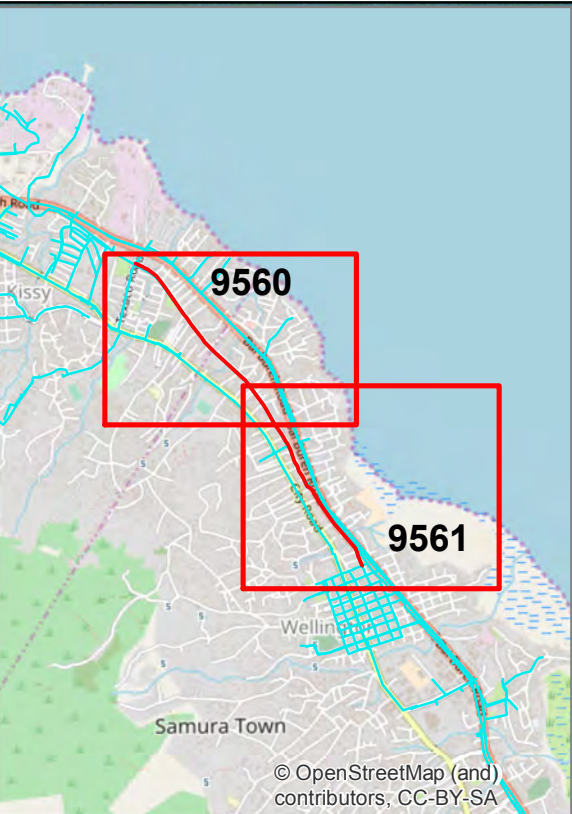
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Rev.	Date	Description		By	Chk'd	App'd
Drawing Status					Suitability	
WORK IN PROGRESS					SO	
Project		<div><div><div>IMC worldwide</div><div>Acuity</div></div><div><div>EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone  Tel: +232 78 188040</div></div></div>				
Client		<div><div><div>Department for International Development</div><div>Sierra Leone State Emblem</div></div><div><div>P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone  Tel: +232 22 225887</div></div></div>				
		<div><div><div>Member of the SNC-Lavalin Group</div></div><div><div>Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW  Tel: +44 1372 726140 www.atkinsglobal.com</div></div></div>				
Project Title		ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY				
Drawing Title		5.9 a 300mm AC MAINS REHABILITATION				
Scale	Designed	Drawn	Checked	Authorised		
1:5,000	JNK	JNK	CC	RS/AC		
Original Size	Date	Date	Date	Date		
A3	30/01/18	30/01/18	30/01/18	30/01/18		
Drawing Number				Revision		
FW-ATK-0509-2-DR-NE-9559				P0.1		





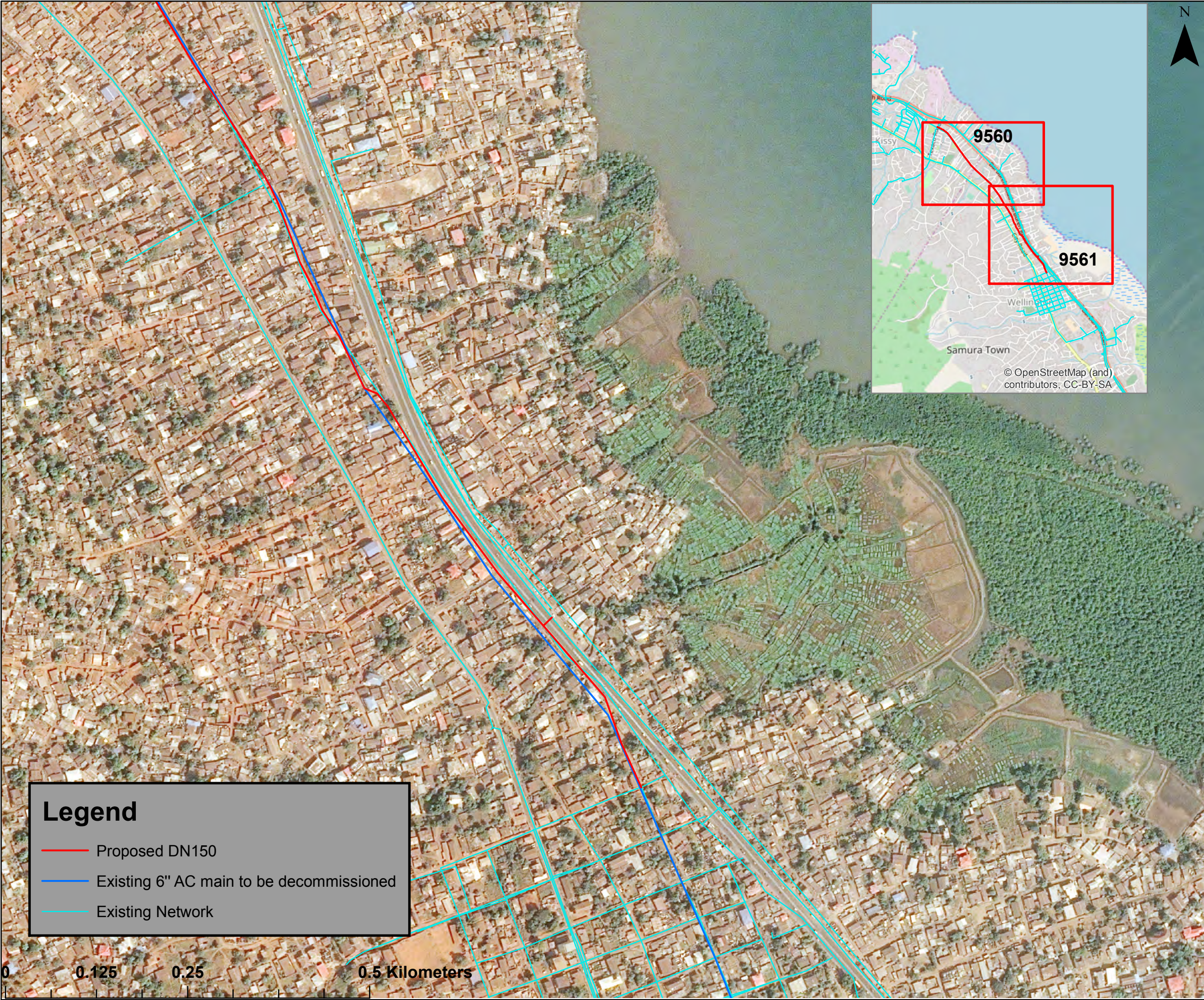
### Legend

- Proposed DN150
- Existing 6" AC main to be decommissioned
- Existing Network









P0.1		30/01/18		Stage 2 Issue		JNK	CC	RS/AC
Rev.	Date	Description				By	Chk'd	App'd
Drawing Status								Suitability
WORK IN PROGRESS								SO
Project		<div><div></div><div>EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone Tel: +232 78 188040</div></div>						
Client		<div><div></div><div>P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone Tel: +232 22 225887</div></div>						
		<div><div> Member of the SNC-Lavalin Group</div><div>Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW Tel: +44 1372 726140 www.atkinsglobal.com</div></div>						
Project Title		ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY						
Drawing Title		5.9 b 6"AC IN THE EAST MAINS REHABILITATION						
Scale	Designed	Drawn	Checked	Authorised				
1:5,000	JNK	JNK	CC	RS/AC				
Original Size	Date	Date	Date	Date	Date			
A3	30/01/18	30/01/18	30/01/18	30/01/18	30/01/18			
Drawing Number								Revision
FW-ATK-0509-2-DR-NE-9560								P0.1





### Legend

- Proposed DN150
- Existing 6" AC main to be decommissioned
- Existing Network

P0.1		30/01/18		Stage 2 Issue		JNK	CC	RS/AC
Rev	Date	Description				By	Chk'd	App'd
Drawing Status								Suitability
WORK IN PROGRESS								SO
Project		<div><div></div><div>EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone Tel: +232 78 188040</div></div>						
Client		<div><div></div><div>P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone Tel: +232 22 225887</div></div>						
		<div><div><div>Member of the SNC-Lavalin Group</div></div><div>Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW Tel: +44 1372 726140 www.atkinsglobal.com</div></div>						
Project Title		ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY						
Drawing Title		5.9 b 6"AC IN THE EAST MAINS REHABILITATION						
Scale	Designed	Drawn	Checked	Authorised				
1:5,000	JNK	JNK	CC	RS/AC				
Original Size	Date	Date	Date	Date	Date			
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Drawing Number								Revision
FW-ATK-0509-2-DR-NE-9561								P0.1











### Legend

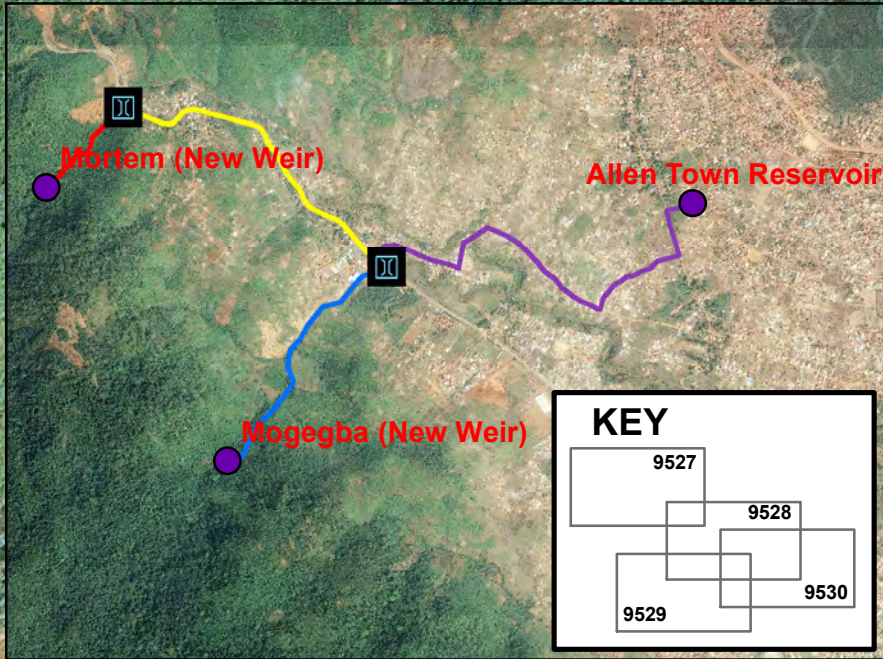
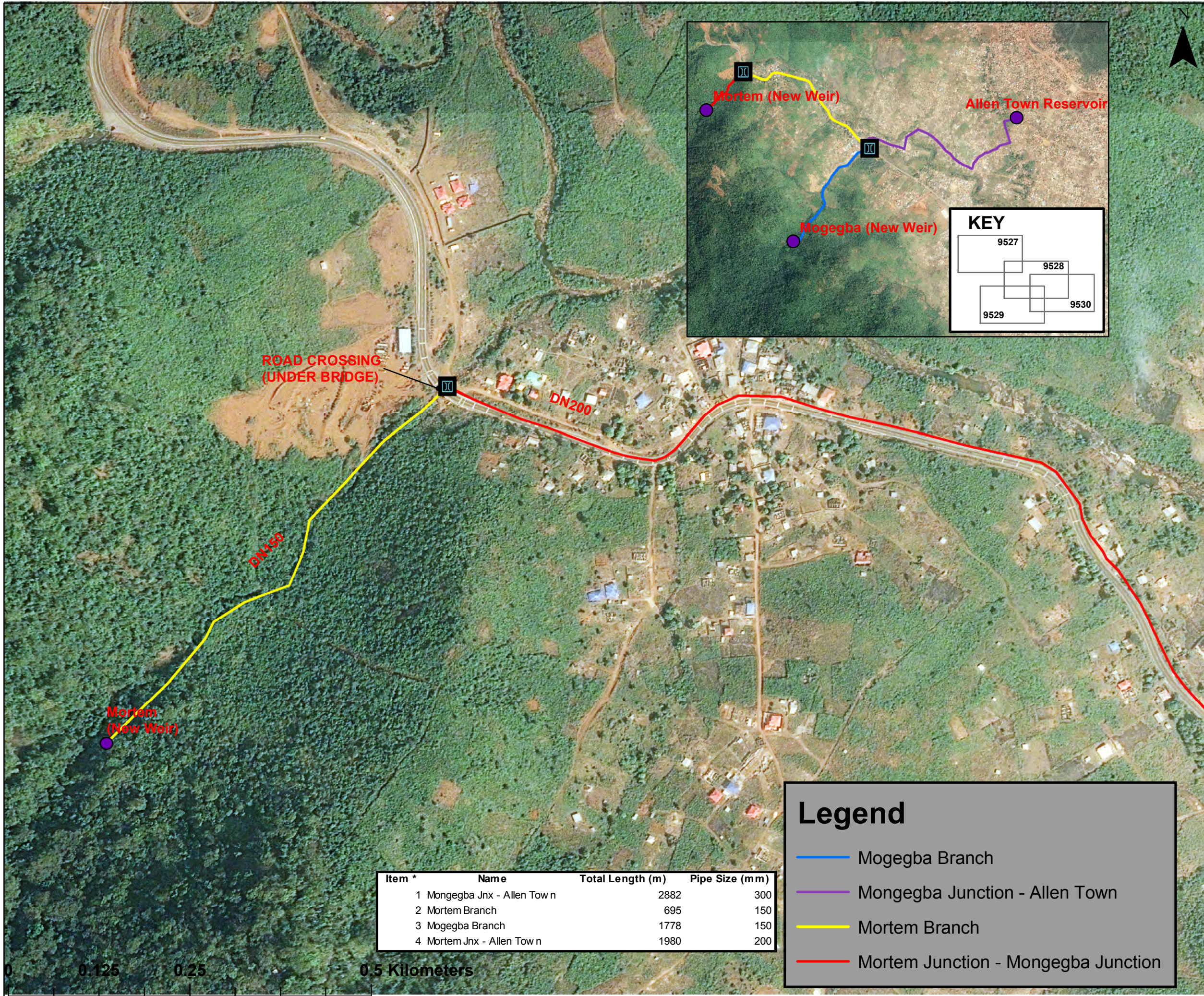
- Proposed DN150
- Existing Network

### Polygons

- Hooke Street WSZ
- Dan Street WSZ
- Maxwell Street WSZ

P0.1	30/01/18	Stage 2 Issue		JNK	CC	RS/AC			
Rev.	Date	Description		By	Chk'd	App'd			
Drawing Status					Suitability				
WORK IN PROGRESS					SO				
Project		  		EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone  Tel: +232 78 188040					
Client		  <i>Good Doing Better, Doing Good</i>		P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone  Tel: +232 22 225887					
		 Member of the SNC-Lavalin Group		Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW  Tel: +44 1372 726140 www.atkinsglobal.com					
Project Title		ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY							
Drawing Title		5.9 a PROPOSED PLAN FOR REPLACEMENT OF 300mm AC MAIN							
Scale	1:23,000	Designed	JNK	Drawn	JNK	Checked	CC	Authorised	RS/AC
Original Size	A3	Date	30/01/18	Date	30/01/18	Date	30/01/18	Date	30/01/18
Drawing Number					Revision				
FW-ATK-0509-2-DR-NE-9562					P0.1				





KEY	
9527	9528
9529	9530

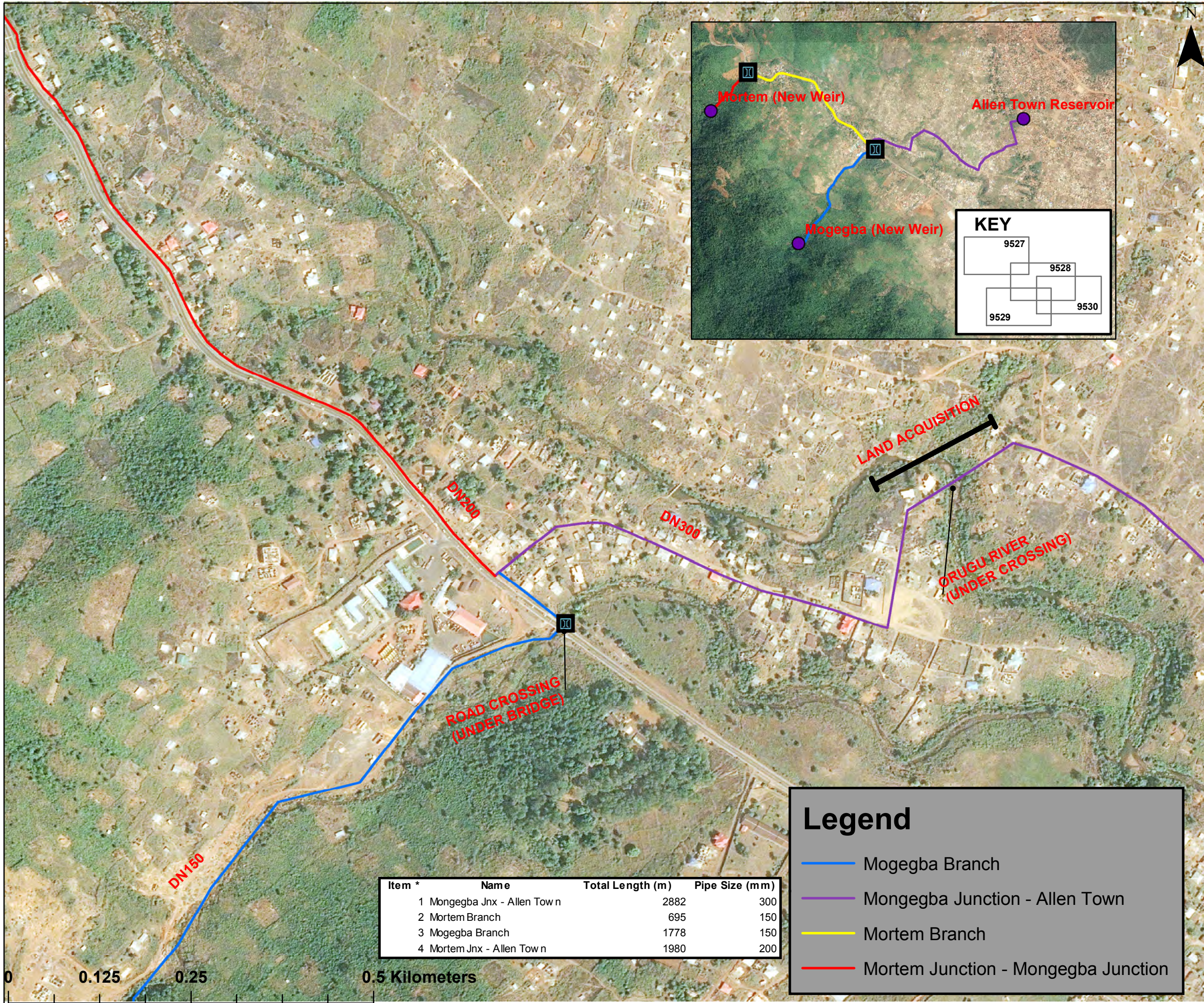
Item *	Name	Total Length (m)	Pipe Size (mm)
1	Mongegba Jnx - Allen Tow n	2882	300
2	Mortem Branch	695	150
3	Mogegba Branch	1778	150
4	Mortem Jnx - Allen Tow n	1980	200

# Legend

- Mogegba Branch
- Mongegba Junction - Allen Town
- Mortem Branch
- Mortem Junction - Mongegba Junction

P0.1	11/01/18	Stage 2 Issue	JNK	JK	RS/AC
Rev.	Date	Description	By	Chk'd	App'd
Drawing Status					Suitability
WORK IN PROGRESS					SO
Project		EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone Tel: +232 78 188040			
Client		P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone Tel: +232 22 225887			
Atkins		Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW Tel: +44 1372 726140 www.atkinsglobal.com			
Project Title ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY					
Drawing Title TRANSMISSION MAINS FOR ORUGU SOURCES					
Scale	Designed	Drawn	Checked	Authorised	
1:5,000	JNK	JNK	JK	RS/AC	
Original Size	Date	Date	Date	Date	
A3	11/01/18	11/01/18	11/01/18	11/01/18	
Drawing Number					Revision
FW-ATK-0605-2-DR-C-9527					P0.1





Item *	Name	Total Length (m)	Pipe Size (mm)
1	Mongegba Jnx - Allen Town	2882	300
2	Mortem Branch	695	150
3	Mogegba Branch	1778	150
4	Mortem Jnx - Allen Town	1980	200

Legend

Mogegba Branch

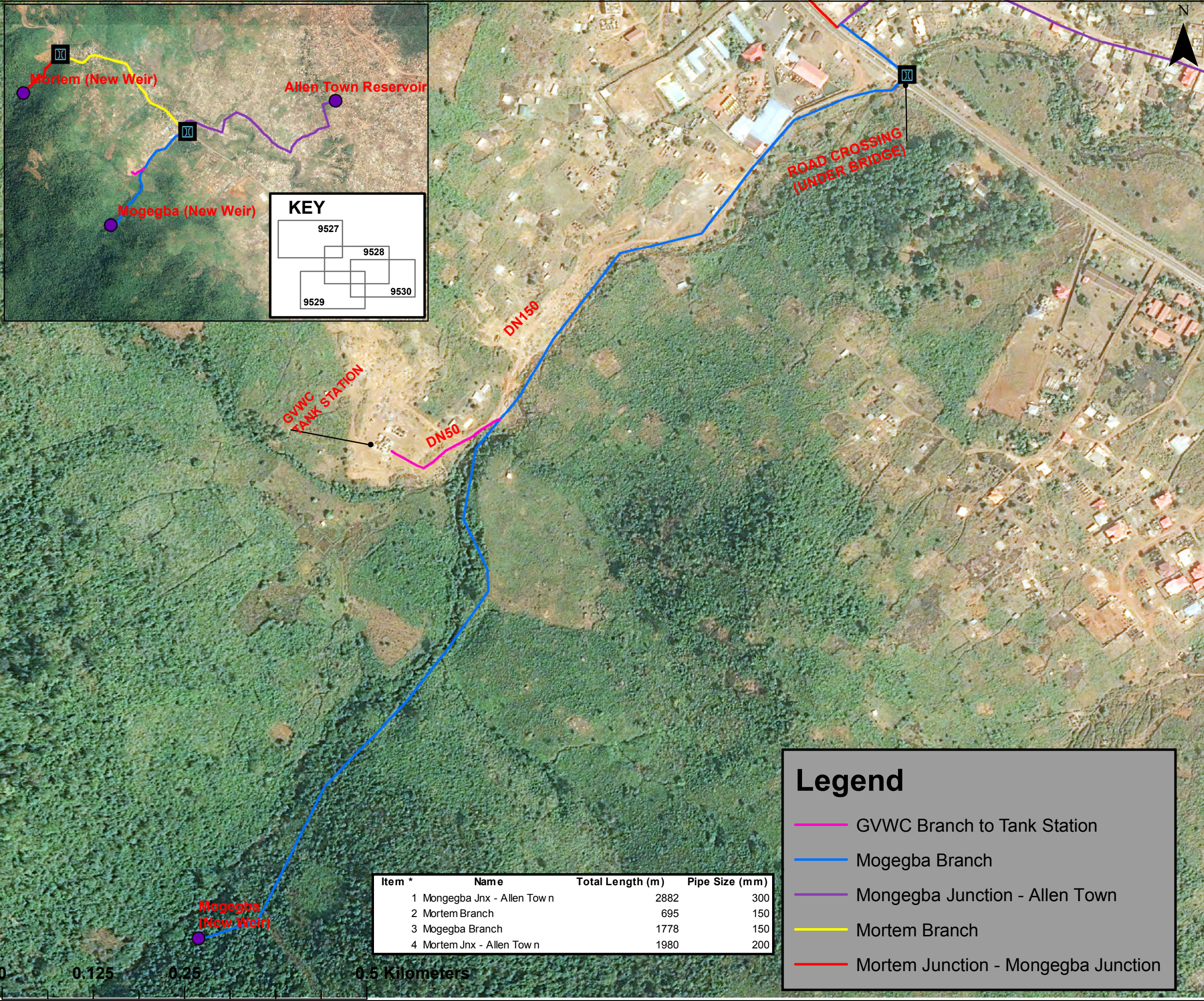
Mongegba Junction - Allen Town

Mortem Branch

Mortem Junction - Mongegba Junction

P0.1		11/01/18		Stage 2 Issue		JNK	JK	RS/AC
Rev.	Date	Description				By	Chk'd	App'd
Drawing Status								Suitability
WORK IN PROGRESS								SO
Project		<div><div> Acuity</div><div>EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone Tel: +232 78 188040</div></div>						
Client		<div><div></div><div>P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone Tel: +232 22 225887</div></div>						
		<div><div> Member of the SNC-Lavalin Group</div><div>Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW Tel: +44 1372 726140 www.atkinsglobal.com</div></div>						
Project Title ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY								
Drawing Title TRANSMISSION MAINS FOR ORUGU SOURCES								
Scale	Designed	Drawn	Checked	Authorised				
1:5,000	JNK	JNK	JK	RS/AC				
Original Size	Date	Date	Date	Date	Date			
A3	11/01/18	11/01/18	11/01/18	11/01/18	11/01/18			
Drawing Number FW-ATK-0605-2-DR-C-9528								Revision P0.1





KEY			
9527		9528	
9529		9530	

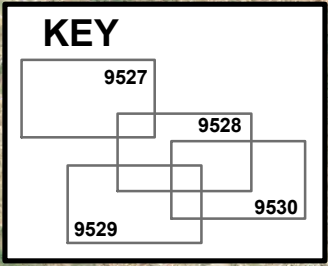
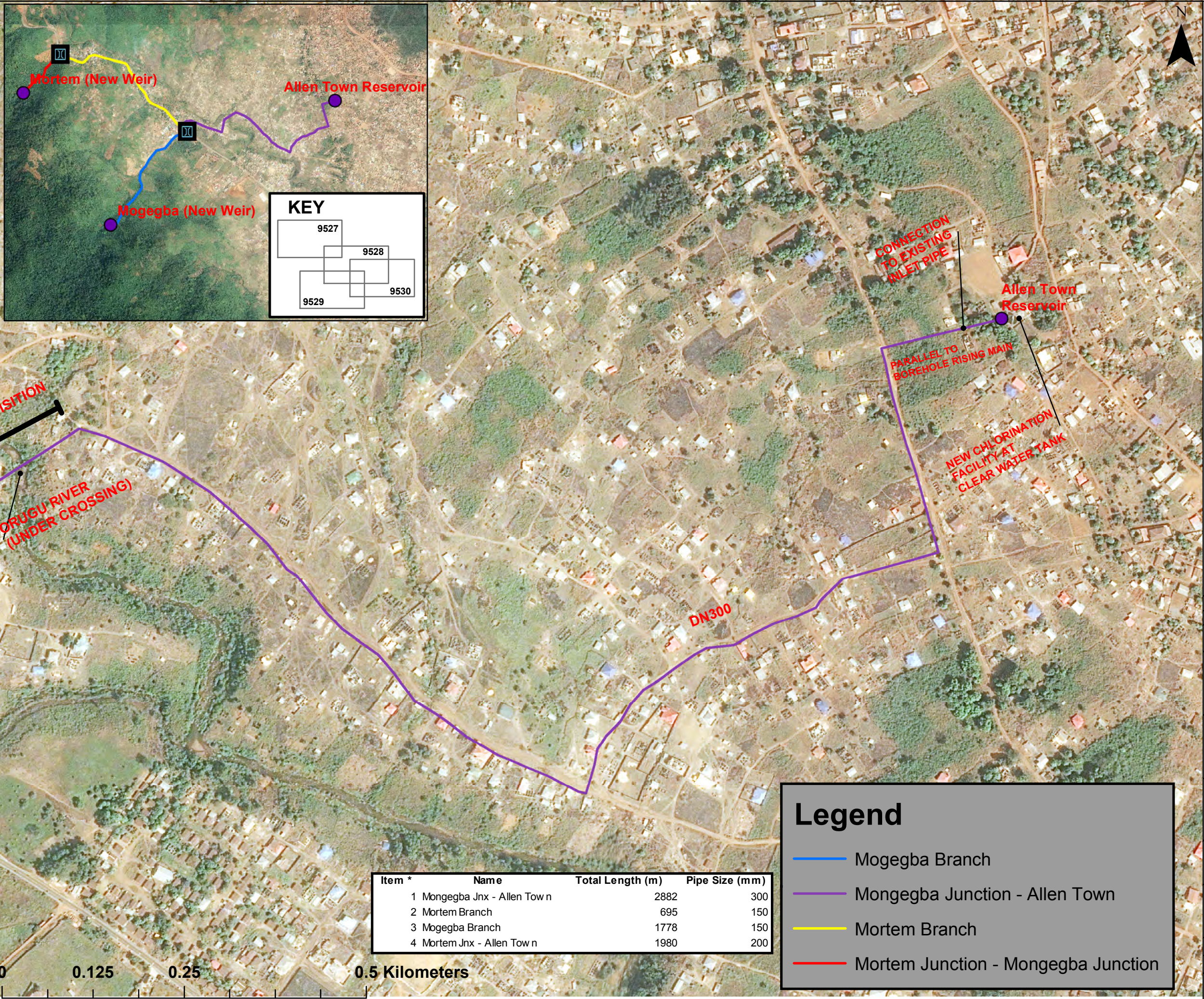
# Legend

- GVWC Branch to Tank Station
- Mogegba Branch
- Mongegba Junction - Allen Town
- Mortem Branch
- Mortem Junction - Mongegba Junction

Item *	Name	Total Length (m)	Pipe Size (mm)
1	Mongegba Jnx - Allen Tow n	2882	300
2	Mortem Branch	695	150
3	Mogegba Branch	1778	150
4	Mortem Jnx - Allen Tow n	1980	200

P0.1	11/01/18	Stage 2 Issue	JNK	JK	RS/AC
Rev.	Date	Description	By	Chk'd	App'd
Drawing Status					Suitability
WORK IN PROGRESS					SO
Project		EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone Tel: +232 78 188040			
Client		P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone Tel: +232 22 225887			
Atkins		Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW Tel: +44 1372 726140 www.atkinsglobal.com			
Project Title ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY					
Drawing Title TRANSMISSION MAINS FOR ORUGU SOURCES					
Scale	Designed	Drawn	Checked	Authorised	
1:5,000	JNK	JNK	JK	RS/AC	
Original Size	Date	Date	Date	Date	
A3	11/01/18	11/01/18	11/01/18	11/01/18	
Drawing Number					Revision
FW-ATK-0605-2-DR-C-9529					P0.1





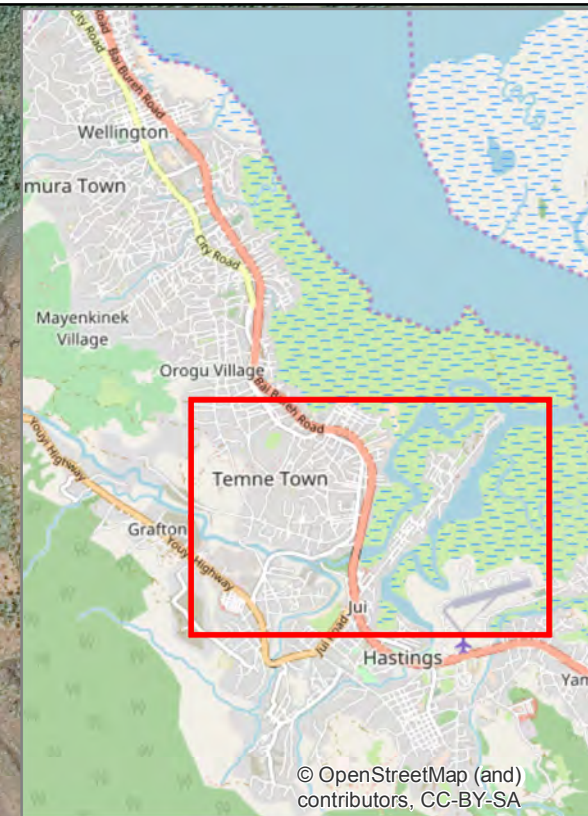
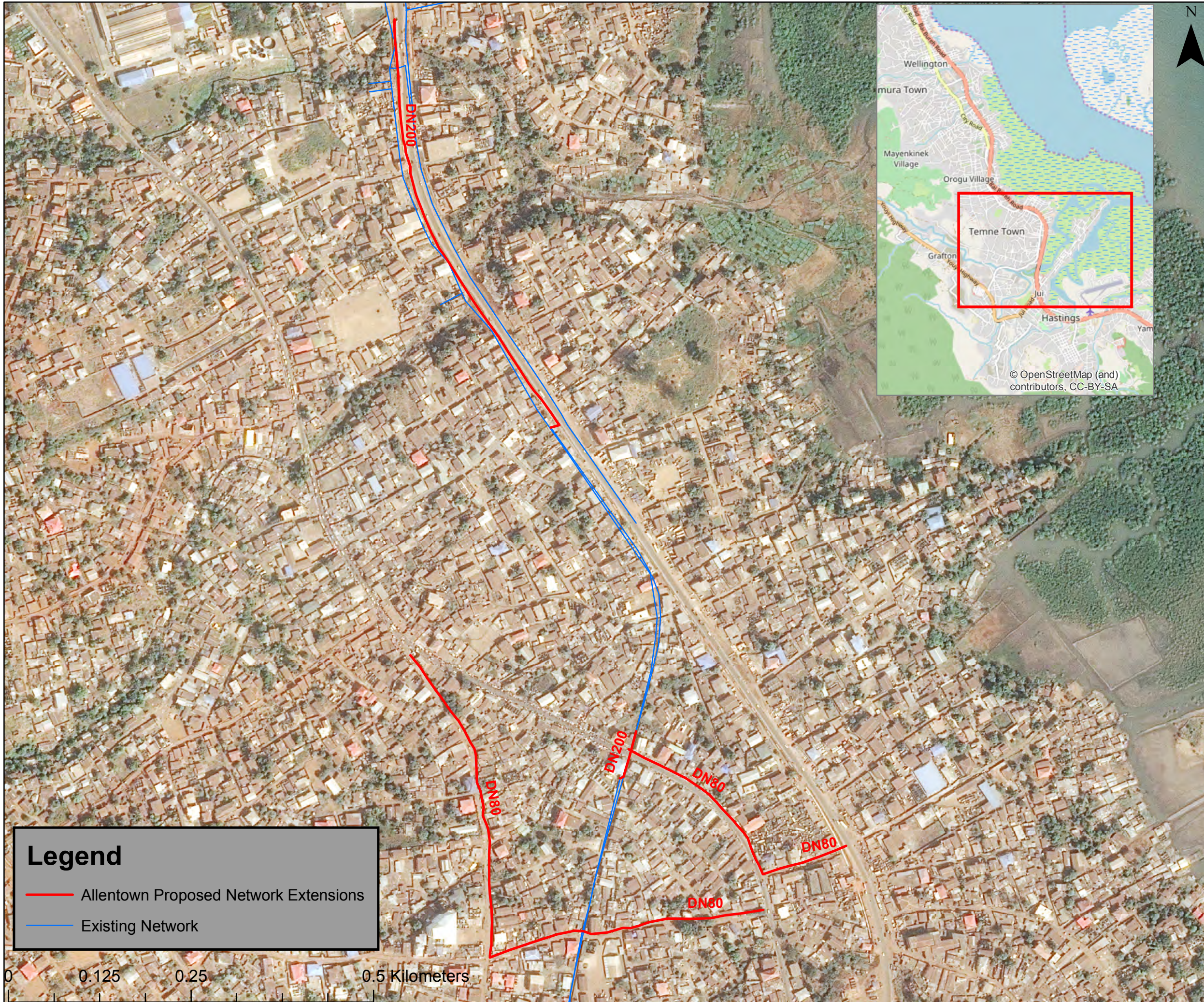
## Legend

- Mogegeba Branch
- Mongegba Junction - Allen Town
- Mortem Branch
- Mortem Junction - Mongegba Junction

Item *	Name	Total Length (m)	Pipe Size (mm)
1	Mongegba Jnx - Allen Tow n	2882	300
2	Mortem Branch	695	150
3	Mogegeba Branch	1778	150
4	Mortem Jnx - Allen Tow n	1980	200

P0.1	11/01/18	Stage 2 Issue	JNK	JK	RS/AC
Rev.	Date	Description	By	Chk'd	App'd
Drawing Status					Suitability
WORK IN PROGRESS					SO
Project		EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone Tel: +232 78 188040			
Client		P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone Tel: +232 22 225887			
Project Title		ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY			
Drawing Title		TRANSMISSION MAINS FOR ORUGU SOURCES			
Scale	Designed	Drawn	Checked	Authorised	
1:5,000	JNK	JNK	JK	RS/AC	
Original Size	Date	Date	Date	Date	Date
A3	11/01/18	11/01/18	11/01/18	11/01/18	11/01/18
Drawing Number					Revision
FW-ATK-0605-2-DR-C-9530					P0.1





**Legend**

- Allentown Proposed Network Extensions
- Existing Network

**KEY**

9523

9524

9525

9526

P0.1	8/01/18	Stage 2 Issue	JNK	CC	RS/AC
Rev.	Date	Description	By	Chk'd	App'd
Drawing Status				Suitability	
WORK IN PROGRESS				SO	

Project



EPC Project Office  
No. 3 Jalloh Close  
Spur Loop  
Freetown  
Sierra Leone  
Tel: +232 78 188040

Client



P.O. Box 700  
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Sierra Leone  
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KT18 5BW  
Tel: +44 1372 726140  
www.atkinsglobal.com

Project Title **ENGINEERING MANAGEMENT SERVICES TO REHABILITATE FREETOWN WATER SUPPLY**

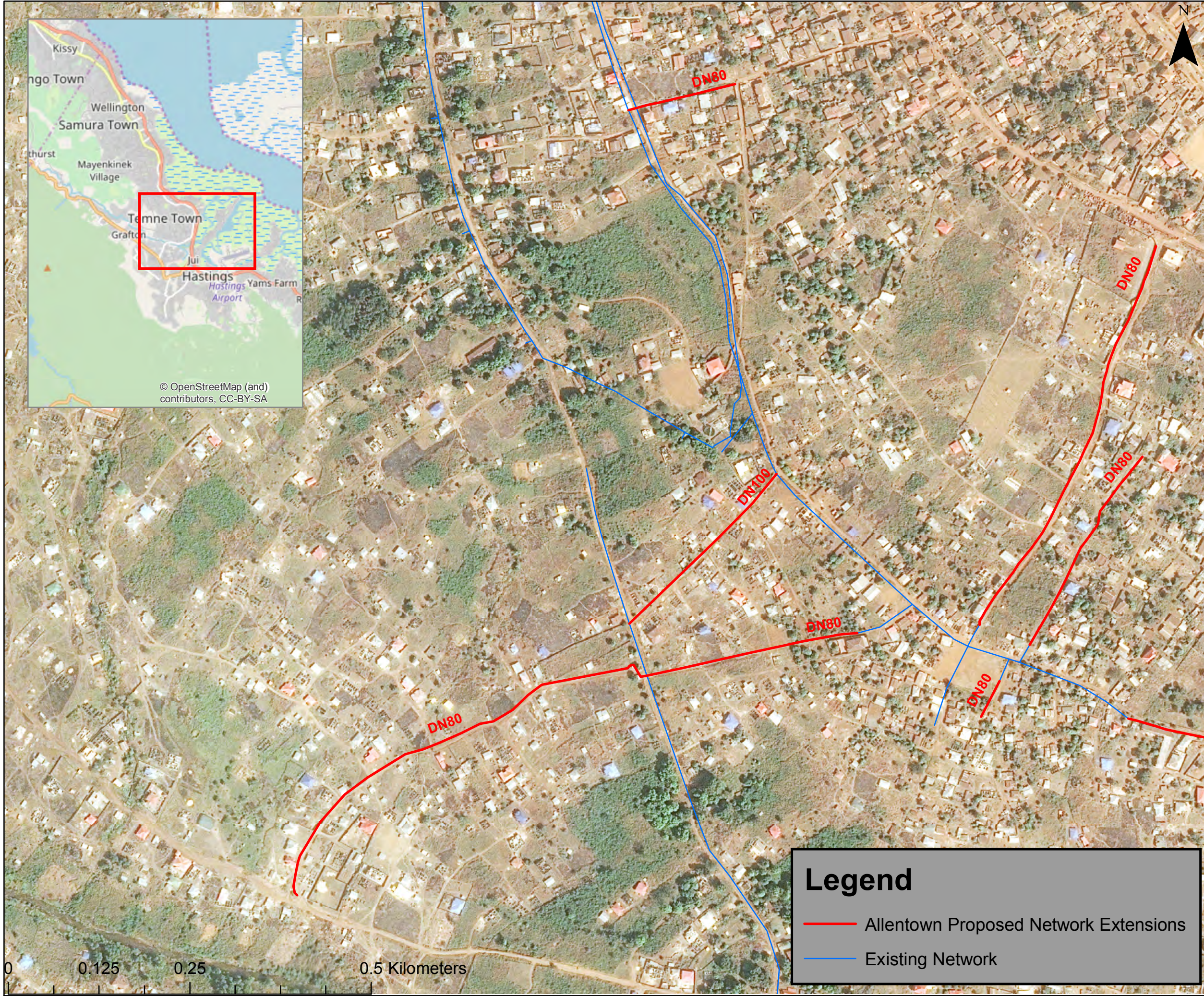
Drawing Title **6.9 ALLENTOWN PROPOSED NETWORK EXTENSIONS**

Scale	1:5,000	Designed	JNK	Drawn	JNK	Checked	CC	Authorised	RS/AC
Original Size	A3	Date	8/01/18	Date	8/01/18	Date	8/01/18	Date	8/01/18
Drawing Number <b>FW-ATK-0609-2-DR-C-9523</b>								Revision <b>P0.1</b>	









### KEY

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P0.1	8/01/18	Stage 2 Issue	JNK	CC	RS/AC
Rev.	Date	Description	By	Chk'd	App'd
Drawing Status					Suitability
WORK IN PROGRESS					SO
Project		<div><div></div><div>EPC Project Office No. 3 Jalloh Close Spur Loop Freetown Sierra Leone Tel: +232 78 188040</div></div>			
Client		<div><div></div><div>P.O. Box 700 Guma Building 12/14 Lamina Sankoh Street Freetown Sierra Leone Tel: +232 22 225887</div></div>			
		<div><div> Member of the SNC-Lavalin Group</div><div>Atkins Epsom Office Woodcote Grove Ashley Road Epsom, Surrey KT18 5BW Tel: +44 1372 726140 www.atkinsglobal.com</div></div>			
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FW-ATK-0609-2-DR-C-9525					P0.1





## Appendix 3: Biodiversity Assessment



**BIODIVERSITY ASSESSMENT REPORT FOR THE FREETOWN WATER SUPPLY  
REHABILITATION PROJECT**

**BY**

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# ECOLOGICAL INFORMATION ON THE RAPID BIODIVERSITY ASSESSMENT FOR THE FREETOWN WATER SUPPLY REHABILITATION PROJECT

## INTRODUCTION

Environmental Impact Assessment (EIA) is mandatory for every project that involves construction of reservoir or their facilities with the aim of providing water for various purposes and plays important role in bringing water where there is scarcity or totally non-existence. The construction of reservoir facilities brings about large-scale changes in nature, from climatic factors to wildlife, and for most elements of flora and fauna, these changes can be disastrous if no study is done to suggest alternatives or mitigation measures hence the need for an EIA.

Altogether five taxa were captured this study. These included Mammals(and bats), Reptiles and Amphibians, Avifauna, Fish and plants.

These biodiversity surveys were conducted in three out of the nine work package areas ie Mogegeba, Guma WTW and Mortem surveyed areas, the reason for this was that these areas have their vegetation cover where wildlife can be hosted and serve as habitat for them. Information on the lay down area in Mile 13 will be provided later when data is available.

### a) Mogegeba (Work site 1)

The Mogegeba (orugu) axis is a degraded area and has some few forest patches which also harbor few species.

#### Mammals

#### Methodology

Four methods were used interchangeably depending on the circumstance during the survey and are outlined as below:

- ❖ **Reconnaissance survey:** whereby team members searched around the work package sites for the occurrence and these were recorded mostly by chance observations or evidential signs (i.e. tracks, trails, scrapes, food remnants, sounds, location (habitat), droppings, footprints etc.
- ❖ **Opportunistic survey:** where individuals were recorded immediately upon seeing them in the surveyed area
- ❖ **Interviews:** We found this method very helpful such that most of the mammals recorded were confirmed to be present in the work package areas by resident communities and tour guides who have lived in and around those survey areas for most part of their lives.

The Mogegeba (Orugu) axis falls within the distribution range of 12 terrestrial mammals of which four are listed, these are the Western Red Colobus *Piliocolobus badius* (Endangered), Western Pied Colobus *Colobus polykomos* (Vulnerable), Sooty mangabey (Vulnerable) and Tree pangolin *Phataginus tricuspis* (Endangered). Throughout the survey, no presence of bats were observed in this area:



**Table 1: List of mammals species identified in Mogegeba work package area**

No	Common Name	Scientific Name	IUCN STATUS
1	Africa Forest Buffalo	<i>Syncerus saffer nanus</i>	LC
2	Bushbuck	<i>Tragelaphus scriptus</i>	LC
3	Maxwell's duiker	<i>Cephalophus maxwelli</i>	LC
4	Bay duiker	<i>Cephalophus dorsalis</i>	LC
5	Fire footed rope squirrel	<i>Funisciurus pyrropus</i>	LC
6	Brush tailed porcupine	<i>Atherurus africanus</i>	LC
7	Giant pouched rat	<i>Cricetomy semini</i>	LC
8	Tree pangolin	<i>Phataginus tricuspis</i>	EN
9	Western pied colobus	<i>Colobus polykomos</i>	VU
10	Western red colobus	<i>Piliocolobus badius</i>	EN
11	Sooty mangabey	<i>Cercocebus atys</i>	VU
12	Campbell's monkey	<i>Cercocebus campbelli</i>	LC
13	Lesser spot-nosed monkey	<i>Cercopithecus petaurista</i>	LC

**LC-Least concern EN-Endangered VU- Vulnerable**

#### **Recommendations/Mitigation Measures:**

- Ensure the protection of these animals when they come out from their places when the work is in progress since the quest for bush meat is high among the locals

#### **B) Reptiles and Amphibians**

##### **i) Reptiles:**

##### **Methodology**

- Species diversity survey in which reptiles of the various species were identified and recorded during the field activities.
- Time constrained searching techniques involved scanning the terrain and investigating potential hiding places or specific habitats to find and record individuals



Fig 1: *Philothamnus irregularis* is species found around disturb forest axis, area that has been previously disturbed.

Photo by Keifala Lahai



**Fig 2:** *Agama agama*

Photo by Kefala Lahai

This species was found on the ground with its eggs during the survey, it was quite clear that the agama agama was present in all the surveys. However, the distribution of this species at the different sites gives a hint that the Agama lizard (*Agama agama*), geckos (*Hemidactylus brooki*) are mainly restricted to much degraded areas. The region offers a diverse Agama agama assemblage typical of an only moderately disturbed upper Guinea forest with a variety of landscapes and standing water and influence from open or degraded habitats.

**Table 2: List of reptile species identified during the survey at Mogegeba worksite**

NO	SCIENTIFIC NAME	FAMILY	NO. OF INDIVIDUAL SPECIES	IUCN Threatened category
1	<i>Philothamnus irregularis</i>	Colubridae	1	LC
2	<i>Agama agama</i>	Agamidae	13	LC
3	<i>Hemidactylus brooki</i>	Gekkonidae	10	LC
<b>TOTAL INDIVIDUAL SPECIES</b>			<b>24</b>	

## ii) Amphibians:

### Methodology:

Amphibians were recorded during visual and acoustic encountered survey covering all available habitats like the stream and on leaf litters for amphibians. Searching techniques included visual scanning of the terrain an investigation of potential hiding places or very specific habitats (e.g. rocky stream and also drier habitat.





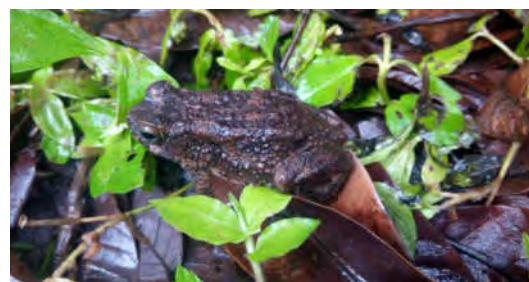
**Fig 3: Team leader (right) and herpetologist (left) scanning the terrain for amphibians**

Photo by Patrick Dauda

The amphibian survey lies within the distribution range of 123 amphibian species in all the three sites visited. Its populations at the site are really high within the streams and drainage areas inhabited by the Sierra Leone Water Frog *Odontobatrachus natator*, while the *Ptychadena bibroni* was almost found everywhere in the disturb areas within the survey sites. Amongst all, only the *Odontobatrachus natator* is of conservation concern and is listed as Near Threatened (NT) species. This species is commonly called the Sierra Leone water frog (*Odontobatrachus natator*), and it was also recorded inside the two miles tunnel. The *Odontobatrachus natator* species was the most highly encountered species found throughout the survey site. The habitat of this species ranges from rocky stream areas, waterfalls to water catchment areas with moderate to high water current. Given that the construction work will consist of creating water channels, the potential impacts on this species would be low, as would impacts on the majority of the other amphibians. This species is confined to the Upper Guinea forest edges where it is found on rocky stream and waterfalls. It is classified as Near Threatened by IUCN



*Fig4a:Odontobatrachus natator*



*Fig4b:Amietophrynus maculatus* Photo by Keifala Lahai

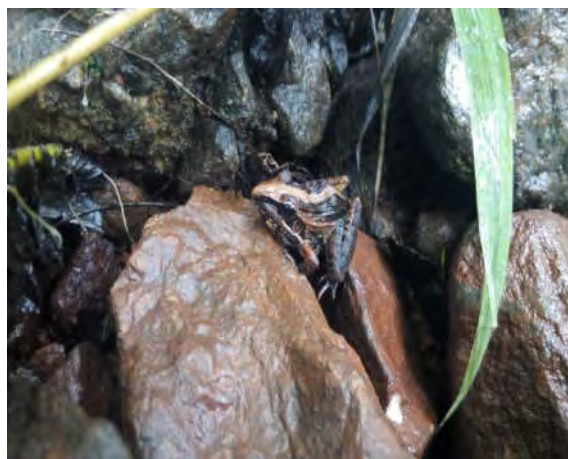


Fig 5a: *Ptychadena bibroni*



Fig 5b: *Ptychadena bibroni* Photo by Keifala Lahai

**Table 3: List of amphibian species recorded during the survey at Mogegeba worksite**

No	SCIENTIFIC NAME	FAMILY	IUCN Threatened category
1	<i>Ptychadena bibroni</i>	Ptychadenidae	LC
2	<i>Amietophrynus maculatus</i>	Amietophrynidae	LC
3	<i>Phrynobatrachus phyllophilus</i>	Phrynobatrachidae	NT
4	<i>Hoplobatrachus occipitalis</i>	Dicroglossidae	LC
5	<i>Odontobatrachus natator</i>	Odontobatrachidae	NT
6	<i>Phrynobatrachus tokba</i>	Phrynobatrachidae	LC
7	<i>Phyllactimantis boulengeri</i>	Hyperoliidae	LC
8	<i>Afraxalus dorsalis</i>	Hyperoliidae	LC

#### Recommendations/Mitigation measures:

- Reptiles and amphibians differ in their habitat preferences. Thus amphibians need water for breeding and other activities so leaving water channels and maintaining flow quantity of approximately (Construction engineers to suggest) downstream during work will reduce the impact especially if work requires draining all available water.
- Amphibians like hiding under leaf litters thus care must be taken to protect them from physical damage if they are detected
- Care must also be taken to avoid snakes and other reptiles during work if they are detected
- Impact on these animals is minimal/temporal if the work is not extended for longer duration



### C) Avifauna (Birds)

#### Methodology

- ❖ Visual observation: This included observing birds by walking slowly along tracks and trails and stopping frequently. Attempts were made to cover as much ground and visit as many locations in the habitat at Mogegba.

This is known as direct identification method involving:

- sighting and seeing the bird
- observing the overall shape and appearance of the birds
- observing the foraging and social behaviours
- observing the different feather colours

Any species identified using this method were recorded and a species list was later prepared in the data analysis

- ❖ opportunistic/systematic survey: In this method the survey team moved in the forests especially at work package area of Mogegba to record any species found in those areas



Fig 6a: *Merops albicollis*-White Throated Bee-Eater Fig 6b: *Streptopelia semitorquata*- Red eyed-Dove Photo by Patrick Dauda

**Table 4: List of bird species recorded during the survey at Mogegba work site**

No	Species English Name	Scientific Name	Individuals	IUCN	High Forest Dependent
1	Bronze Mannikin	<i>Spermestes cucullata</i>	27	-	-
2	African Harrier Hawk	<i>Polyboroides typus</i>	6	-	-
3	African Pied Hornbill	<i>Tockus fasciatus</i>	3	-	-
5	Black-throated Coucal	<i>Centropus leucogaster</i>	1	-	-
4	Blue-breasted Kingfisher	<i>Halcyon malimbica</i>	1	-	-
5	Blue-headed Wood Dove	<i>Turtur brehmeri</i>	1	-	-
6	Buff-Throated Sunbird	<i>Chalcomitra adelberti</i>	1	-	-
7	Common Fiscal	<i>Lanius collaris</i>	1	-	-
8	Chestnut Wattle-eye	<i>Dyaphorophyia castanea</i>	1	-	-
9	Chestnut-breasted Nigrita	<i>Nigrita bicolor</i>	1	-	-
10	Collared Sunbird	<i>Hedydipna collaris</i>	1	-	-
11	Common Bulbul	<i>Pycnonotus barbatus</i>	7	-	-

12	Green Crombec	<i>Sylvietta virens</i>	1	-	-
13	Green Hylia	<i>Hylia prasina</i>	3	-	-
14	Little grey-Greenbul	<i>Andropadus gracilis</i>	1	-	-
15	Laughing Dove	<i>Streptopelia senegalensis</i>	1	-	-
16	Grey-backed Camaroptera	<i>Camaroptera brachyura</i>	1	-	-
17	Grey-crowned Nigrita	<i>Nigrita canicapillus</i>	1	-	-
18	Grey-Longbill	<i>Macrosphenus concolor</i>	1	-	-
19	Little Greenbul	<i>Andropadus virens</i>	3	-	-
20	Malachite Kingfisher	<i>Alcedo cristata</i>	1	-	-
21	Northern Grey-Headed Sparrow	<i>Passer griseus</i>	1	-	-
22	Pied Crow	<i>Corvus albus</i>	2	-	-
23	Red-eyed Dove	<i>Streptopelia semitorquata</i>	3	-	-
24	Senegal Coucal	<i>Centropus senegalensis</i>	2	-	-
25	Simple Leaflove	<i>Chlorocichla simplex</i>	1	-	-
26	Buff-throated Sunbird	<i>Chalcomitra adelberti</i>	1	-	-
27	Swamp Palm Bulbul	<i>Thescelocichla leucopleura</i>	3	-	-
28	White-throated Bee-eater	<i>Merops albicollis</i>	5	-	-
29	Woodland Kingfisher	<i>Halcyon senegalensis</i>	1	-	-
30	Yellowbill	<i>Ceuthmochares aereus</i>	1	-	-
31	Yellow-browed Camaroptera	<i>Camaroptera superciliaris</i>	2	-	-
		<b>31 Species</b>	<b>86</b>	<b>0</b>	<b>0</b>

A total of 86 individuals belonging to 31 species were recorded at Mogegeba work package area during the survey but none was found to be of conservation concern meaning that construction work in this area will have little or no interaction with the bird community. It was also observed that this area is not a migration route for the bird species recorded in the survey.

#### **Recommendations/Mitigation measures:**

- The forest cover around the work site should be maintained to serve as offset for the bird species
- Trees serve as temporal and permanent habitats for some birds therefore the construction should not chop off the vegetation cover but reserve it for these animals
- The scale of impact will be temporal with shorter duration of work

#### **D) Fish (Pisces)**

##### **Methodology**

- on-site identification of fish species using field guide for fresh water species
- visual observation to record species found

Surprisingly our search could not reveal any identifiable/mature fish species in the area at the time of the study although from interviews with some members of the resident community indicate that fish species like *Tilapia* can be present and these views were confirmed by the appearance of newly hatched unidentifiable fries of this species in stagnant rocky waters.





Photo by Patrick Dauda

**Fig 7: Stagnant rocky water containing unidentifiable fries of *Tilapia Sp***

**Recommendation/Mitigation measures:**

- Maintain water channels with regulated flow of water downstream to ensure the survival of fish species
- Work should not be extended for longer duration to minimize the impact

**E) Tree and plant species**

**Methodology**

- Point count of plant species occurring in the work package areas
- Transect count whereby all species along the transect are counted
- Tree identification in the work package areas

**Table 5: List of tree species recorded during the survey at Mogegeba worksite**

No	SPECIES	FAMILY
1	<i>Ceiba pentanda</i>	Bombacaceae
2	<i>Parinari excelsa</i>	Rosaceae
3	<i>Blighia unijugata</i>	Spidaceae
4	<i>Anthocleista nobilis</i>	Loganaceae
5	<i>Margaritaria discoidea</i>	Euphorbiaceae
6	<i>Elaeis guineensis</i>	palmaceae
7	<i>Allophyllus africanus</i>	Sapindaceae
8	<i>Chestis ferruginea</i>	connaraceae
9	<i>Allanblackia parviflora</i>	gulliferae
10	<i>Alchornea cordifolia</i>	enphorbiaceae
11	<i>Sterculia tragacantha</i>	sterculaceae
12	<i>Morinda lucida</i>	rubiceae
13	<i>Macaranga barteri</i>	Euphorbiaceae
14	<i>Samanea dinklaigei</i>	mimosaceae
15	<i>Diospyros thomasi</i>	ebenaceae
16	<i>Nauclea latifolia</i>	rusiaceae

17	<i>Naucea diderrichii</i>	Rubiaceae
18	<i>Anisophyllea laurina</i>	Rhizophoraceae
19	<i>Rauvolfia vomitoria</i>	Apocynaceae
20	<i>Trichilia monadelpha</i>	Meliaceae
21	<i>Bridelia micrantha</i>	Eusphabiaceae
22	<i>Cratorispermum laurinum</i>	rubiceae
23	<i>Harungana madagascariensis</i>	Hypericaceae
24	<i>Albizia zygia</i>	Mimosaceae
25	<i>Phylcosmus africanus</i>	Ixouanthaceae
26	<i>Dichrostachys glomerata</i>	Mimosaceae
27	<i>Millicia excelsa</i>	Moraceae
28	<i>Millicia regea</i>	Moraceae
29	<i>Hymenocardia lyrata</i>	Enphorbiaceae
39	<i>Mareya micrantha</i>	Enphobiaceae
31	<i>Tabernaemontana crassa</i>	Apocynaceae
32	<i>Lannea nigritana</i>	Anacardiaceae
33	<i>Pentacleista macrophylla</i>	Mimosaceae
34	<i>Cleistopholis patens</i>	Annonaceae
35	<i>Macaranga heudelotii</i>	Enphorbiaceae
36	<i>Vismia guineensis</i>	Hypericeae
37	<i>Daniellia thurifera</i>	Cesalpiniaceae
38	<i>Canarium schweinfurthii</i>	Burseraceae
39	<i>Amphimas pterocarpoides</i>	Caesalpiniaceae
40	<i>Carpolobia lutea</i>	Polygalaceae
41	<i>Dialium guineensis</i>	Caesalpiniaceae
42	<i>Pycnanthus angolensis</i>	Myristicaceae
43	<i>Macaranga heterophylla</i>	Enphorbiaceae
44	<i>Funtumia Africana</i>	Apocynaceae
45	<i>Albizia adiantifolia</i>	Mimosaceae
46	<i>Xylopia aethiopica</i>	Annonaceae
47	<i>Trema guineensis</i>	Ulmaceae
48	<i>Placodiscus splendidus</i>	Sapindaceae
49	<i>Deinbollia grandifolia</i>	Sapindaceae
50	<i>Vamgueriopsis discolor</i>	Rubiaceae
51	<i>Tetrorchidium didymostemon</i>	Euphorbiaceae
52	<i>Zanthoxylum gillettii</i>	Rubiaceae
53	<i>Holarrhena floribunda</i>	Apocynaceae
54	<i>Homalium letestui</i>	Flacourtiaceae
55	<i>Ficus exasperata</i>	Moraceae
56	<i>Homalium smythei</i>	Samydaceae
57	<i>Bombax buonopozense</i>	Bombacaceae
58	<i>Musanga cecropoides</i>	Moraceae
59	<i>Ficus sp.</i>	Moraceae
60	<i>Terminalia ivorensis</i>	Cambretaceae
61	<i>Pentadesma butyraceae</i>	Guttiferae
62	<i>Cola lateritia</i>	Sterculia



63	<i>Diospyros cooperi</i>	Eberaceae
64	<i>Diospyros heudeloti</i>	Eberacea
65	<i>Maesopsis eminii</i>	Rhamnaceae
66	<i>Parkia bicolor</i>	Mimosaceae
67	<i>Cassia sieberiana</i>	Caesalpinaceae
68	<i>Piptadena strum africanum</i>	Mimosaceae
69	<i>Cynometra leonensis</i>	Caesalpinaceae
70	<i>Cala acuminata</i>	Steraliaceae
71	<i>Carapa procera</i>	Meliaceae
72	<i>Klainedoxa gabonensis</i>	Irvingiaceae
73	<i>Xylia evensii</i>	Mimosaceae
74	<i>Ficus sur</i>	Moraceae
75	<i>Brachystegia leonensis</i>	Caesalpinaceae
76	<i>Anthonotha macrophylla</i>	Leguminosaeceae
77	<i>Cryptosepalum tetraphyllum</i>	Leguminosaeceae
78	<i>Coffea stenophylla</i>	Rubiaceae
79	<i>Ficus mucuso</i>	Moraceae
80	<i>Memecylon afzeli</i>	Melastomaceae
81	<i>Erythroxylum mannii</i>	Euphorbiaceae

A total of 81 tree species belonging to 43 families were recorded during the study in the Mogegeba work site (Table 4). Some of these species have been listed as either threatened, vulnerable or endangered by the IUCN. For instance *Daniellia thurifera*, *Millicia excelsa*, *Millicia regia*, *Brachystegia leonensis* and *Cryptosepalum tetraphyllum* are listed as threatened and were very common in all three survey sites.

**Table 6: List of plant species recorded during the survey at Mogegeba worksite**

	PLANT	SPECIES
1	<i>Tetracera alnifolia</i>	Dilleniaceae
2	<i>Aspilia africana</i>	Asteraceae
3	<i>Triumfetta tomentosa</i>	Tiliaceae
4	<i>Costus afer</i>	Zingiberaceae
5	<i>Mezoneurum benthamianum</i>	Caesalpinaceae
6	<i>Acacia penata</i>	Mimosaceae
7	<i>Salacia erecta</i>	Hippocrateaceae
8	<i>Manniophyton fulrum</i>	Euphorbiaceae
9	<i>Ipomoea involucrata</i>	Convolvulaceae
10	<i>Chromolaena odorata</i>	Asteraceae
11	<i>Sida acuta</i>	Malvaceae
12	<i>Scleria barteri</i>	Cyperaceae
13	<i>Calopogonium mucunoides</i>	Papilionaceae
14	<i>Centrosema pubesceae</i>	Papilionaceae
15	<i>Hibiscus sterculiifolius</i>	Malvaceae
16	<i>Cambretum racemosum</i>	Cambretaceae
17	<i>Aframomum daniellii</i>	Zingiberaceae
18	<i>Cnestis ferruginea</i>	Connaraceae
19	<i>Urera oblongifolia</i>	Urticaceae
20	<i>Ipomea mauritiana</i>	Convolvulaceae

21	<i>Ageratum conyzoides</i>	Asteraceae
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A total of 21 plant species belonging to 17 families were recorded in the work site at Mogegeba



**Fig 8:** *Daniellia thurifera*

*Photo by Patrick Dauda*

#### **Recommendation/Mitigation measures:**

- There is already observed deforestation in this work site from people engaged in agriculture, charcoal burning, stone mining and building which in some way has got a negative impact on both tree and plant species. In that regard therefore, this project/construction work should reduce drastically the quantity of vegetation cover to chop off so that the scale of impact can be minimized
- Ensure that work duration is reduced so that impact is on a temporal scale
- Local trees can be planted around the work site as a way of restoring the land after the construction work. It is not recommended to plant invasive species like eucalyptus or acacia.

#### **B) Guma dam treatment work site**

The Guma dam treatment work area consists of luxuriant forest area and has most forest vegetation that harbors more species.

#### **Mammals (including Bats)**

##### **Methodology**

Four methods were used interchangeably depending on the circumstance during the survey and are outlined as below:

- ❖ **Reconnaissance survey:** whereby team members searched around the work package sites for the occurrence and these were recorded mostly by chance observations or evidential signs (i.e. tracks, trails, scrapes, food remnants, sounds, location (habitat), droppings, footprints etc.
- ❖ **Opportunistic survey:** where individuals were recorded immediately upon seeing them in the surveyed area
- ❖ **Roost inspection:** In the case of Bats, capturing using mist nets and identifying them using field guides especially for bats of Sierra Leone
- ❖ **Interviews:** We found this method very helpful such that most of the mammals recorded were confirmed to be present in the work package areas by resident communities and tour guides who have lived in and around those survey areas for most part of their lives.



**Table 7: List of mammal species recorded during the survey at Guma dam work site**

No	Common Name	Scientific Name	IUCN
1	Africa Forest Buffalo	<i>Syncerus saffer nanus</i>	LC
2	Bushbuck	<i>Tragelaphus scriptus</i>	LC
3	Maxwell's duiker	<i>Cephalophus maxwelli</i>	LC
4	Bay duiker	<i>Cephalophus dorsalis</i>	LC
5	Fire footed rope squirrel	<i>Funisciurus pyrropus</i>	LC
6	Brush tailed porcupine	<i>Atherurus africanus</i>	LC
7	Giant pouched rat	<i>Cricetomys emini</i>	LC
8	Tree pangolin	<i>Phataginus tricuspis</i>	EN
9	Western pied colobus	<i>Colobus polykomos</i>	VU
10	Western red colobus	<i>Piliocolobus badius</i>	EN
11	Sooty mangabey	<i>Cercocebus atys</i>	VU
12	Campbell's monkey	<i>Cercocebus campbelli</i>	LC
13	Lesser spot-nosed monkey	<i>Cercopithecus petaurista</i>	LC

**LC-Least concern EN-Endangered VU- Vulnerable**

#### **Recommendations/Mitigation measures:**

- Care must be taken to protect these animals from physical damage during rehabilitation
- Care must also be taken to protect their hiding/dwelling places (habitats) during the rehabilitation
- In the case of bats in the tunnel the assessment carried out in August 2017 highlighted the following mitigations measures:
  - 1 - Carrying out the works where the bat population is at its lowest which is during the rainy season
  - 2- Reduction of lights during the works preventing any unnecessary use of lights when possible
  - 3- Considering working at night
  - 4- Besides assessing potential fluctuations of the bat population and, if appropriate, adapting mitigation measures during the project, a monitoring plan should be put in place to observe the colony after the construction work and evaluate success of the mitigation measures. Colony counts, assessment of species composition, and activity monitoring would constitute suitable methods to this end.

An alternative would also be to find a suitable roosting site where bats could relocate to. It should be located in the vicinity of the intake tower and comply with similar conditions (ie. temperature and humidity). To this end, an experienced bat specialist could capture the bats and taken them to the new site. This does not mean that the bat colony will settle in the new location.

## **B) Reptiles and Amphibians**

### **i) Reptiles:**

#### **Methodology**

- Species diversity survey in which reptiles of the various species were identified and recorded during the field activities.
- Time constrained searching techniques involved scanning the terrain and investigating potential hiding places or specific habitats to find and record individuals\

**Table 8: List of reptile species recorded at Guma dam work site**

NO	SCIENTIFIC NAME	FAMILY	IUCN Threatened category
1	<i>Philothamnus irregularis</i>	Colubridae	LC
2	<i>Aparallactus sp.</i>	Atractaspidae	LC
3	<i>Agama agama</i>	Agamidae	LC
4	<i>Hemidactylus brooki</i>	Gekkonidae	LC

**LC-Least concern**



Fig 9a: *Hemidactylus brooki*



Fig 9b: *Aparallactus sp.* Photo by Keifala Lahai

A juvenile of the *Aparallactus sp.* is a venomous earth viper, although it is listed as Least Concern under the IUCN Red list and can only be found in the forest leaf litter cover.

## ii) Amphibians:

### Methodology

- Species diversity survey in which amphibians of the various species were identified and recorded during the field activities.
- Time constrained searching techniques involved scanning the terrain and investigating potential hiding places or specific habitats to find and record individuals

**Table 9: List of amphibian species recorded at Guma Dam work site**

NO	SCIENTIFIC NAME	FAMILY	IUCN Threatened category
1	<i>Ptychadena bibroni</i>	Ptychadenidae	LC
2	<i>Amietophrynus maculatus</i>	Amietophrynidae	LC
3	<i>Phrynobatrachus phyllophilus</i>	Phrynobatrachidae	NT
4	<i>Odontobatrachus natator</i>	Odontobatrachidae	NT
5	<i>Phrynobatrachus tokba</i>	Phrynobatrachidae	LC
6	<i>Phyllactimantis boulengeri</i>	Hyperoliidae	LC
7	<i>Leptopilis macrotis</i>	Hyperoliidae	LC

**LC-Least concern EN-Endangered VU- Vulnerable**



The Guma dam area has an intact forest and harbours a good number of species, there are two species of conservation concern here, the Sierra Leone Water Frog *Odontobatrachus natator* and the *Phrynobatrachus phyllophilus* (Fig 10c)



Fig 10a: *Odontobatrachus natator*



Fig10b: *Amietophrynus maculatus* Photo by Keifala Lahai

Both species were encountered on around the ingres tunnel of the Guma Valley Dam. We found Fig 10a to be listed as Near threatened according to the IUCN. *Amietophrynus maculatus* is widely spread in Africa in a number of habitats, and it can tolerate disturbed habitats. Consequently, it is not considered as Threatened species.



Fig 10c: *Phrynobatrachus phyllophilus*



Fig 11a: searching for species at the ingres tunnel



Fig 11b: *Odontobatrachus natator* visible in the intake tunnel photo by Keifala



Fig 12: searching for amphibians and bats in the intake tunnel at Guma WTW

Photo by Patrick Dauda

A short distance walked in the tunnel and the erratic weather condition (heavy rains) at the time of the survey reveal no presence of bats in the main Guma tunnel although research conducted earlier in 2017 by a Senior Bats Specialist contradicts this observation. However, *Odontobatrachus natator* was visible in the tunnel indicating that the species needs water for every life activity especially breeding.

#### **Recommendations/Mitigation measures:**

- Maintain water in the tunnel for the amphibian species to survive during rehabilitation
- In all cases the rehabilitation work should not be extended for longer periods so that the impact on the species can be temporal

#### **C) Avifauna (Birds)**

##### **Methodology**

- ❖ Visual observation: This included observing birds by walking slowly along tracks and trails and stopping frequently. Attempts were made to cover as much ground and visit as many locations in the habitat at Guma Dam work site.

This is known as direct identification method involving:

- sighting and seeing the bird
- observing the overall shape and appearance of the birds
- observing the foraging and social behaviours
- observing the different feather colours



Any species identified using this method were recorded and a species list was later prepared in the data analysis

- ❖ opportunistic/systematic survey: In this method the survey team moved in the forests especially at work package area of Guma Dam to record any species found in those areas

**Table 10: List of birds species recorded at Guma Dam work site**

No	Species English Name	Scientific Name	Individuals	IUCN	High Forest Dependent
1	Bronze Mannikin	<i>Spermestes cucullata</i>	14	-	-
2	African Harrier Hawk	<i>Polyboroides typus</i>	4	-	-
3	African Pied Hornbill	<i>Tockus fasciatus</i>	2	-	-
4	Blackcap Illadopsis	<i>Illadopsis cleaveri</i>	1	-	1
5	Black-throated Coucal	<i>Centropus leucogaster</i>	1	-	-
6	Blue-breasted Kingfisher	<i>Halcyon malimbica</i>	1	-	-
7	Blue-headed Wood Dove	<i>Turtur brehmeri</i>	1	-	-
8	Buff-Throated Sunbird	<i>Chalcomitra adelberti</i>	1	-	-
9	Common Fiscal	<i>Lanius collaris</i>	1	-	-
10	Chestnut Wattle-eye	<i>Dyaphorophya castanea</i>	1	-	-
11	Chestnut-breasted Nigrita	<i>Nigrita bicolor</i>	1	-	-
12	Chocolate-backed Kingfisher	<i>Halcyon badia</i>	1	-	1
13	Collared Sunbird	<i>Hedydipna collaris</i>	1	-	-
14	Common Bulbul	<i>Pycnonotus barbatus</i>	3	-	-
15	Finsch's Flycatcher Thrush	<i>Stizorhina finschi</i>	1	-	1
16	Fire-bellied Woodpecker	<i>Dendropicos pyrrhogaster</i>	1	-	1
17	Forest Robin	<i>Stiphrornis erythrothorax</i>	1	-	1
18	Forest Scrub Robin	<i>Cercotrichas leucosticta</i>	1	-	1
19	Green-tailed Bristlebill	<i>Bleda eximius</i>	1	NT	1
20	Great Blue Turaco	<i>Corythaeola cristata</i>	1		1
21	Green Crombec	<i>Sylvietta virens</i>	1	-	-
22	Green Hylia	<i>Hylia prasina</i>	4	-	-
23	Little grey-Greenbul	<i>Andropadus gracilis</i>	1	-	-
24	Laughing Dove	<i>Streptopelia senegalensis</i>	1	-	-
25	Grey-backed Camaroptera	<i>Camaroptera brachyura</i>	1	-	-
26	Grey-crowned Nigrita	<i>Nigrita canicapillus</i>	1	-	-
27	Grey-headed Bristlebill	<i>Bleda canicapillus</i>	1	-	1
28	Grey-Longbill	<i>Macrosphenus concolor</i>	1	-	-
29	Honeyguide Greenbul	<i>Baeopogon indicator</i>	1	-	1
30	Little Greenbul	<i>Andropadus virens</i>	4	-	-
31	Malachite Kingfisher	<i>Alcedo cristata</i>	1	-	-
32	Northern Grey-Headed Sparrow	<i>Passer griseus</i>	1	-	-
33	Olive-bellied Sunbird	<i>Cinnyris chloropygius</i>	1	-	1
34	Olive-green Camaroptera	<i>Camaroptera chloronota</i>	1	-	1
35	Pale-breasted Illadopsis	<i>Illadopsis rufipennis</i>	1	-	1

36	Pied Crow	<i>Corvus albus</i>	2	-	-
37	Red-bellied Paradise Flycatcher	<i>Terpsiphone rufiventer</i>	1	-	1
38	Red-eyed Dove	<i>Streptopelia semitorquata</i>	2	-	-
39	Red-rumped Tinkerbird	<i>Pogoniulus atroflavus</i>	1	-	1
40	Rufous-sided Broadbill	<i>Smithornis rufolateralis</i>	1	-	1
41	Rufous-winged Illadopsis	<i>Illadopsis rufescens</i>	1	NT	1
42	Senegal Coucal	<i>Centropus senegalensis</i>	1	-	-
43	Sharpe's Apalis	<i>Apalis sharpie</i>	1	-	1
44	Simple Leaflove	<i>Chlorocichla simplex</i>	1	-	-
45	Slender-billed Greenbul	<i>Andropadus gracilirostris</i>	1	-	1
46	Speckled Tinkerbird	<i>Pogoniulus scolopaceus</i>	1	-	1
47	Spotted Greenbul	<i>Ixonotus guttatus</i>	1	-	1
48	Spotted Honeyguide	<i>Indicator maculatus</i>	1	-	1
49	Buff-throated Sunbird	<i>Chalcomitra adelberti</i>	1	-	-
50	Swamp Palm Bulbul	<i>Thescelocichla leucopleura</i>	1	-	-
51	Tambourine Dove	<i>Turtur tympanistria</i>	1	-	1
52	Western Bearded Greenbul	<i>Criniger barbatus</i>	1	-	1
53	Western Black-headed Oriole	<i>Oriolus brachyrhynchus</i>	1	-	1
54	Western Bronze-naped Pigeon	<i>Columba iriditorques</i>	1	-	1
55	Western Nicator	<i>Nicator chloris</i>	1	-	1
56	Western Olive Sunbird	<i>Cyanomitra olivacea</i>	2	-	1
57	White-spotted Flufftail	<i>Sarothrura pulchra</i>	1	-	1
58	White-tailed Alethe	<i>Alethe diademata</i>	1	-	1
59	White-throated Bee-eater	<i>Merops albicollis</i>	1	-	-
60	Woodland Kingfisher	<i>Halcyon senegalensis</i>	1	-	-
61	Yellowbill	<i>Ceuthmochares aereus</i>	1	-	-
62	Yellow-billed Barbet	<i>Trachylaemus purpuratus</i>	1	-	1
63	Yellow-browed Camaroptera	<i>Camaroptera superciliaris</i>	1	-	-
64	Yellow-casqued Hornbill	<i>Ceratogymna elata</i>	1	VU	1
65	Brown-Checked Hornbill	<i>Bycanistes cylindricus</i>	1	VU	1
66	Yellow-spotted Barbet	<i>Buccanodon duchaillui</i>	1		1
67	Yellow-throated Tinkerbird	<i>Pogoniulus subsulphureus</i>	1		1
68	Yellow-whiskered Greenbul	<i>Andropadus latirostris</i>	1		1
69	White Throated-Blue Swallow	<i>Hirundo nigrita</i>	1		1
		69 Species	99	4	37

**NT-Near Threatened VU-Vulnerable**

A total of 99 individuals were recorded belonging to 69 species among which were 4 species that are listed as near threatened and vulnerable respectively, 37 individuals were identified as high forest dependent species (Table 10). As rehabilitation work in this area is restricted to specific locations at the dam and the fact that the forest has larger coverage area, most of the forest can serve as offset especially for the high forest dependent species as recorded here



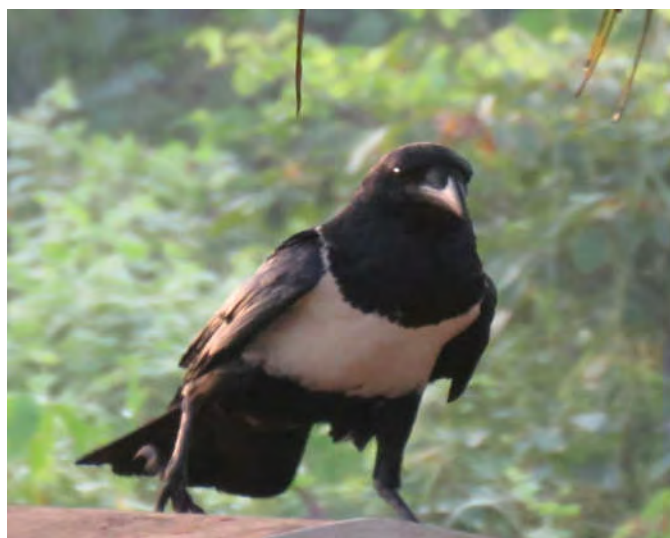
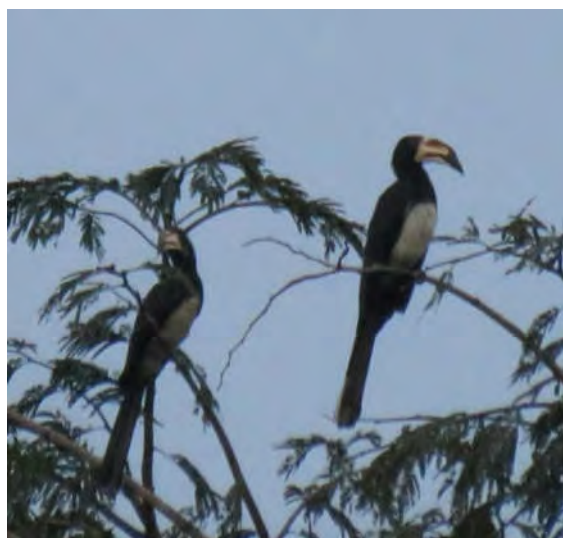


Fig 13: *Tockus fasciatus*- African Pied Hornbill      Fig 14: *Corvus albus*-Pied Crow Photo by Patrick Dauda

*Tockus fasciatus*-African Pied Hornbill Broad black wings, outer-tail feathers with broadly tipped white, cream yellow tipped black bill recorded in forest and adjacent woodland habitats in and around the guma dam.

*Corvus albus*-Pied Crow Black and white below, white collar on hind neck. It occurs in all habitats except in closed-canopy forest.. Typically near habitations and cultivations. Species is common and was recorded at all three sites

#### **Recommendations/Mitigation measures:**

- Maintain the forest cover for the high forest dependant species of birds
- Reduce the number of trees to be chopped around the rehabilitation areas at this site as these be habitats for the birds

#### **D) Fish (Pisces)**

Throughout our search, there were no fish species discovered although there may be fish species in the main reservoirs but our search was limited to upland areas of the dam

#### **E) Tree and plant species**

##### **Methodology**

- Point count of plant species occurring in the work package areas
- Transect count whereby all species along the transect were counted
- Tree identification in the work package areas

**Table 11. Tree species recorded at the Guma Dam work site**

	SPECIES	FAMILY
1	<i>Ceiba pentanda</i>	Bombacaceae
2	<i>Parinari excelsa</i>	Rosaceae
3	<i>Blighia unijugata</i>	Spidaceae
4	<i>Anthocleista nobilis</i>	Loganaceae
5	<i>Margaritaria discoidea</i>	Euphorbiaceae
6	<i>Elaeis guineensis</i>	palmaceae
7	<i>Allophyllus africanus</i>	Sapindaceae
8	<i>Chestis ferruginea</i>	connaraceae
9	<i>Allanblackia parviflora</i>	gulliferae
10	<i>Alchornea cordifolia</i>	enphorbiaceae
11	<i>Sterculia tragacantha</i>	sterculaceae
12	<i>Morinda lucida</i>	rubiacae
13	<i>Macaranga barteri</i>	Euphorbiaceae
14	<i>Samanea dinklaigei</i>	mimosaceae
15	<i>Diospyros thomassii</i>	ebenaceae
16	<i>Nauclea latifolia</i>	rusiaceae
17	<i>Naucea diderrichii</i>	Rubiaceae
19	<i>Anisophyllea laurina</i>	Rhizophoraceae
20	<i>Rauvolfia vomitoria</i>	Apocynaceae
21	<i>Trichilia monadelpha</i>	Meliaceae
22	<i>Bridelia micrantha</i>	Eusphabiaceae
23	<i>Cratorispermum laurinum</i>	rubicea e
24	<i>Harungana madagascariaensis</i>	Hypericaceae
25	<i>Albizia zygia</i>	Mimosaceae
26	<i>Phylocosmus africanus</i>	Ixouanthaceae
27	<i>Dichrostachys glomerata</i>	Mimosaceae
28	<i>Millicia excelsa</i>	Moraceae
29	<i>Millicia regea</i>	Moraceae
30	<i>Hymenocardia lyrata</i>	Enphorbiaceae
31	<i>Mareya micrantha</i>	Enphobiaceae
32	<i>Tabernaemontana crassa</i>	Apocynaceae
33	<i>Lannea nigritana</i>	Anacardiaceae
34	<i>Pentacleista macrophylla</i>	Mimosaceae
35	<i>Cleistopholis patens</i>	Annonaceae
36	<i>Macaranga heudelotii</i>	Enph0rbiaceae
37	<i>Vismia guineensis</i>	Hypericeae
38	<i>Daniallia thurifera</i>	Ceasalpiniaceae
39	<i>Canarium schweinfurthii</i>	Burseaceae
40	<i>Amphimas pterocarpoides</i>	caesalpiniaceae
41	<i>Carpolobia lutea</i>	Polygalaceae
42	<i>Dialium guineensis</i>	Caesalpiniaceae
43	<i>Pycnanthus angolensis</i>	Myristicaceae
44	<i>Macaranga heterophylla</i>	Enphorbiaceae
45	<i>Funtumia Africana</i>	Apocynaceae
46	<i>Albizia adiantifolia</i>	Mimosaceae



This area consists of and Plant species. side is still intact and forest species like (Vulnerable) which other studied sites.

**Table 12.Plant the Guma Dam**

47	<i>Xylopia aethiopica</i>	Annonaceae
48	<i>Trema guineensis</i>	Ulmaceae
49	<i>Placodisus splendidus</i>	Sapindaceae
50	<i>Deinbollia grandifolia</i>	Sapindaceae
51	<i>Vamgueriopsis discolor</i>	Rubiaceae
52	<i>Tetrorchidium didymostemon</i>	Euphorbiaceae
53	<i>Zanthoxylum gillettii</i>	Rubiaceae
54	<i>Holarrhena floribunda</i>	Apocynaceae
55	<i>Homalium letestui</i>	Flacourtiaceae
56	<i>Ficus exasperata</i>	Moraceae
57	<i>Homalium smythei</i>	Samydaceae
58	<i>Bombax buonopozense</i>	Bombacaceae
59	<i>Musanga cecropoides</i>	Moraceae
60	<i>Ficus sp.</i>	Moraceae
61	<i>Terminalia ivorensis</i>	cambretaceae
62	<i>Pentadesma butyraceae</i>	Guttiferae
63	<i>Cola lateritia</i>	Sterculia
64	<i>Diospyros cooperi</i>	Eberaceae
65	<i>Diospyros heudeloti</i>	Eberacea
66	<i>Maesopsis eminii</i>	Rhammnaceae
67	<i>Parkia bicolor</i>	Mimosaceae
68	<i>Cassia sieberiana</i>	Caesalpiniaceae
69	<i>Piptadena strum africanum</i>	Mimosaceae
70	<i>Cynometra leonensis</i>	Caesalpiniaceae
71	<i>Cala acuminata</i>	Steraliaceae
72	<i>Carapa procera</i>	Meliaceae
73	<i>Klainedoxa gabonensis</i>	Irvingiaceae
74	<i>Xylia evensii</i>	Mimosaceae
75	<i>Ficus sur</i>	Moraceae
76	<i>Brachystegia leonensis</i>	Caesalpiniaceae
77	<i>Anthonotha macrophylla</i>	Leguminosaeceae
78	<i>Cryptosepalum tetraphyllum</i>	Leguminosaeceae
79	<i>Coffea stenophylla</i>	Rubiaceae
80	<i>Ficus mucuso</i>	Moraceae
81	<i>Memecylon afzeli</i>	Melastomaceae
82	<i>Erythroxyllum mannii</i>	Euphorbiaceae
83	<i>Lophira alata</i>	Ochanaceae

high diversity of Tree The forest on this habours some true *Laphira alata* was not found in the

**species recorded at work site**

	PLANT	SPECIES
1	<i>Tetracera alnifolia</i>	Dilleniaceae
2	<i>Aspilia africana</i>	Asteraceae
3	<i>Triumfetta tomentosa</i>	Tiliaceae
4	<i>Costus afer</i>	Zingiberaceae
5	<i>Mezoneurum benthamiamum</i>	Ceasalpiniaceae
6	<i>Acacia penata</i>	Mimossaceae
7	<i>Salacia erecta</i>	Hippocrateaceae
8	<i>Manniophyton fulrum</i>	Enphorbiaceae
9	<i>Ipomoea involuccrata</i>	Convolvunlaceae

10	<i>Chromolaena odorata</i>	Asteraceae
11	<i>Sida acuta</i>	Malvaceae
12	<i>Scleria barteri</i>	Cyperaceae
13	<i>Calopogonium mucunoides</i>	Papilionaceae
14	<i>Centrosema pubesceae</i>	Papilionaceae
15	<i>Hibiscus sterculiifolius</i>	Malvaceae
16	<i>Cambretum racemosum</i>	Cambretaceae
17	<i>Aframomum daniellii</i>	Zingiberaceae
18	<i>Cnestis ferruginea</i>	Connaraceae
19	<i>Urera oblongifolia</i>	Urticaceae
20	<i>Ipomea mauritiana</i>	Convolvulaceae
21	<i>Ageratum conyzoides</i>	Asteraceae

**Table 13. List of IUCN Red list and Threatened tree species at the Guma Dam.**

	<b>SPECIES</b>	<b>CATEGORY</b>
1	<i>Millicia regia</i>	Vulnerable
2	<i>Nauclea diderrichii</i>	Vulnerable
3	<i>Cryptosepalum tetraphyllum</i>	Vulnerable
4	<i>Terminalia ivorensis</i>	Vulnerable
5	<i>Brachystegia leonensis</i>	Vulnerable
6	<i>Lophira alata</i>	Vulnerable
7	<i>Millicia excelsa</i>	Vulnerable
8	<i>Daniellia thurifera</i>	Near Threatened

**NT-Near threatened VU-Vulnerable**

#### **Recommendations/Mitigation measures:**

- The chopping up of trees should be restricted to the rehabilitation areas of the treatment works and should include a small of trees to reduce the loss of vegetation cover
- Maintain valuable tree species especially those that have been listed as vulnerable and near threatened

#### **C) Mile 13 (Lay- down area)**

Information on this site is unavailable at the moment until an arrangement is reached with BAM, NPAA and the ESHIA team as to the date of visiting this site to establish the buffer zone (NPAA), area of land to be cleared (BAM) and number and type of tree species to be chopped.

#### **D) Mortem ( work site 3)**

This area is similar in terms of species occurrence, characterized of farm bush and disturbed forest.

#### **Mammals**

#### **Methodology**



Four methods were used interchangeably depending on the circumstance during the survey and are outlined as below:

- ❖ **Reconnaissance survey:** whereby team members searched around the work package sites for the occurrence and these were recorded mostly by chance observations or evidential signs (i.e. tracks, trails, scrapes, food remnants, sounds, location (habitat), droppings, footprints etc.
- ❖ **Opportunistic survey:** where individuals were recorded immediately upon seeing them in the surveyed area
- ❖ **Interviews:** We found this method very helpful such that most of the mammals recorded were confirmed to be present in the work package areas by resident communities and tour guides who have lived in and around those survey areas for most part of their lives.

Mortem axis lies within the distribution range of 11 terrestrial mammals

**Table 14. List of mammal species recorded at the Mortem stream work site**

No	Species			IUCN Threatened category
	Common Name	Scientific Name	Family	
1	Bushbuck	<i>Tragelaphus scriptus</i>	2	LC
3	Fire footed rope squirrel	<i>Funisciurus pyrropus</i>	2	LC
4	Brush tailed porcupine	<i>Atherurus africanus</i>	1	LC
5	Giant pouched rat	<i>Cricetomys emini</i>	4	LC
6	Campbell's monkey	<i>Cercocebus campbelli</i>	1	LC
7	Lesser spot-nosed monkey	<i>Cercopithecus petaurista</i>	1	LC
<b>TOTAL INDIVIDUAL SPECIES</b>			<b>11</b>	

**LC- Least concern**

Site 1 and 3 have no species of conservation concern in terms of mammal species, meaning that the construction and/or rehabilitation work has nothing to do with any species disturbance.

#### **Recommendations/Mitigation measures:**

- Ensure the protection of these animals when they come out from their places when the work is in progress since the quest for bush meat is high among the locals

#### **B) Reptiles and Amphibians**

##### **i) Reptiles:**

##### **Methodology**

- Species diversity survey in which reptiles of the various species were identified and recorded during the field activities.
- Time constrained searching techniques involved scanning the terrain and investigating potential hiding places or specific habitats to find and record individuals

**Table 15: List of reptiles species recorded at Mortem work site**

NO	SCIENTIFIC NAME	FAMILY	NO. OF INDIVIDUAL SPECIES	IUCN Threatened category
1	<i>Philothamnus irregularis</i>	Colubridae	1	LC
3	<i>Agama agama</i>	Agamidae	13	LC
4	<i>Hemidactylus brooki</i>	Gekkonidae	10	LC

**LC-Least concern**



A total of 24 individuals belonging to 3 families were recorded at Mortem work site, all species recorded here are classified as least concern on the IUCN red listing meaning that work can be done here without any interaction with the environment in terms of these entities  
Fig 15: *Agama agama* Photo by Keifala Lahai

## **ii) Amphibians**

### **Methodology**

- Species diversity survey in which amphibians of the various species were identified and recorded during the field activities.
- Time constrained searching techniques involved scanning the terrain and investigating potential hiding places or specific habitats to find and record individuals

**Table 16. List of amphibian species recorded at the Mortem stream work site.**

NO	SCIENTIFIC NAME	FAMILY	NO. OF INDIVIDUAL SPECIES	IUCN Threatened category
1	<i>Ptychadena bibroni</i>	Ptychadenidae	7	LC
4	<i>Hoplobatrachus occipitalis</i>	Dicroglossidae	3	LC
5	<i>Odontobatrachus natator</i>	Odontobatrachidae	13	NT
<b>TOTAL INDIVIDUAL SPECIES</b>			<b>23</b>	

**LC-Least concern NT-Near threatened**

A total of 23 individuals belonging to 3 families were recorded at this site among which *odontobatrachus natator* (Near Threatened) was the only species of conservation concern and can survive even after the construction of the Dam as this species depends highly on water flows.





**Fig 16:** *Ptychadena bibroni* at the mortem stream

Photo by Patrick Dauda

#### **Recommendation/Mitigation measures:**

- Generally, amphibian species highly depend on water, meaning that the construction process should not take away all the water facilities around for species survival.
- There should be at least a water catchment or passage area for amphibians to move freely. The construction work should not be a cause on species disturbance or damage them as there are some leaf litters that are as small as 6mm.
- Amphibians like hiding under leaf litters thus care must be taken to protect them from physical damage if they are detected
- Allow snakes and other reptiles to escape if they are detected

### **C) Avifauna (Birds)**

#### **Methodology**

- ❖ Visual observation: This included observing birds by walking slowly along tracks and trails and stopping frequently. Attempts were made to cover as much ground and visit as many locations in the habitat at Mortem work site.

This is known as direct identification method involving:

- sighting and seeing the bird
- observing the overall shape and appearance of the birds
- observing the foraging and social behaviours

- observing the different feather colours

Any species identified using this method were recorded and a species list was later prepared in the data analysis

- ❖ opportunistic/systematic survey: In this method the survey team moved in the forests especially at work package area of Mortem stream to record any species found in those areas

**Table 17: List of bird species recorded at Mortem work site**

No	Species English Name	Scientific Name	Individuals	IUCN	High Forest Dependent
1	Bronze Manikin	<i>Spermestes cucullata</i>	13	-	-
2	African Harrier Hawk	<i>Polyboroides typus</i>	2	-	-
3	African Pied Hornbill	<i>Tockus fasciatus</i>	1	-	-
5	Black-throated Coucal	<i>Centropus leucogaster</i>	1	-	-
6	Blue-breasted Kingfisher	<i>Halcyon malimbica</i>	1	-	-
7	Buff-Throated Sunbird	<i>Chalcomitra adelberti</i>	1	-	-
8	Common Fiscal	<i>Lanius collaris</i>	2	-	-
9	Collared Sunbird	<i>Hedydipna collaris</i>	1	-	-
10	Common Bulbul	<i>Pycnonotus barbatus</i>	3	-	-
11	Green Crombec	<i>Sylvietta virens</i>	1	-	-
12	Didric Cuckoo	<i>Chrisococcyx caprius</i>	1	-	-
13	Double-Sporred Francolin	<i>Francolinus bicalcaratus</i>	1	-	-
14	Green Hylia	<i>Hylia prasina</i>	2	-	-
15	Laughing Dove	<i>Streptopelia senegalensis</i>	1	-	-
16	Grey-backed Camaroptera	<i>Camaroptera brachyura</i>	1	-	-
17	Grey-Longbill	<i>Macrosphenus concolor</i>	1	-	-
18	Klass-s Cuckoo	<i>Chrysococcyx klass</i>	1	-	-
19	Little Greenbul	<i>Andropadus virens</i>	2	-	-
20	Malachite Kingfisher	<i>Alcedo cristata</i>	1	-	-
21	Northern Grey-Headed Sparrow	<i>Passer griseus</i>	1	-	-
22	Pied Crow	<i>Corvus albus</i>	1	-	-
23	Red-eyed Dove	<i>Streptopelia semitorquata</i>	2	-	-
24	Senegal Coucal	<i>Centropus senegalensis</i>	1	-	-
25	Simple Leaflove	<i>Chlorocichla simplex</i>	1	-	-
27	Buff-throated Sunbird	<i>Chalcomitra adelberti</i>	1	-	-
28	White-throated Bee-eater	<i>Merops albicollis</i>	2	-	-
29	Whistling Cisticola	<i>Cisticola lateralis</i>	4	-	-
30	Yellow-browed Camaroptera	<i>Camaroptera superciliaris</i>	2	-	-
31	Village Weaver	<i>Ploceus cucullatus</i>	19	-	-
		<i>31 Species</i>	74	0	0

A total of 74 individuals belonging to 31 species were recorded at this site but none was found to be of conservation concern meaning that construction work in this area will have no significant impact on the



avifauna and if there should be any such impact, the nearby vegetation will serve as offset when clearing of the vegetation at the work site will commence



Fig 16: *Spermestes cuculata*-Bronze Mannikin, dark brown above, white below, small bird found in groups not found inside the forest, mostly around village gardens and grassy habitat recorded at site 1 and 3.

Photo by Patrick Dauda

#### **Recommendations/Mitigation measures:**

- The forest cover around the work site should be maintained to serve as offset for the bird species
- Trees serve as temporal and permanent habitats for some birds therefore the construction should not chop off all the vegetation cover but reserve some for these animals
- The scale of impact will be temporal with shorter duration of work

#### **D) Fish (Pisces)**

##### **Methodology**

- on-site identification of fish species using field guide for fresh water species
- visual observation to record species found

Similar to site 1 (Mogegba) our search could not reveal any identifiable/mature fish species in the area at the time of the study although similar interviews with the tour guide that accompanied the team responded that fish species like *Tilapia* can be present in the stream.

#### **Recommendation/Mitigation measure:**

- Maintain water channels with regulated flow of water downstream to ensure the survival of fish species
- Work should not be extended for longer duration to minimize the impact

#### **E) Tree and plant species**

##### **Methodology**

- Point count of plant species occurring in the work package areas
- Transect count whereby all species along the transect are counted
- Tree identification in the work package areas

**Table 18. List of tree species recorded along the Mortem stream work site.**

	<b>SPECIES</b>	<b>FAMILY</b>
1	<i>Ceiba pentanda</i>	Bombacaceae
2	<i>Parinari excelsa</i>	Rosaceae
3	<i>Blighia unijugata</i>	Spidaceae
4	<i>Anthocleista nobilis</i>	Loganaceae
5	<i>Margaritaria discoidea</i>	Euphorbiaceae
6	<i>Elaeis guineensis</i>	palmaceae
7	<i>Allophyllus africanus</i>	Sapindaceae
8	<i>Chestis ferruginea</i>	connaraceae
9	<i>Allanblackia parviflora</i>	gulliferae
10	<i>Alchornea cordifolia</i>	enphorbiaceae
11	<i>Sterculia tragacantha</i>	sterculaceae
12	<i>Morinda lucida</i>	rubiceae
13	<i>Macaranga barteri</i>	Euphorbiaceae
14	<i>Samanea dinklaigei</i>	mimosaceae
15	<i>Diospyros thomasi</i>	ebenaceae
16	<i>Nauclea latifolia</i>	rusiceae
17	<i>Naucea diderrichii</i>	Rubiaceae
19	<i>Anisophyllea laurina</i>	Rhizophoraceae
20	<i>Rauvolfia vomitoria</i>	Apocynaceae
21	<i>Trichilia monadelphae</i>	Meliaceae
22	<i>Bridelia micrantha</i>	Eusphabiaceae
23	<i>Cratorispermum laurinum</i>	rubiceae e
24	<i>Harungana madagascariensis</i>	Hypericaceae
25	<i>Albizia zygia</i>	Mimosaceae
26	<i>Phylocosmus africanus</i>	Ixouanthaceae
27	<i>Dichrostachys glomerata</i>	Mimosaceae
28	<i>Millicia excelsa</i>	Moraceae
29	<i>Millicia regea</i>	Moraceae
30	<i>Hymenocardia lyrata</i>	Enphorbiaceae
31	<i>Mareya micrantha</i>	Enphobiaceae
32	<i>Tabernaemontana crassa</i>	Apocynaceae
33	<i>Lannea nigritana</i>	Anacardiaceae
34	<i>Pentacleista macrophylla</i>	Mimosaceae
35	<i>Cleistopholis patens</i>	Annonaceae
36	<i>Macaranga heudelotii</i>	Enphorbiaceae
37	<i>Vismia guineensis</i>	Hypericeae
38	<i>Daniellia thurifera</i>	Caesalpinaceae
39	<i>Canarium schweinfurthii</i>	Burseaceae
40	<i>Amphimas pterocarpoides</i>	caesalpinaceae
41	<i>Carpolobia lutea</i>	Polygalaceae
42	<i>Dialium guineensis</i>	Caesalpinaceae
43	<i>Pycnanthus angolensis</i>	Myristicaceae



The Mortem reveal the harbour more especially stream although *Lophira alata* area.

**Table 19: List species the Mortem**

44	<i>Macaranga heterophylla</i>	Enphorbiaceae
45	<i>Funtumia Africana</i>	Apocynaceae
46	<i>Albizia adiantifolia</i>	Mimosaceae
47	<i>Xylopia aethiopica</i>	Annonaceae
48	<i>Trema guineensis</i>	Ulmaceae
49	<i>Placodisus splendidus</i>	Sapindaceae
50	<i>Deinbollia grandifolia</i>	Sapindaceae
51	<i>Vamgueriopsis discolor</i>	Rubiaceae
52	<i>Tetrorchidium didymostemon</i>	Euphorbiacea
53	<i>Zanthoxylum gillettii</i>	Rubiaceae
54	<i>Holarrhena floribunda</i>	Apocynaceae
55	<i>Homalium letestui</i>	Flacourtiaceae
56	<i>Ficus exasperata</i>	Moraceae
57	<i>Homalium smythei</i>	Samydaceae
58	<i>Bombax buonopozense</i>	Bombacaceae
59	<i>Musanga cecropoides</i>	Moraceae
60	<i>Ficus sp.</i>	Moraceae
61	<i>Terminalia ivorensis</i>	cambretaceace
62	<i>Pentadesma butyraceae</i>	Guttiferae
63	<i>Cola lateritia</i>	Sterculia
64	<i>Diospyros cooperi</i>	Eberaceae
65	<i>Diospyros heudeloti</i>	Eberacea
66	<i>Maesopsis eminii</i>	Rhammnaceae
67	<i>Parkia bicolor</i>	Mimosaceae
68	<i>Cassia sieberiana</i>	Caesalpinaceae
69	<i>Piptadena strum africanum</i>	Mimosaceae
70	<i>Cynometra leonensis</i>	Caesalpinaceae
71	<i>Cala acuminata</i>	Steraliaceae
72	<i>Carapa procera</i>	Meliaceae
73	<i>Klainedoxa gabonensis</i>	Irvingiaceae
74	<i>Xylia evensii</i>	Mimosaceae
75	<i>Ficus sur</i>	Moraceae
76	<i>Brachystegia leonensis</i>	Caesalpinaceae
77	<i>Anthonotha macrophylla</i>	Leguminosaeceae
78	<i>Cryptosepalum tetraphyllum</i>	Leguminosaeceae
79	<i>Coffea stenophylla</i>	Rubiaceae
80	<i>Ficus mucuso</i>	Moraceae
81	<i>Memecylon afzeli</i>	Melastomaceae
82	<i>Erythroxylum mannii</i>	Euphorbiaceae
	<b>PLANT</b>	<b>SPECIES</b>
1	<i>Tetracera alnifolia</i>	Dilleniaceae
2	<i>Aspilia africana</i>	Asteraceae
3	<i>Triumfetta tomentosa</i>	Tiliaceae
4	<i>Costus afer</i>	Zingiberaceae
5	<i>Mezoneurum benthamiamum</i>	Ceasalpinaceae
6	<i>Acacia penata</i>	Mimossaceae
7	<i>Salacia erecta</i>	Hippocrateaceae

work site also potential to plant species along the there was no recorded in this

**of plant recorded in work site**

8	<i>Manniophyton fulrum</i>	Enphorbiaceae
9	<i>Ipomoea involucreata</i>	Convolvunlaceae
10	<i>Chromolaena odorata</i>	Asteraceae
11	<i>Sida acuta</i>	Malvaceae
12	<i>Scleria barteri</i>	Cyperaceae
13	<i>Calopogonium mucunoides</i>	Papilionaceae
14	<i>Centrosema pubesceae</i>	Papilionaceae
15	<i>Hibiscus sterculiifolius</i>	Malvaceae
16	<i>Cambretum racemosum</i>	Cambretaceae
17	<i>Aframomum daniellii</i>	Zingiberaceae
18	<i>Cnestis ferruginea</i>	Connaraceae
19	<i>Urera oblongifolia</i>	Urticaceae
20	<i>Ipomea mauritiana</i>	Convolvulaceae
21	<i>Ageratum conyzoides</i>	Asteraceae

**Table 20. List of tree species classified as threatened on the IUCN Red list at Mortem stream work site**

	<b>SPECIES</b>	<b>CATEGORY</b>
1	<i>Millicia regia</i>	Vulnerable
2	<i>Nauclea diderrichii</i>	Vulnerable
3	<i>Cryptosepalum tetraphyllum</i>	Vulnerable
4	<i>Terminalia ivorensis</i>	Vulnerable
5	<i>Brachystegia leonensis</i>	Vulnerable
6	<i>Lophira alata</i>	Vulnerable
7	<i>Millicia excelsa</i>	Vulnerable
8	<i>Daniellia thurifera</i>	Near Threatened

#### **Recommendations/Mitigation measures:**

- Care must be taken to protect valuable tree species to prevent the loss of these trees
- Reduce as much as possible the number of tree species to be chopped so that the impact from deforestation already evident can be reduced
- Planting local trees at this site is recommended to replace those lost during construction work. It is not recommended to plant invasive species like eucalyptus and acacia.

**Conclusion:** The survey reveals interesting findings on the flora and fauna diversity in the three work sites with the Guma dam showing high species diversity due its intact nature



## REFERENCES (For bird study)

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**Please let me know again if there is any query about this report**







## Appendix 4: Labour Policies





## **Appendix 4- Labour Policies**

IMC Modern Slavery and Human Trafficking Statement for 2017 to 2018

BAM Sustainable Business Policy

BAM Modern Slavery Statement

BAM Equality Diversity and Inclusion Policy

BAM Project HIV AIDS Workplace Policy

## **IMC Worldwide Modern Slavery and Human Trafficking Statement**

For financial year end date December 31, 2017.

### **Introduction**

IMC Worldwide Ltd (IMC) is committed to the Modern Slavery Act of 2015. As a business and as individuals, we are committed to our core values. As such, we ensure we demonstrate trust, integrity and excellence in our work and the projects we deliver. We have always had a zero-tolerance stance on corruption, bribery, forced work, and other unethical actions. IMC takes tackling modern slavery worldwide seriously, and we are committed to working towards the Sustainable Development Goals, particularly Goal 8 – Decent Work and Economic Growth.

In the past 12 months, IMC has taken several measures to demonstrate our commitment to the Modern Slavery Act 2015 and worked towards eradicating the risk of modern slavery in our supply chains. We have become a member of the UN Global Compact and will be implementing processes to measure our own progress towards these goals, which include not being complicit in human rights abuses, the elimination of all forms of forced and compulsory labour and the effective abolition of child labour. To do this, we are working towards the guidance and principles of the Ethical Trading Initiative (ETI) and the International Labour Organisation (ILO).

We will continue to improve our processes and procedures to continuously combat such acts.

### **Our Business and Organisational Structure**

IMC Worldwide is a UK-based leading, independent consulting company with over 50 years of experience implementing, monitoring and successfully delivering development programmes in over 120 countries across Sub-Saharan Africa, South and South-East Asia, Middle East, the Pacific, the Caribbean, Eastern Europe, and Central Asia.

IMC has offices in Nepal, Pakistan and Bangladesh from which our largest projects in Asia are delivered. IMC is committed to ensuring the international labour standards we work towards in the UK are embedded as normal practice in the regional teams and offices. We have strong relationships with our country teams and are working with them on the best way to ensure we can monitor and report on modern slavery in our supply chains.

### **Supply Chain**

Our supply chains consist of partner organisations, located all over the world, and independent consultants. All partners and independent consultants are expected to carry out their work ethically and must sign up and adhere to the IMC Business Ethics Policy. The



Business Ethics Policy covers acts of corruption, modern slavery, human trafficking, and fairness in procurement, as well as a code of conduct.

During 2017, IMC made progress to ensuring modern slavery can be eradicated in our supply chain in Nepal. The team has hired a Supply Chain Manager to look specifically into issues such as modern slavery. The specialist has created a series of tools to assist the project teams in identifying instances of modern slavery and developed a project checklist that can be used on project audits specifically related to modern slavery. Part of these tools and training is identifying the relevant bodies that incidents can be reported to, ensuring effective and efficient responses.

The nature of the work IMC carries out overseas sometimes means that our supply chains are wide and disparate. As such, a great deal of work is being carried out to identify where we, as a management consultancy, have the greatest leverage to influence change and set a standard for best practice.

## **Our Policies**

IMC's Anti-Slavery and Human Trafficking Policy outlines our commitment to preventing modern slavery risk, how we intend to act as a business and how we expect all our staff, independent consultants and partner organisations to act. The policy also outlines our reporting guidelines, and we encourage anyone who suspects a modern slavery incident to come forwards and report it. Additionally, IMC's whistleblowing service details are available to all our staff, independent consultants, partner organisations and the public.

IMC operates several other policies designed to safeguard all individuals. These include our environmental policy, security policy, redundancy policy, health and wellbeing policy, and ethics and anti-corruption policy, amongst others. All policies are reviewed periodically to ensure they remain up-to-date and fit for purpose. IMC does not support or knowingly deal with any business or individual involved in slavery or human trafficking. We will not work with any party that we suspect is connected in any way with slavery or trafficking.

## **Due Diligence, Risk and Mitigation**

IMC is committed to undertaking due diligence on all our partner organisations, suppliers and individual consultants. We want to ensure that everyone we work with holds the same high standards and policies that we do. We are keen to collaborate with our partners to tackle complex issues surrounding modern slavery and human trafficking, and if one of our partner organisations does not have a specific policy in place, we require them to agree to ours. We aim to stand as an example of best practice and choose to partner with organisations and individuals who wish to do the same.

We have updated our independent whistleblowing systems and processes and include details on our website, intranet and in all our contractual agreements to ensure our employees, suppliers and the public can raise concerns confidentially and anonymously should they witness any wrongdoing.

In 2017, IMC has updated the project risk register tool which is to be completed at proposal stage, again during the start of a project, and updated continually throughout the lifespan of a project. The risk register provides scope for modern slavery to be added as a risk at several levels, including bonded labour, child labour, human trafficking and forced labour. The risk register requires mitigation measures to be included. A copy of the risk register is to be shared with the wider team, and all members are encouraged to input their concerns.

## Looking Forward

Going forward, we will continue to uphold our zero-tolerance standards and work with our supply chains to do the same, so that together we help combat modern slavery.

As outlined previously, IMC's Supply Chain Manager in Nepal is working to develop a toolkit and training to help those working in the country office to feel comfortable and confident in reporting instances of modern slavery. IMC hopes to trial this approach in Nepal, and from the feedback from the project team, develop a similar training for our other country offices.

IMC understands that modern slavery is not only a risk in the countries in which we work overseas, but also in the UK. As such, we are committed to encouraging our staff, independent consultants and partner organisations to read IMC's anti-slavery and human trafficking policy and understand their rights and the rights of those we work with.

As a company we are committed to continuous improvement and our target for 2018 will be to map where we have the greatest leverage to influence change in our supply chains, trail a training toolkit in Nepal, and develop this to be implemented elsewhere in the coming years.

## Approval of this statement

This statement is made pursuant to section 54(1) of the Modern Slavery Act 2015 and constitutes IMC's modern slavery and human trafficking statement for the financial year 1 January to 31 December 2017.

A handwritten signature in blue ink, appearing to read "Gavin English".

Signed Gavin English

Managing Director

Date: 16/03/2018





## **BAM Nuttall Limited**

### **Sustainable business policy**

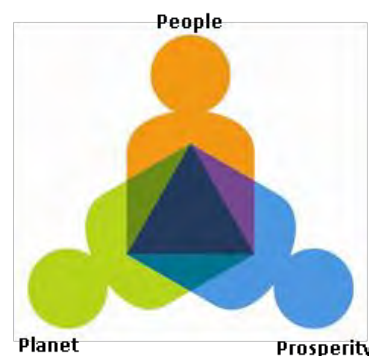
**(Incorporating responsible procurement, ethical sourcing, modern slavery and efficient resource utilisation)**

The Board of BAM Nuttall Ltd is committed to achieving a sustainable future. We aim to ensure that the business achieves a balanced and positive triple bottom line by considering people planet and prosperity for all, contributing to economic development, having an overall positive impact on society and the environment and improving quality of life.

BAM Nuttall is committed to ensuring that at all times, the way we work, the materials we use, the energy we consume, the way we treat others, the manner in which we source goods and services and the way we engage with the communities we are part of, are all sustainable.

In particular BAM Nuttall aims to:

- conduct business in a sustainable and ethical manner
- take all practicable steps for the continuing health, safety and welfare of all people who may be affected by our activities
- have a zero tolerance approach to modern slavery in our business and our supply chain
- reduce negative impacts and enhance the natural environment
- encourage innovation and identify effective, sustainable solutions that have a beneficial legacy for all
- drive design towards whole life, sustainable options
- establish good relationships with local and wider business and social communities wherever we are working
- source and utilise all goods and services in line with this policy



We set challenging sustainability objectives and work proactively with our customers, design and supply chain partners towards alignment and the achievement of our combined targets and goals. To enable this we will:

- design our business processes to drive sustainable solutions
- engage early with all stakeholders to identify and maximise long term benefits
- encourage innovation and continual improvement in everything that we do
- source materials and services ethically and responsibly
- maximise resource and energy efficiency and minimise negative impacts
- promote and support sustainable principles and practices within our business, with our customers, our designers, throughout our supply chain and with the wider business community
- procure materials from verified sustainable sources where possible
- consider climate change mitigation in all of our activities

This policy is given effect by the application of an integrated management system of processes, together with the active participation and commitment of all personnel both within the organisation and in our wider field of influence.

The Board has appointed the Head of Sustainability to ensure awareness of this policy is promoted throughout the company and with our supply chain partners. This policy is reviewed for continuing suitability at least annually and revised as often as may be appropriate.

**Stephen Fox**  
**Chief Executive, on behalf of the BAM Nuttall Board**

Date: 01 February 2016

Last review: 20 July 2018

## **BAM NUTTALL LIMITED**

### **MODERN SLAVERY ACT TRANSPARENCY STATEMENT 2017**

#### **Introduction from the Chief Executive, Steve Fox**

BAM is committed to combatting slavery and human trafficking throughout our operations and those associated with our business. This is not a standalone issue, but one which forms part of our approach to ensuring we treat people with dignity and respect, that we source goods and services responsibly, that we promote and strive for transparency and that we conduct our business with the highest regard to ethical and environmental standards. We are committed to ensuring that all of our employees and third parties performing services for or on our behalf and/or joint venture parties abide by the highest professional and ethical standards.

#### **Our business**

We are a part of the Royal BAM Group and our ultimate parent company, Koninklijke BAM Groep NV, has its head office in the Netherlands. We have in excess of 2,500 employees and the Group has over 20,000 employees worldwide. BAM Nuttall operates primarily in the UK but collaborates with all parts of the wider BAM Group, including on issues of ethical and responsible business practices.

Our business is organised into 7 business units and we operate in nine sectors. More information about what we do can be found at: <http://www.bamnuttall.co.uk/pg/whatwedo>

#### **Our supply chain**

We have a varied supply chain with a selection of key supply chain partners across different parts of the business. While work is ongoing within the industry to identify high risk areas, we believe that risks mainly lie with lower skilled trades and workforce. We work closely with industry and our supply chain to help identify areas of risk where modern slavery could occur and work in partnership with them to help ensure its prevention.

#### **Materials & Goods**

In selecting where materials and goods are sourced from we review specifications for ethical and sustainability criteria where it is within our ability to do so. Where we provide design services, we specify to industry standards for responsible and sustainably sourced / produced material as outlined in our sustainable business policy.

#### **What we are doing**

It is the responsibility of all BAM Nuttall employees to be aware of and report any suspected incidents of unfair treatment either within our business or within our supply chain.

In order to identify and mitigate risks we have set up a cross company working group with our sister company BAM Construct UK to identify and carry out the appropriate and proportionate measures that should be taken to minimise the risks of modern slavery or human trafficking in our organisation or in our supply chains. The working group consists of representatives from our legal, human resources, commercial, supply chain and sustainability teams.



During 2017 we undertook the following actions:

- Updated company policies, codes of conduct, KPIs and procedures to take account of modern slavery and human trafficking risks.
- Held supply chain engagement forums, at which modern slavery was discussed. Approximately 250 separate companies attended during 2017.
- Actively participated in the Supply Chain School Special Interest Group helping to develop industry wide solutions to modern slavery.
- Communicated the importance of modern slavery compliance to all major suppliers through a newsletter
- Introduced new software group wide which helps to identify high risk events to enable improved focus on supply chain risk.
- Undertaken training for the Board of Directors led by an external specialist in modern slavery

During 2018 we are undertaking the following actions:

- Working with a third party to carry out a gap analysis of our current approach in line with ISO 20400, to assess potential risks in our supply chain and develop recommendations for improvement.
- Holding a focus group with operational (project based) staff to gain feedback on the most effective methods of communicating with staff and supply chain regarding modern slavery risks.
- Developing eLearning and further BAM Specific training and communications for employees, project teams and suppliers.

## Due diligence

To ensure all those in our supply chain and contractors share our values we have in place a supply chain compliance programme. This consists of:

- Annual reviews with our tier 1 suppliers
- BAM Link partner agreements allowing greater transparency through partnership working and all BAM Link Agreements include provision for agreement on Modern Slavery policies
- Builders Profile assessment system including elements specifically aimed at modern slavery prevention.

We have appointed the Company Secretary as our Compliance Officer, a role that includes a responsibility to our Board for overseeing compliance with the Modern Slavery Act and annual preparation of the Modern Slavery Act Transparency Statement. Our Business Process and Quality, Human Resources and Procurement departments are also involved with ensuring the robustness of modern slavery and human trafficking compliance within BAM Nuttall.

This statement is made pursuant to section 54(1) of the Modern Slavery Act 2015 and constitutes our slavery and human trafficking statement for the financial year ending 31st December 2017.

A handwritten signature in black ink, appearing to read 'S C Fox', with a long, sweeping horizontal line extending to the right.

S C Fox  
Chief Executive  
BAM Nuttall Ltd  
28 June 2018



## BAM Nuttall Limited Equality, Diversity and Inclusion policy

The Board of BAM Nuttall Ltd fully supports the concepts of fairness and respect which are at the core of equality, diversity and inclusion. This is founded on our defined corporate values of people focus, honesty and openness and a commitment to considering the needs of all our stakeholders.

We value diversity and are committed to creating the inclusive organisation necessary to achieve our long term vision.

We believe that developing a workforce that reflects the diversity of our customer base and the communities in which we operate will help us successfully meet all of our commitments to our stakeholders. We consider there to be significant business benefits from integrating equality, diversity and inclusion in day-to-day business practice and are determined to eliminate discrimination and disadvantage within the workplace.

This policy underpins all other policies, management plans, strategies and procedures. The Board has appointed a Diversity Committee, which is responsible for the implementation of this policy and the accompanying equality, diversity and inclusion Implementation Plan. In particular the committee:

- ensures the Implementation Plan has clear and measurable objectives
- regularly reviews the policy and monitors the Plan to ensure they continue to support our best practice objectives
- ensures all of our people (whether employees, agency staff, sub-contractors, consultants, or suppliers) are aware of this policy
- ensures that commitment to equality, diversity and inclusion is considered within the company's personnel review mechanisms

While the Board has overall responsibility for the Policy, every one also has a personal responsibility for recognising and implementing diversity principles and for treating our customers, suppliers, the public and colleagues with understanding and respect.

Our inclusive approach means that all stakeholders are treated with fairness, dignity and respect. We are not adversely influenced or prejudiced in any way by an individual's age, gender identity, marital or civil partnership status, race, colour, ethnic origin, sexual orientation, disability (both physical and mental), religion or belief, working patterns, caring responsibilities, pregnancy or trade union membership.

Our objectives are:

- to be an exemplary employer by fully delivering the Implementation Plan to gain the business benefits of good practice
- to maximise the opportunities for diverse talent to join and remain in the company
- to maintain a working environment where discrimination, bullying, harassment and victimisation are not tolerated and support this with a well defined grievance process
- to encourage through training and consistent communication all our people to take an active role against all forms of discrimination and harassment
- to ensure that remuneration, benefits, terms and conditions and recruitment, appraisal and promotion procedures are fair and equal and not affected by prejudice and stereotyping
- to help all employees through training and other opportunities to develop to their full potential
- to develop greater understanding of our commitment to equality, diversity and inclusion amongst our customers, suppliers, contractors, our people and applicants
- to ensure that all policies and procedures are not only in line with, but exceed our obligations under current legislation and codes of practice

Discrimination, bullying, harassment and victimisation will not be tolerated and breaches of the company's Equality, Diversity and Inclusion Policy and procedures and any unfair or unlawful discrimination will be dealt with under the company's disciplinary procedures and could lead to dismissal.

Stephen Fox  
Chief Executive, on behalf of the BAM Nuttall Board

Previous revisions: 01 April 2010

Date: 02 March 2011

Last review: 20 July 2018



## BAM

# Project HIV and AIDS Workplace Policy

## General Statement

BAM Nuttall regards health and safety at work as a matter of foremost importance. It has an ongoing and determined commitment to take all reasonably practicable steps to safeguard the health, safety and welfare of all employees and other people who may be affected by BAM Nuttall activities.

1. BAM shall provide close collaboration and cooperation with the client in implementing workplace HIV and AIDS interventions
2. BAM shall ensure that no any form of stigma and discriminative actions against workers on the basis of real or perceived HIV status are done by the employer, supervisors or fellow employees in the workplace.
3. BAM shall use appropriate disciplinary and grievance procedures, to protect all workers from HIV and AIDS related stigma and discrimination by co-workers, supervisors or employer.
4. BAM shall guarantee that job access, status, promotion, security and training will not be influenced merely by the HIV status of an employee.
5. BAM shall work closely with the Client in addressing stigma and discrimination through trainings and other behavior change strategies.
6. BAM shall make sure that, all our programs that are instituted are gender sensitive to age and sexual orientation.
7. BAM shall make sure that both women and men are targeted explicitly, and where warranted, addressed through separate programs, in recognition of the different types and degrees of risk and needs for male and female workers.
8. BAM shall make sure that its health and safety procedures and operations are in alignment with the national and international standards on Occupational Health and Safety.
9. BAM shall make sure that standard procedures are applied to reduce risk injury at work involving blood, and potential exposure to blood borne pathogens and such injured employees shall be assisted using protective gears like gloves and first aid procedures will be taken.
10. BAM shall make sure that appropriate HIV and AIDS information are included into occupational health and first aid training including tool box meetings.
11. BAM shall create conducive environment for voluntary HIV counseling and Testing among the road construction workers
12. BAM shall make sure that high level of collaboration is maintained among the key stakeholders to make this programme effective and sustainable with active involvement of workers infected and affected by HIV and AIDS.
13. BAM shall strive to create a climate that allows for and encourages voluntary disclosure of an individual's positive HIV status and guarantees that workers will not be discriminated based on their disclosed HIV status.
14. BAM shall ensure that all information and test results of workers concerning HIV and AIDS are confidential and that workers may give informed consent to release such information to individuals/ co-workers/ management as per national and international guiding documents.
15. BAM shall guarantee confidentiality of any medical information relating to HIV status that any of its workers may have in their possession by virtue of their position in the company.
16. BAM shall release staff in case of referral to health facilities for further checkup, treatment and counseling of people with HIV and AIDS.

**Richard Rawet, on behalf of the BAM Nuttall**

Date: 25th July 2018

Recent revisions: July 2018

Last review: 25 July 2018



## Appendix 5: FGD Guide



## REHABILITATION OF FREETOWN WATER SUPPLY

### Focus Group Discussion Guide

#### GENERAL SITUATION OF COMMUNITIES WITHIN PROJECT AREA

20 Minutes

Identification of communities represented in FGD

Identify the predominant livelihood activities undertaken within your respective communities.

What are the specific environmental problems experienced in your respective localities? (e.g. flooding, drought, landslide)

*Expand to suit urban setting, especially relevant to proposed contraction works– noise, dust, storm runoff, waste management, etc.*

Outline the common water related diseases

*Water borne diseases, skin infection, etc. What is the point for communities to answer this question for the ESHIA?*

*Make sure not to go off topic- less relevant to businesses.*

For each of the common disease and epidemic, please give the possible cause.

Identify the major infrastructural challenges faced by your respective communities.

Which of the infrastructural changes requires the utmost attention and why?

*? relevant to a CDAP, but how relevant is it to this project. How important is improving the water supply compared to other infrastructure improvements? Rank 0-5 (not at all, very low - very high)*

What are the water specific problems faced by youths in your communities?

How have these water problems being handled in your respective communities?

What are the specific water-related problems faced by women in your communities?
How have these water problems being handled in your respective communities?
What are the specific water related problems faced by children in your communities?
How have these water problems being handled in your respective communities?
<p align="center"><b>COMMUNITY AWARENESS AND PERCEPTION ABOUT THE PROJECT</b></p> <p align="center"><b>25 minutes</b></p>
<p>What do you know about the proposed GVWC water rehabilitation project in Freetown?</p> <p><i>Note: If participants have little or no idea of the proposed project, the moderator should proceed and give a detailed explanation of the project.</i></p>
<p>What type of water rehabilitation works are entailed in the project?</p> <p><i>At this point, the facilitator explains in detail the work item applicable to area (detailed work item is attached to this guide): Construct Marjay Town &amp; Angola Town Reservoirs to Increased reliability of Supply along Peninsula road.</i></p> <p><i>For project to explain – temporary &amp; permanent, positive + negative &amp; find participants’ reactions to each, scale 0 – 5?</i></p>
What do you think about the project in terms of its relevance and timeliness?
<p align="center"><b>ENVISAGED PROJECT POSITIVE IMPACTS</b></p> <p align="center"><b>15 minutes</b></p>
What are your opinions concerning the possible positive impacts of the project on people in your community?
What are the possible positive impacts of the project on community livelihoods?
<p>What are the possible positive impacts of the project on the environment (water bodies, flora, fauna, air, soil, etc.)?</p> <p><i>modify to suit urban setting</i></p>
<b>ENVISAGED PROJECT NEGATIVE IMPACTS –</b>



<b>15 minutes</b>
What are your opinions concerning the possible negative impact of the project on people in your community?
What are the possible negative impacts of the project on community livelihoods?
What are the possible negative impacts of the project on the environment (water bodies, flora, fauna, air, soil, etc.)?
<b>MITIGATION MEASURES – 20 minutes</b>
<i>During this session, the facilitator asks each of the following questions for each specific impact identified in the preceding section.</i>
<p>Suggest possible ways to avoid or reduce the negative impact of the project on people</p> <p><i>What are your opinions/preferences on the proposed ways to ...</i></p> <p><i>these should only be during the construction phase, with the possible exception of the visual impact of the reservoirs (offset by the proximity to reliable good quality &amp; pressure water supply</i></p>
Suggest possible ways to avoid or reduce the negative impact of the project on community livelihood during construction.
Suggest possible ways to avoid or reduce the negative impact of the project on the environment during construction.
<b>RAP UP SESSION – 5 minutes</b>



## Appendix 6: FGD Summarised Transcripts





# Appendix 6- FGD Summarised Transcripts

## FGD Marjay Town

Date: 5th June 2018

Time: 10:00am

Location: Marjay Town

### 1.1 Demographical Information

Number of Attendance: 64

Percentage Women:

#### 1.1.1 Identification of communities represented in FGD

- Baoma community
- Mambo village
- Seven battalion
- Furnima
- Northem
- SLBC
- Goodrich
- Marjay town
- Sherbro town
- Gbendembu
- Oba funkia
- Dodo
- Kailahun Court Barray
- Attam Town

#### 1.1.2 Identify the predominant livelihood activities undertaken within your respective communities.

Major livelihoods activities that are consensus among the various participant groups include:

- Petty trading: this was the most predominant across all communities in Marjay Town. It is the main source of income for women as opined by most participants of all focus discussion groups).
- Stone mining (for mountain edge communities): able bodied men are particularly active in this livelihood activity.
- Sand mining (for communities along the coast)
- Fishing and Fish processing (for communities along the coast): men dominate in fishing activities while women are more involved in fish processing activities.
- Backyard gardening: this is mostly performed by women of older ages along mountain edge communities.

Other livelihood activities include some white color jobs (which are mostly done by community leaders) and middle man-power activities:



- Farming
- Mercenary
- Carpentering
- Teaching
- Driving
- Okada riding
- Tailoring
- Charcoal burning
- Hairdressing
- Plumbing

**1.1.3 What are the specific environmental problems experienced in your respective localities? (e.g. flooding, drought, landslide)**

The most important environmental problems identified across the three participant groups in order of significance are:

- Flooding: this is more common within coastal communities
- Erosion due to surface run off: this is more common in mountain edge communities.

**1.1.4 Outline the common water related diseases. For each of the common disease and epidemic, please give the possible cause.**

The three most common water related diseases identified by all focus group participants include:

Diarrhoea, typhoid and cholera.

These diseases are caused by the intake or consumption unsafe water. The lack of access to pure drinking water within the community is the major cause of these diseases.

**1.1.5 Identify the major infrastructural challenges faced by your respective communities. Which of the infrastructural changes requires the utmost attention and why?**

The most prominent infrastructural challenges faced by communities as identified by all participant groups include:

- Lack of pipe borne water
- Lack of health center
- Lack of dumping sites
- Lack recreational center (identified mostly by youths in all Focus groups)
- Lack of markets (pointed by most business people)
- Lack of schools
- Poor road network

All participants across focus groups consensually agreed that the provision of pipe borne water requires the utmost attention because of the numerous challenges (teenage pregnancy, rough terrain, and long distances) related to water accessibility

**1.1.6 What are the water specific problems faced by youths in your communities?**

The most important problems faced by youths that is related to water are:

- Walking long distances to search for water
- Harassment from public and private water facility operators





### **1.1.7 How have these problems being handled in your respective communities?**

Participants in all groups opined that in most cases these problems have not been attended to.

However, community leaders submitted that in some cases, community stakeholders levy fines for harassment and even seek police interventions.

### **1.1.8 What are the specific water-related problems faced by women in your communities?**

Most women in all groups were particularly responsive to this question. They stated the following:

- The women are faced with the daily task of providing water irrespective of the distance to be covered.
- In some cases, the young girls are sexually abused, leading to early pregnancy and dropped from school

### **1.1.9 How have these problems being handled in your respective communities?**

- Some private individuals try to construct wells and stand post which are not enough to meet the demand. These are mostly community leaders and white colour jobs community people who are relatively well-to-do.
- Most stakeholders pay less attention to these problems because they can afford to but bowser from GUMA or other vendors

### **1.1.10 What are the specific water related problems faced by children in your communities?**

- The children walk long distances to fetch water and then go to school late. They are also less attentive in class due to fatigue from fetching water.
- Some are been harassed and raped, leading to early pregnancy.

### **1.1.11 How have these problems being handled in your respective communities?**

Most women in the various groups interviewed collectively confirmed that nothing much have done in handling these problems.

In few cases, however, community leaders (especially community chiefs) have imposed some laws and associated penalties to such crimes. The children and women in focus groups qualified that these laws and penalties have not done much to reduce the problems.

## **1.2 COMMUNITY AWARENESS AND PERCEPTION ABOUT THE PROJECT**

### **1.2.1 What do you know about the proposed GVWC water rehabilitation project in Freetown?**

Most of the community leaders have a fair idea of the project. This is because they have been contacted at an earlier stage by the proponent/client to coordinate the community engagement meetings. They remarked that the project has been drafted to complement the rising demand of good drinking water within the communities.

Business people, and Women and children showed no idea of the project.

### **1.2.2 What do you think about the project in terms of its relevance and timeliness?**

Overwhelmingly, community leaders who are expected to some extent to provide water facilities within their communities stated that: the project is an answer to the cry of the city and its environs; owing to the fact that the lack of potable water is the single most important infrastructural challenge facing all communities represented in FGDs. This was re-echoed in the women and children FGD session and also by the business people.



Participants of all focus groups confirmed that the availability of potable water will help in solving a lot of problems within the communities that are related to water shortages.

### 1.3 ENVISAGED PROJECT POSITIVE IMPACTS

#### 1.3.1 **What are your opinions concerning the possible positive impacts of the project on people in your community?**

The major positive impacts envisaged by the participants of all groups are:

- The project can reduce school dropout due to reduced time and distance covered to fetch water – women were particularly emphatic of this point.
- It can increase life expectancy due to reduction of water related diseases.
- Lower risk of accidents to children – as they normally cross major roads to fetch water
- Reduction of child labor in the communities as some children are involved fetching water and selling it in their neighborhood.

#### 1.3.2 **What are the possible positive impacts of the project on community livelihoods?**

Participants of all categories stated the following as the project impact on community livelihoods:

- Employment opportunity in the communities especially for the youths during construction work.
- Improve and strengthen community petty trading – most business are related to the availability of water. Business people emphasized this positive impact
- More savings in terms of time and income – as most people spend a lot of time to fetch water and others buy water for domestic use.

#### 1.3.3 **What are the possible positive impacts of the project on the environment (water bodies, flora, fauna, air, soil, etc.)?**

Participants of all groups opined that the project will have little impacts on the above environmental aspects due to the fact that the work item of this area will be done in mostly build up residential areas and there will be little impact on especially flora and fauna.

### 1.4 ENVISAGED PROJECT NEGATIVE IMPACTS

#### 1.4.1 **What are your opinions concerning the possible negative impact of the project on people in your community?**

- Reduction of water related disease
- Creation of local employment
- Reduce cost of running water business
- Saves time
- Improves school attendance
- Improves the effective and efficient learning process of children
- Increase in the sales of food products during construction
- Reduction in conflicts that occurs due to illegal pipe connection
- Reduces anti-social activities among the community members.
- Reduces child labor
- Reduces lateness to work
- Saves household income

Improves hygiene and sanitization in schools.





#### **1.4.2 What are the possible negative impacts of the project on community livelihoods?**

The most important generally agreed negative impacts of projects on livelihoods in order of community importance are listed below:

- Displacement of business places along the piping route. This was very important for businesses that are encroached along GVWC main distribution pipeline
- Route (drive) cut-off during construction.
- Damages to private properties that are encroached to GVWC main distribution pipeline
- Outbreak of accident due to excavation and other construction activities during project implementation phase.
- Cut-off water supply to those who have GVWC connection during the project implementation phase.
- Reduces the income level of water business vendor.

#### **1.4.3 What are the possible negative impacts of the project on the environment (water bodies, flora, fauna, air, soil, etc.)?**

Due to the nature of the construction activities associated with the work package, participants have no idea of the negative impacts of the project to the above environmental receptacles. They further opined that the construction work will take place in mostly residential areas with little or no flora or fauna.

### **1.5 MITIGATION MEASURES**

#### **1.5.1 Suggest possible ways to avoid or reduce the negative impact of the project on people**

Participants in all groups suggested the following mitigation measures:

- Compensation to affected persons; business people were in full agreement of this suggestion since are the most affected.
- Relocation of business places; this was suggested by business people and overwhelmingly re-echoed in all other participant groups.
- Provide alternative temporal route during the project implementation phase.
- Placement of signs during project implementation so as to avoid unnecessary problems
- Provision of Milla tanks to cushion water shortage during project implementation
- Community involvement i.e. through sensitization to create community awareness of the project.
- Safety measures should be taken during construction phase in order to enhance community safety
- Making use of community labour and local material like stone and sand to help increase local income. This was particularly suggested by youths in all of the participants groups.
- Capacitates community members with maintenance skills to solve pipe damage in the local communities. Local plumbers and other craftsmen were particularly emphatic of this suggestion.

#### **1.5.2 Suggest possible ways to avoid or reduce the negative impact of the project on community livelihood during construction.**

Employ community youth as labour and buy local materials within the community so as to promote local economy.

#### **1.5.3 Suggest possible ways to avoid or reduce the negative impact of the project on the environment during construction.**

- All participants of the various groups engaged during the session suggested that constant public engagement on construction activities is the most important way to avoid most of the negative impacts highlighted.



- Using safety tapes to conceal excavated -During construction process, there should be a focal person to direct places where the pipes should pass through. The need for temporal source of water during construction for us to survive on.
- Excavated areas should be covered again after the pipes are laid down areas.

## 1.6 The Rap Up

Participants were asked to briefly explain what they understood about the project. The following were their responses

- ✓ Participants were very happy about the initiative and further highlighted the common diseases contacted as a result of water shortage and other negative effects faced by children due to water shortage and finally said that lack of water leads to improper functioning of the community and lateness of adults to work
- ✓ Participants emphasized on the importance of the project and outlined some negative effects of water shortage like teenage pregnancy, school dropout, the high risk of diseases and also other community people do sell water at high cost. They also revealed that water is life.
- ✓ They pointed out that, they had spent lot of resources on water management, but it is not sustainable due to several factors which were; community negligence, lack of monitoring, and lack of maintenance. They strongly believe that the said project will be sustainable in their communities.
- ✓ One of the participants further shared the community's negative experienced as a result of water shortage
- ✓ Participants commented on the educational aspect that all the schools in their communities lack water supply and this has negatively impacted the pupils and the teachers as well.





## FGD Mongegba

Date: 12<sup>th</sup> June 2018

Time: 10:00am

### 2.1 GENERAL SITUATION OF COMMUNITIES WITHIN PROJECT AREA

#### 2.1.1 Identification of communities represented in FGD

The communities represented by each FGD group was Mongegba.

#### 2.1.2 Identify the predominant livelihood activities undertaken within your respective communities.

All groups identified Petty trading and Stone mining as predominant activities within the community.

Business groups also identified:

- Charcoal burning
- Motorbike (Okada) riding

Community Leader group identified:

- Agricultural Practices
- Driving
- Carpentry, Tailoring and Labour Work.

Women groups identified:

- Agriculture
- Charcoal burning

#### 2.1.3 What are the specific environmental problems experienced in your respective localities? (e.g. flooding, drought, landslide)

Business only identified pollution of local water sources when it rains. However community leaders identified the following:

- Flooding
- Landslide
- Mudslide
- Erosion
- Waste emission
- Water contamination
- No drainage system
- Heavy storm do affect dwellings

Women could not identify any specific environmental problems.



**2.1.4 Outline the common water related diseases. For each of the common disease and epidemic, please give the possible cause.**

Businesses could not identify any water related diseases. However, community leaders have identified cholera; diarrhoea, typhoid and malaria as water diseases occurring within their area that are caused by:

- Poor sanitation - hygiene
- Lack of toilet facilities
- Lack of community awareness

Women's also identified malaria due to poor waste management.

**2.1.5 Identify the major infrastructural challenges faced by your respective communities. Which of the infrastructural changes requires the utmost attention and why?**

Important issues identified by all group:

- Lack of health center
- Lack of secondary schools
- Lack of safe water sources (lack of piped water, unsafe drinking water, lack of purified boreholes)

Business felt that piped water was a priority as it could prevent numerous challenges (teenage pregnancy, rough terrain, and long distances) related to water accessibility. They also identified lack of electricity as an issue.

Community Leaders also felt that inadequate water supply is their utmost infrastructural challenge as "water is life" and there will be no life without the presence of water. They also went on to identified erosion – surface soil/channels/disposing of material downstream; poor drainage facilities and land degradation as the other infrastructural challenges.

Women only other infrastructural challenges were lack of electricity.

**2.1.6 What are the water specific problems faced by youths in your communities?**

In the women's group they felt these were the water specific problems:

- Walking long distances to search for water
- Poor quality of water for consumption

Both the business and community leaders identified unemployment, antisocial behaviour and lack training and education.

**2.1.7 How have these problems being handled in your respective communities?**

Community Leaders were answered with the angle of what this project could do to solve these problem. General it was about sensitisations and awareness and job creation.

Women felt that these problems were not being dealt with.

**2.1.8 What are the specific water-related problems faced by women in your communities?**

Business and community leaders identifies that women are faced with the daily task of providing water, or are responsible for the children sent to collect the water, irrespective of the distance to be covered. Women go on to say that they have problems relating to the distance and rough terrains that are a big issues.

On top of this all groups identified the issue of the water being unsafe and leading to water related diseases.





Women and businesses also identifies the cost- spending much of their income on water- and the time to collect the water as an issue.

Community Leaders identified quarrels over to access to the water and community members denied the right to access water from Guma construction site.

#### **2.1.9 How have these problems being handled in your respective communities?**

All groups feels like this problem is being handled through community water projects or private individual paying for water points.

Business and Women both say other household members helping fetch water is one approach currently in place.

Women also said that most stakeholders paid less attention to these problems because they can afford to procure water from vendors.

#### **2.1.10 What are the specific water related problems faced by children in your communities?**

All groups identified that children walked long distances to fetch water and over rough terrain which caused the following issues:

- Reduced school attendance
- Late to school
- Less attentive, drops in effective and efficient learning
- Increase in antisocial behaviour, and
- early pregnancies

Community leaders also identified higher risk of accidents and child labour and Women said that some are been harassed and raped, leading to early pregnancy.

#### **2.1.11 How have these problems being handled in your respective communities?**

Community Leaders were answered with the angle of what this project could do to solve these problem. General it was about sensitisations and awareness and job creation.

Women felt that these problems were not being dealt with.

## **2.2 COMMUNITY AWARENESS AND PERCEPTION ABOUT THE PROJECT**

#### **2.2.1 What do you know about the proposed GVWC water rehabilitation project in Freetown?**

All groups had little or no knowledge about the project but their initial response was positive.

#### **2.2.2 What do you think about the project in terms of its relevance and timeliness?**

All groups agreed; Women though it was timely and community leaders and businesses said it was important.

## **2.3 ENVISAGED PROJECT POSITIVE IMPACTS**

#### **2.3.1 What are your opinions concerning the possible positive impacts of the project on people in your community?**

Community Leaders believes the positive impacts will be:

- No child labour



- No lateness to school
- Safe from disease outbreak
- Increase investors accommodation
- There is high standard of living

Businesses believes the positive impacts will be:

- Increase in school attendance
- Increase the rate of effective and efficient learning process among school going people
- Improves the general hygiene among local residence
- Reduces anti-social crimes among the youth like raping or forceful sex with teenage girls which ultimately leads to teenage pregnancy.
- Saves household income and time spent in accessing water facilities.

All believe it will increase access to safe drinking water.

### **2.3.2 What are the possible positive impacts of the project on community livelihoods?**

All believe there will be job opportunity. Women and Community leaders also see it as an increase in sources of income.

Community leaders and women identified this as increasing access to source of water for agriculture.

Business believes it will increase in the sales of local material like stone and sand.

### **2.3.3 What are the possible positive impacts of the project on the environment (water bodies, flora, fauna, air, soil, etc.)?**

None identified

## **2.4 ENVISAGED PROJECT NEGATIVE IMPACTS**

### **2.4.1 What are your opinions concerning the possible negative impact of the project on people in your community?**

Community Leaders have highlighted that:

- Some people may not happy for the passage of pipes on their lands
- **Increased** Erosion could lead to land owners being upset.

Business highlight:

- Destruction of private structures
- Minor accident during projects implementation
- Cut-off in water supply to those who have the Guma connection

Women said that it should affect electricity and communication poles

### **2.4.2 What are the possible negative impacts of the project on community livelihoods?**

Women and Business identified displacement of business places along the road where the pipes are laid. Women also identified that a potential negative impact would be community labour being ignored and loss of some agricultural lands.





### **2.4.3 What are the possible negative impacts of the project on the environment (water bodies, flora, fauna, air, soil, etc.)?**

Community leaders are worried about environmental degradation caused by this project and potential erosion.

Women identified potential loss in soil quality and flora.

## **2.5 MITIGATION MEASURES**

### **2.5.1 Suggest possible ways to avoid or reduce the negative impact of the project on people**

Measure suggested by all groups include:

- Alternative sources of water during projects implementation.
- Compensation of Effected People
- Continued consultation and signs- informing them when the construction will be starting and informing them of the risks through signs
- 
- Appropriate diversions for traffic- including signs and consultation was suggested by Women and businesses.

Businesses and community leaders also want business to be relocated to minimise the impacts.

Businesses would like the community to take ownership of the projects as they believe they can deliver it in time. They also suggested water management by household members and to lower the placement of pipes to avoid pipe damages.

Community leaders believe it is an opportunity to increase access and construct taps in each compound.

### **2.5.2 Suggest possible ways to avoid or reduce the negative impact of the project on community livelihood during construction.**

- Women and business want local labour and local materials used so that it can promote the local economy.

### **2.5.3 Suggest possible ways to avoid or reduce the negative impact of the project on the environment during construction.**

Women highlight excavated areas should be covered again after the pipes are laid down areas and use of community members to direct and identify them so as to reduce impacts on their livelihood.

Community leaders to avoid deforestation on dam area

## **2.6 The Rap Up**

Participants were asked to briefly explain what they understood about the project. The following were their responses

- ✓ Stakeholders pointed out that water issue is highly affecting their community especially the women and children, they highlighted the positive and negative impacts of water scarcity which leads to lot of problems which were teenage pregnancy, children lateness to schools, high risk of accidents etc, in their community and also recommended for installation of big water pipes.
- ✓ Participants from the business people revealed that the questions posed on them during the FGD were encouraging and at the end of the FGD they were able to give answers to them. however, they



appreciated the idea of the proposed project and also pointed out their livelihood activities which were; stone mining, driving etc, and how the water project has to positively impact their community.

- ✓ The women and children group, who happens to be the ones that suffer the most pleaded that the availability of water will help them so much.





## FGD Southern Section

Date: 13<sup>th</sup> June 2018

Time: 10:00am

### 3.1 GENERAL SITUATION OF COMMUNITIES WITHIN PROJECT AREA

#### 3.1.1 Identification of communities represented in FGD

- The communities represented in this FGD include, Mile 13, Mambo Village and Ogu Farm

#### 3.1.2 Identify the predominant livelihood activities undertaken within your respective communities.

The predominant livelihood activities identified by Business Leaders include:

1. Stone mining
2. Sand mining
3. Petty trading
4. Fishing
5. Backyard gardening
6. Farming
7. Water business

The predominate livelihood activities identified by community leaders include :

1. Petty trading
2. Stone mining
3. Sand mining
4. Coal burning
5. Wood cutting
6. Fishing

The predominant livelihood activities identified by women include :

1. Petty trading
2. Backyard gardening
3. Stone mining
4. Farming
5. Water business

#### 3.1.3 What are the specific environmental problems experienced in your respective localities? (e.g. flooding, drought, landslide)

Women identified flooding and in rare cases high winds as an environmental problem experienced

Community leaders identified, flooding, poor road construction, wind erosion, landslides and lack of access to water through pipes

Business leaders identified, diarrhoea cholera, flooding and high winds



**3.1.4 Outline the common water related diseases. For each of the common disease and epidemic, please give the possible cause.**

Group	Water related diseases	Possible cause
Business Sector	Diarrhoea	Impure Water
Business Sector	Cholera	Impure Water
Community leaders	Diarrhoea	Contaminated Water Source of water Poor waste management
Community leaders	Cholera	Contaminated Water Source of water Poor waste management
Community leaders	Typhoid	Contaminated Water Source of water Poor waste management
Women	Diarrhoea	Poor Sanitation Lack of clean water
Women	Cholera	Poor Sanitation Lack of clean water

Community leaders also identified : Skin disease dysentery and malaria as water related diseases

**3.1.5 Identify the major infrastructural challenges faced by your respective communities. Which of the infrastructural changes requires the utmost attention and why?**

Community leaders identified :

1. Poor road network
2. Poor water supply in the community
3. Erosion
4. Poor drainage facilities
5. Land degradation

Women and business leaders both identified :

1. Lack of water
2. Lack of health centers

**3.1.6 What are the water specific problems faced by youths in your communities?**

Business sector identified unemployment as the problem. Women identified walking long distances to search for water as well as harassment from public and private water facility operators. Community leaders identified, unemployment, drugs, teenage pregnancy, prostitution and social activities and walking long distances to fetch water





### **3.1.7 How have these problems being handled in your respective communities?**

Community leaders, suggested youth problems were handled through purchasing miller tanks, maintenance of the sources of water and meeting with different organisations for help.

Women note the some Non-Governmental Organisations have been to their community to offer counselling and to sensitise people

Business leaders note the community has created a self- help project to address unemployment in their community

### **3.1.8 What are the specific water-related problems faced by women in your communities?**

Business leaders identified, Cholera, Diarrhoea and skin diseases as water related problems which can be addressed by boiling water before drinking and good hygiene. Contrary to this community leaders and women identified lack of water for drinking and domestic work which prevents household activities and it means women have to walk long distances for water.

### **3.1.9 How have these problems being handled in your respective communities?**

Women identified building water wells would improve this problem. Women suggested having water from the wells available between specific times would also improve this issue. Business leaders suggested community cleaning at water sites and increasing the communities awareness on the importance of clean water wells. Business leaders suggested boiling water before drinking

### **3.1.10 What are the specific water related problems faced by children in your communities?**

Women, business leaders and community identified fetching water from long distances as a water related problem for children which causes them to be late for school and too tired to concentrate. Community leaders and business leaders also identified teenage pregnancy as a water related problem for children. The distance required to fetch water increases the likelihood that children can be harassed on the journey or raped.

### **3.1.11 How have these problems being handled in your respective communities?**

All groups identified awareness campaigns through NGO's as a mechanism to reduce to burden to children. Business leaders suggested the provision of water in schools to assist with the problem

## **3.2 COMMUNITY AWARENESS AND PERCEPTION ABOUT THE PROJECT**

### **3.2.1 What do you know about the proposed GVWC water rehabilitation project in Freetown?**

Business sector had little to no knowledge about the Freetown Water Project. Community leaders were informed about the project through their Member of Parliament. Women had also heard about the project and believed it would improve their lives. Women were told the Freetown Water Project would rehabilitate the existing water facilities and install new pipes connecting more communities..

### **3.2.2 What type of water rehabilitation works are entailed in the project?**

Community Leaders thought:

1. Plumbing
2. Labour
3. Driving
4. Digging



## 5. Sensitization and Monitoring

Women thought:

1. Rehabilitation of existing water facilities
2. Installing new pipes

### 3.2.3 What do you think about the project in terms of its relevance and timeliness?

All stakeholders thought the project is relevant and timely as the communities keep expanding

## 3.3 ENVISAGED PROJECT POSITIVE IMPACTS

### 3.3.1 What are your opinions concerning the possible positive impacts of the project on people in your community?

- Women identified
  1. Reduction of water related disease
  2. Local employment
  3. Reduce cost of running water business
  4. Saves time
  5. Improves school attendance
  6. Improves the effective and efficient learning process of children
  7. Increase in the sales of food products during construction
  8. Reduction in conflicts that occurs due to illegal pipe connection

Community leaders identified

1. Reduces the cost of connection and minimize illegal connection
2. No ch Reduces the cost of connection and minimize illegal connection
3. No child labour
4. More source of water
5. job opportunity creation for the community
6. There will be ready market
7. Diseases reduction
8. Less distance to fetch water
9. Increase water supply
10. Descent environment
11. Protected environment
12. Compensation of land owners
13. Free movement of people

Business leaders identified :

1. Reduction of water related disease
2. Local employment
3. Reduce cost of running water business
4. Saves time
5. Improves school attendance
6. Improves the effective and efficient learning process of children
7. Increase in the sales of food products during construction
8. Reduction in conflicts that occurs due to illegal pipe connection





### 3.3.2 What are the possible positive impacts of the project on community livelihoods?

Women identified job opportunities for the youth and also promote local business in the community (business and community leaders did not answer this question)

### 3.3.3 What are the possible positive impacts of the project on the environment (water bodies, flora, fauna, air, soil, etc.)?

Women thought water related diseases will reduce (business and community leaders did not answer this question)

## 3.4 ENVISAGED PROJECT NEGATIVE IMPACTS

### 3.4.1 What are your opinions concerning the possible negative impact of the project on people in your community?

Women identified

1. Displacement of business places along the piping route and proposed new pipes Traffic within the community
2. Increase in dust, noise and poor air quality
3. The project reduces the income of local water vendors

Business people identified

1. Displacement of business places along the piping route.
2. Route (drive) cut-off during construction.
3. Increase in the rate of dust particles in the atmosphere.
4. Outbreak of accident.

Community leaders identified

1. Potential losses of private land specific negative impact to the people

### 3.4.2 What are the possible negative impacts of the project on community livelihoods?

Women identified :

1. Displacement of businesses along the existing pipe routes and proposed new ones.
2. Traffic within the community
3. Increase in dust, noise and poor air quality  
Reduces the income level of water vendors

Business people identified :

1. Displacement of business places along the piping route.
2. Route (drive) cut-off during construction.
3. Increase in the rate of dust particles in the atmosphere.
4. Outbreak of accident.
5. Cut-off water supply to those who have Guma connection during the project implementation phase
1. Community leaders identified Meeting places loss
2. Noise and vibration pollution



### **3.4.3 What are the possible negative impacts of the project on the environment (water bodies, flora, fauna, air, soil, etc.)?**

Women said they are not aware of any negative environmental issues this project might cause.

Community leaders identified :

1. Breeding places for mosquitoes
2. Dust emission in the dry season
3. Exposure of pipes

## **3.5 MITIGATION MEASURES**

### **3.5.1 Suggest possible ways to avoid or reduce the negative impact of the project on people**

Mitigation methods identified by business people include:

1. Improves local sources of water during the project implementation phase,
2. Deep burial of pipes to avoid pipe damage.
3. Provide alternative route during the project implementation phase.
4. Placement of signs during project implementation so as to avoid unnecessary problems
5. Relocate the affected business places.
6. Compensate affected people.
7. Community involvement.
8. Making use of community labour and local material like stone and sand.

Mitigation methods identified by women include:

1. Compensation of project affected persons
2. Alternative water supply so as to reduce burden on women and children
3. Use of appropriate environmental and safety measures throughout the construction phases

Mitigation methods identified by community leaders include:

1. Sensitization of community members on water issues
2. Compensation and relocation
3. Reclamation after digging
4. Community monitoring

### **3.5.2 Suggest possible ways to avoid or reduce the negative impact of the project on community livelihood during construction.**

Community leaders suggested :

1. Community awareness in the implementation of the project
2. Reclamation excavated places
3. Road signs to reduce accident
4. Community relocation during the process
5. Temporal source of water during implementation
6. Compensation
7. Employment creation

Women suggested that the project employees the youth for labour intensive work and the project purchases materials locally within the community to promote the local economy





Business leaders suggested

1. Improves local sources of water during the project implementation phase,
2. Deep burial of pipes to avoid pipe damage.
3. Provide alternative route during the project implementation phase.
4. Placement of signs during project implementation so as to avoid unnecessary problems
5. Relocate the affected business places.
6. Compensate affected people.
7. Community involvement.
8. Making use of community labour and local material like stone and sand.

**3.5.3 Suggest possible ways to avoid or reduce the negative impact of the project on the environment during construction.**

Women and business leaders suggested, constant public engagement on construction activities and use safety measures throughout the construction phase.

Excavated areas should be covered again after the pipes are laid down areas.



## FGD Adonkia

Date: 13<sup>th</sup> June 2018

Time: 1:00pm

### 4.1 GENERAL SITUATION OF COMMUNITIES WITHIN PROJECT AREA

#### 4.1.1 Identification of communities represented in FGD

- Adonkia
- New London
- Ogoo Farm
- Laka

#### 4.1.2 Identify the predominant livelihood activities undertaken within your respective communities.

Women identified :

1. Petty trading
2. Stone mining
3. Fishing
4. Farming
5. Plumbing
6. Bike riding
7. Masonry

Community Leaders identified:

1. Petty trading
2. Contractors
3. Carpentry
4. Plumbing

Business leaders identified :

1. Petty trading
2. Stone mining
3. Fishing
4. Farming
5. Plumbing
6. Bike riding
7. Masonry

#### 4.1.3 What are the specific environmental problems experienced in your respective localities? (e.g. flooding, drought, landslide)

Women and Business leaders identified, flooding and heavy winds. Community leaders identified flooding drought and landslide.





**4.1.4 Outline the common water related diseases. For each of the common disease and epidemic, please give the possible cause.**

Group	Water related diseases	Possible cause
Business Sector	Diarrhoea	Unsafe drinking water
Business Sector	Cholera	Unsafe drinking water
Business Sector	Skin disease	Unsafe water used during bathing
Community leaders	Diarrhoea	Contaminated Water Poor waste management Poor hygiene Mosquito bite
Community leaders	Cholera	Contaminated Water Poor waste management Poor hygiene Mosquito bite
Community leaders	Typhoid	Contaminated Water Poor waste management Poor hygiene Mosquito bite
Community leaders	Malaria	Contaminated Water Poor waste management Poor hygiene Mosquito bite
Women	Malaria	Lack of clean water Poor waste management
Women	Typhoid	Lack of clean water Poor waste management

**4.1.5 Identify the major infrastructural challenges faced by your respective communities. Which of the infrastructural changes requires the utmost attention and why?**

The major infrastructural challenged identified by women and business leaders include lack of health centers and lack of water pipes. Business leaders noted that the challenges related to accessing water require the utmost attention

Community leader, identified poor water supply in the community, erosion, land degradation and pollution as the major infrastructural challenges faced.

**4.1.6 What are the water specific problems faced by youths in your communities?**

Women identified walking long distances for water and bullying from other community members as the main problems faced by the youth. Community leaders and business leaders identified, unemployment, and anti-social



disorder. Community leaders also noted teenage pregnancy. How have these problems been handled in your respective communities?

Business leaders said employment was being tackled by projects, and lobbying by NGO's. Social disorder was being tackled by massive sensitization campaigns. Women and community leaders argued the water issues faced by the youths are being handled by government interventions. However women noted that the elders of the community do not care about these issues. Community leaders believe

#### **4.1.7 What are the specific water-related problems faced by women in your communities?**

Community leaders identified shortage of water for drinking and domestic work. Business leaders identified skin infections, cholera and the distance to fetch water. Women noticed the biggest problem faced by women is the distance to retrieve water and the dangers posed to girls who have long distances to travel to fetch water.

#### **4.1.8 How have these problems been handled in your respective communities?**

Women identified using private wells and water vendors as a mechanism of reducing the lack of water and risk to girls. Community leaders identified community awareness to tackle water-related problems faced by women. Business leaders identified community water projects to reduce the amount of time needed for women to retrieve water.

#### **4.1.9 What are the specific water related problems faced by children in your communities?**

Business leaders identified walking long distances to retrieve water and reduced attentiveness in school as a result of fetching water.

#### **4.1.10 How have these problems been handled in your respective communities?**

Business leaders identified community water projects as a mechanism to reduce the need for children to travel far. However, women did not believe their community did anything.

### **4.2 COMMUNITY AWARENESS AND PERCEPTION ABOUT THE PROJECT**

#### **4.2.1 What do you know about the proposed GVWC water rehabilitation project in Freetown?**

Women said they knew rehabilitation of networks and installation of new pipes in some communities. Community leaders had some awareness about the project but not specific knowledge.

#### **4.2.2 What type of water rehabilitation works are entailed in the project?**

#### **4.2.3 Community leaders thought the project would entail plumbing, digging sensitization, and monitoring. What do you think about the project in terms of its relevance and timeliness?**

Women felt that access to water has been a reoccurring issue for them so they are happy the network is being built. Similarly community members believed the project is timely as water is in high demand in the community.

### **4.3 ENVISAGED PROJECT POSITIVE IMPACTS**

#### **4.3.1 What are your opinions concerning the possible positive impacts of the project on people in your community?**

Business leaders, women and community leaders identified the following positive impacts

- Access to safe drinking water
- Employment of local residence





- Increase in the sales of local material like stone and sand
- Increase in school attendance
- Promotes health and sanitation within the community

Community leaders also mention, compensation to land owners.

#### **4.3.2 What are the possible positive impacts of the project on community livelihoods?**

Women, community and business leaders identified , increased job opportunities as the main impact on the communities livelihoods

#### **4.3.3 What are the possible positive impacts of the project on the environment (water bodies, flora, fauna, air, soil, etc.)?**

Community leaders identified:

1. Clearing of the environment
2. Excavate
3. Loss of plantation
4. Destruction of plants

Women said works will be done in established human settlements so not much effect will be recorded. Minor impacts will be on some drainage and surface runoff

### **4.4 ENVISAGED PROJECT NEGATIVE IMPACTS**

#### **4.4.1 What are your opinions concerning the possible negative impact of the project on people in your community?**

Women identified:

- Displacement of business centers
- Traffic due to works
- Possible erosion and contamination of some water bodies within the vicinity.
- Possibility of accidents

#### **4.4.2 What are the possible negative impacts of the project on community livelihoods?**

Women, Business leaders identified :

- Displacement of business centers
- Traffic due to works
- Possible erosion and contamination of some water bodies within the vicinity.
- Possibility of accidents

#### **4.4.3 What are the possible negative impacts of the project on the environment (water bodies, flora, fauna, air, soil, etc.)?**

Women stated they are not aware of environmental problems to be caused by this project

### **4.5 MITIGATION MEASURES**

#### **4.5.1 Suggest possible ways to avoid or reduce the negative impact of the project on people**

- Making alternative sources of water during projects implementation.



- Display warning signs during construction and as well make temporal alternatives. routes to be used by the local people.
- Compensate the affected people.
- Relocate affected business places.
- Informing the local residence as and when the implementation phase will start.
- Community people should take ownership of the projects so that the project can be completed within the stipulated time.
- The projects should make use of local labor and materials like stone and labor.
- Guma should ensure that they have a maintenances ready team in case of damage.
- Authorities concerned should fully embark on monitoring during the project implementation phase.

**4.5.2 Suggest possible ways to avoid or reduce the negative impact of the project on community livelihood during construction.**

Employ community youth as labour and buy local materials within the community so as to promote local economy.

**4.5.3 Suggest possible ways to avoid or reduce the negative impact of the project on the environment during construction.**

Constant public engagement on construction activities. Using safety tapes to conceal excavated -During construction process, there should be a focal person to direct places where the pipes should pass through. The need for temporal source of water during construction for us to survive on.

Excavated areas should be covered again after the pipes are laid down areas.





## FGD Mortem

Date: 14<sup>th</sup> June 2018

Time: 10:00am

### 5.1 GENERAL SITUATION OF COMMUNITIES WITHIN PROJECT AREA

#### 5.1.1 Identification of communities represented in FGD

Mortem

#### 5.1.2 Identify the predominant livelihood activities undertaken within your respective communities.

Businesses and women identified:

1. Farming
2. Stoning
3. Backyard gardening
4. Tailoring
5. Charcoal burning
6. Bike riding
7. Sand mining
8. Fishing

Community leaders identified :

- 1 Stone mining
- 2 Woodcutting
- 3 Gardening
- 4 Water selling
- 5 Construction
- 6 Petty trading

#### 5.1.3 What are the specific environmental problems experienced in your respective localities? (e.g. flooding, drought, landslide)

Businesses and women described, illegal waste disposal as the main environmental problems. Businesses also mentioned heavy winds. Community leaders however mentions, landslides, flooding erosion and poor road networks

#### 5.1.4 Outline the common water related diseases. For each of the common disease and epidemic, please give the possible cause.

Group	Water related diseases	Possible cause
<b>Business Sector</b>	Diarrhoea	Unsafe drinking water
<b>Business Sector</b>	Cholera	Unsafe drinking water
<b>Business Sector</b>	Skin disease	Unsafe water used during bathing



<b>Community leaders</b>	Diarrhoea	Contaminated Water Poor waste management Poor hygiene
<b>Community leaders</b>	Cholera	Contaminated Water Poor waste management
<b>Community leaders</b>	Typhoid	Contaminated Water
<b>Community leaders</b>	Malaria	Mosquito bite
<b>Community leaders</b>	Skin infections	Poor Hygiene
<b>Women</b>	Malaria	Lack of clean water Poor waste management
<b>Women</b>	Diarrhoea	Lack of clean water Poor waste management
<b>Women</b>	Typhoid	Lack of clean water Poor waste management

**5.1.5 Identify the major infrastructural challenges faced by your respective communities. Which of the infrastructural changes requires the utmost attention and why?**

Infrastructural challenges identified by businesses :

1. Lack of pipe borne water
2. Lack of health center
3. Lack of recreational center
4. Lack of schools and market

Women identified :

Lack of pipe borne water  
Lack of health center  
Lack of dumping sites  
Lack recreational center  
Lack of markets  
Lack of schools  
Poor road network

Businesses identified :

- Lack of toilet facilities
- No hygiene education
- Water shortage
- Lack of health facility
- Erosion
- Poor drainage facilities





#### **5.1.6 What are the water specific problems faced by youths in your communities?**

Community leaders identified:

1. Unemployment
2. Illegal sale of land
3. Lack of business
4. Hooliganism
5. Lack of food
6. Drugs abuse

Women identified :

1. Walking long distances for water
2. Harassment from public and private facility operators

Business leaders identified lack of employment for the youths

#### **5.1.7 How have these problems being handled in your respective communities?**

business leaders identified community self-help projects, while community leaders identified sensitisation, while women argued the police were intervening in the harassment of youths

#### **5.1.8 What are the specific water-related problems faced by women in your communities?**

Women, community leaders and businesses argued women were faced with the daily task of providing water irrespective of the distance to get water. The long distance posed the threat that women might be sexual assault while going to get water.

#### **5.1.9 How have these problems being handled in your respective communities?**

Women said this issue is being dealt via lobby from NGO's. Community leaders argued they encourage women to fetch water early to avoid certain issues. Business leaders said community leaders provided community water projects to handle the issue

#### **5.1.10 What are the specific water related problems faced by children in your communities?**

Women and business leaders argued similarly to women, children faced the same issue of having to walk long distances to get water. Community leaders on the other hand argued the issues facing children were stealing their belongs where they had travelled to get water.

#### **5.1.11 How have these problems being handled in your respective communities?**

Women argued not much was done to address the issues faced by children. Community leaders and business people said, water tank construction, pipe connections and community dialogue were being used to address the issue

### **5.2 COMMUNITY AWARENESS AND PERCEPTION ABOUT THE PROJECT**

#### **5.2.1 What do you know about the proposed GVWC water rehabilitation project in Freetown?**

Community leaders awareness is based on the information provided by their member of parliament while women and business leaders knew little to nothing about the project.



### **5.2.2 What do you think about the project in terms of its relevance and timeliness?**

Community leaders thought the project is timely because their community needs water. Similarly women felt the time was crucial as they had been feeling neglected from the government.

## **5.3 ENVISAGED PROJECT POSITIVE IMPACTS**

### **5.3.1 What are your opinions concerning the possible positive impacts of the project on people in your community?**

Women and business people and community leaders felt the positive impacts of the project included the availability of good drinking water and an increase in water and sanitation practices.

### **5.3.2 What are the possible positive impacts of the project on community livelihoods?**

Community leaders felt the project presented the opportunity to create job opportunities for the community people as well as compensation of land owners. Business people thought the community will experience increases in sales of food and goods during the construction. Similarly women thought the project presented the opportunity to boost the economy as the project could employ youths.

### **5.3.3 What are the possible positive impacts of the project on the environment (water bodies, flora, fauna, air, soil, etc.)?**

Community leaders identified no specific impact on the environment. Business people felt the project will lead to a clean environment. Women noted water channels will be controlled so as to avoid erosion and other environmental hazards.

## **5.4 ENVISAGED PROJECT NEGATIVE IMPACTS**

### **5.4.1 What are your opinions concerning the possible negative impact of the project on people in your community?**

Women and business leaders identified :

1. Displacement of business places
2. Difficulty in accessing the other side of the road
3. Accident
4. Soil erosion and surface runoff

Community leaders identified:

1. Damages of pipes by vehicles, okada riders,
2. The area will become a breeding place for mosquitoes
3. Pipe exposure
4. Noise pollution
5. Potential loss of private lands

### **5.4.2 What are the possible negative impacts of the project on community livelihoods?**

Business leaders identified :

1. Displacement of business places
2. Difficulty in accessing the other side of the road
3. Accident
4. Soil erosion and surface runoff





Community leaders identified:

1. Damages of pipes by vehicles, okada riders,
2. The area will become a breeding place for mosquitoes
3. Pipe exposure
4. Noise pollution
5. Potential loss of private lands

Women identified :

1. Dislocation of businesses
2. Traffic congestions during excavation for pipe network connections
3. Possibility of accidents
4. Reduction in water quantity to the community

#### **5.4.3 What are the possible negative impacts of the project on the environment (water bodies, flora, fauna, air, soil, etc.)?**

Community leaders identified:

1. Damages of pipes by vehicles, okada riders,
2. The area will become a breeding place for mosquitoes
3. Pipe exposure
4. Noise pollution
5. Potential loss of private lands

Business leaders identified :

1. Soil erosion and surface run off

Women identified

1. Minor loss in flora
2. Increase in noise and air quality
3. Loss of soil quality and possible minor pollution into existing water bodies

## **5.5 MITIGATION MEASURES**

### **5.5.1 Suggest possible ways to avoid or reduce the negative impact of the project on people**

Mitigation measures mentioned by women include :

- Compensation of affected person
- Creation of diversions to control traffic and reduce accident probability
- Use of safety signs and tapes where necessary
- Immediate closure of excavated pits after pipe installation

Mitigation methods mentioned by business leaders include

- Compensate the affected people.
- Relocate affected business places.
- Informing the local residence as and when the implementation phase will start.
- Community people should take ownership of the projects so that the project can be completed within the stipulated time.



Community leaders mentioned :

- Sensitization of community members on water issues
- Compensation and relocation
- Reclamation after digging

**5.5.2 Suggest possible ways to avoid or reduce the negative impact of the project on community livelihood during construction.**

Community leaders mentioned :

1. Reclamation of excavated places
2. Community relocation during the process
3. Temporal source of water during implementation
4. Compensation
5. Employment creation

Business leaders and women agreed that the project should make use of local labor and materials like stone and labor. Community members differed from this opinion arguing, compensation and community relocation during the construction phase.

**5.5.3 Suggest possible ways to avoid or reduce the negative impact of the project on the environment during construction.**

Business leaders mentioned, authorities concerned should fully embark on monitoring during the project implementation phase, and Guma should ensure that they have a maintenance ready team in case of damage. Community leaders suggested the project should provide alternative sources of water during the construction phase.

Women suggested:

1. Creation of diversions to control traffic and reduce accident probability
2. Use of safety signs and tapes where necessary
3. Immediate closure of excavated pits after pipe installation
4. Control noise levels, air pollution and spillage of hazardous materials into the soil and water bodies





## FGD Calaba Town

Date: 19<sup>th</sup> June 2018

Time: 10:00am

### 6.1 GENERAL SITUATION OF COMMUNITIES WITHIN PROJECT AREA

#### 6.1.1 Identification of communities represented in FGD

Robis road (Calaba town)

Pamuronkor (Calaba town)

#### 6.1.2 Identify the predominant livelihood activities undertaken within your respective communities.

Business leaders women identified :

1. Sand mining
2. Petty trading
3. Mercenary
4. Driving
5. Human portage
6. Fishing and or oyster collection
7. Wood gathering

Community leaders identified:

1. Trading
2. Fishing
3. Cabbage collection
4. Sand mining
5. Building and construction
6. Tailoring
7. Teaching

#### 6.1.3 What are the specific environmental problems experienced in your respective localities? (e.g. flooding, drought, landslide)

Women, business leaders and community leaders identified flooding as the main environmental problems they face. Community leaders also included, poor road network, poor water supply, dust emissions during the dry season and poor road network.

#### 6.1.4 Outline the common water related diseases. For each of the common disease and epidemic, please give the possible cause.

Group	Water related diseases	Possible cause
Business Sector	Diarrhoea	Unsafe drinking water
Business Sector	Cholera	Unsafe drinking water



<b>Business Sector</b>	Skin disease	Bathing with unsafe water
<b>Community leaders</b>	Diarrhoea	Contaminated Water Poor waste management Poor hygiene
<b>Community leaders</b>	Cholera	Lack of safe drinking water
<b>Community leaders</b>	Typhoid	Lack of safe drinking water
<b>Community leaders</b>	Malaria	Mosquito bite
<b>Community leaders</b>	Cold	
<b>Women</b>	Malaria	Lack of clean water Poor waste management
<b>Women</b>	Diarrhoea	Lack of clean water Poor waste management
<b>Women</b>	Typhoid	Lack of clean water Poor waste management

**6.1.5 Identify the major infrastructural challenges faced by your respective communities. Which of the infrastructural changes requires the utmost attention and why?**

Women mentioned

1. Lack of pipe borne water
2. Lack of health center
3. Lack of dumping sites
4. Lack recreational center
5. Lack of markets

Business sector mentioned :

1. Poor road
2. Inadequate electricity
3. Lack of pipe borne water facility

Community leaders mentioned :

1. Poor road network
2. Deforestation
3. Construction along dam areas
4. One way supply of water
5. No hygiene education

**6.1.6 What are the water specific problems faced by youths in your communities?**

Community leaders identified :

1. Drop out of girls from school
2. Teenage pregnancy





3. Sleepless night
4. Dizziness in schools
5. Fighting in water sites

Women identified :

1. Walking long distances to search for water
2. Harassment from public and private water facility operators
3. Spending long hours to fetch water
4. Teenage pregnancy
5. Reduces school attendance
6. Reduces performance of school going pupil

Business leaders identified unemployment

#### **6.1.7 How have these problems being handled in your respective communities?**

Business leaders and women argued unemployment was being handled by community self-projects and lobbying to NGOs and other relevant authorities. Women also argued other household members helping children fetch water helps the youth. Community leaders argued, project proposal writing by community leaders, rehabilitation of abandoned water wells, and community water tank erection by the council and Guma helps address problems related with the youth.

#### **6.1.8 What are the specific water-related problems faced by women in your communities?**

Community leaders argued long distance to fetch water, leading to lateness to prepare food, poor hygiene due to lack of bathing. Women and business leaders argued the requirement to complete daily tasks which require water and the distance it takes to fetch water.

#### **6.1.9 How have these problems being handled in your respective communities?**

Business leaders argued community water projects and women purchasing sachet water. Women argued they use private water facilities within the community but this does not meet all their water needs. Community leaders argued this problem has been brought forth to the appropriate authorities and NGO's help supply the community with water

#### **6.1.10 What are the specific water related problems faced by children in your communities?**

Community leaders argued :

1. Teenage pregnancy
2. Timing for school interferes
3. Child labour
4. Skin diseases
5. Bullying of children in water site
6. Immoral lesson learnt from peer group
7. Security concerns

Business leaders identified:

1. Teenage pregnancy
2. Reduce attention in school
3. Reduce performance in school

Women identified:



1. children walk long distances to fetch water and then goes to school late and less attentive in class.
2. Some are been harassed and raped, leading to early pregnancy, while fetching water

#### **6.1.11 How have these problems being handled in your respective communities?**

Community leaders argued:

1. Awareness raising
2. Household community water supply project to minimize water problems
3. Appeal to government through Guma to increase water supply to be distributed in the community
4. Community water committee
5. Negotiating and dialogue with facilities or land owners for borehole project

Business people identified :

1. Massive sensitization
2. Other household members helping in fetching water

Women felt nothing was being done by their community

## **6.2 COMMUNITY AWARENESS AND PERCEPTION ABOUT THE PROJECT**

### **6.2.1 What do you know about the proposed GVWC water rehabilitation project in Freetown?**

Women and Business leaders knew little about the project. Community leaders knew about the project through their ward councillor

### **6.2.2 What type of water rehabilitation works are entailed in the project?**

Women thought the project entailed rehabilitation of some existing holding facilities, rehabilitation of networks and addition of some, construction of some catchment areas and installation of new pipe network in some communities.

Community leaders thought this project entailed, digging, excavation, plumbing, masonry and carpentry

### **6.2.3 What do you think about the project in terms of its relevance and timeliness?**

All stakeholders felt this project is very timely and relevant to their community

## **6.3 ENVISAGED PROJECT POSITIVE IMPACTS**

### **6.3.1 What are your opinions concerning the possible positive impacts of the project on people in your community?**

Community leaders thought:

1. Employment
2. Reduces social vices
3. Reducing the burden on women to fetch water

Business leaders thought:

1. Availability of pipe borne water
2. Saves household income
3. Reduces water related diseases





Women thought:

1. Availability of good quality pipe borne water
2. Saves households income
3. Reduces water related disease
4. Reduce teenage pregnancy
5. Increase school attendance
6. Increase in performance of school going pupil
7. Reduces anti-social disorder

### **6.3.2 What are the possible positive impacts of the project on community livelihoods?**

Community leaders thought :

1. Reduce the incident of diseases
2. Less expenditures of household thus making more savings
3. Increase the number of children in schools
4. More business

Business leaders thought:

1. Reduce teenage pregnancy
2. Increase school attendance
3. Increase in performance of school going pupil
4. Reduce anti-social disorder

Women identified :

1. Reduction of water related disease
2. Creation of local employment
3. Reduce cost of running water business
4. Saves time
5. Improves school attendance
6. Improves the effective and efficient learning process of children
7. Increase in the sales of food products during construction
8. Reduction in conflicts that occurs due to illegal pipe connection
9. Reduces anti-social activities among the community members.
10. Reduces child labor
11. Reduces lateness to work
12. Saves household income
13. Improves hygiene and sanitization in schools.

### **6.3.3 What are the possible positive impacts of the project on the environment (water bodies, flora, fauna, air, soil, etc.)?**

Community leaders thought:

1. Hygiene promotion with adequate water supply
2. Reduces the increment of plastic on the environment
3. Keeps the environment clean

Women thought there would be no impact on the environment.



## 6.4 ENVISAGED PROJECT NEGATIVE IMPACTS

### 6.4.1 What are your opinions concerning the possible negative impact of the project on people in your community?

Women argued :

1. Destruction of private infrastructure and displacement of business places.
2. Temporal route cut-off
3. Accident
4. Generation of mud if the project commences during the rain

Community leaders identified those who sell water might experience reduce income. Businesses argued destruction of private infrastructure

### 6.4.2 What are the possible negative impacts of the project on community livelihoods?

Women argued

1. Displacement of business places along the piping route.
2. Route (drive) cut-off during construction.
3. Damages to private properties
4. Outbreak of accident.
5. Cut-off water supply to those who have Guma connection during the project implementation phase.  
Reduces the income level of water business vendor.

Community leaders argued livelihood diversification due to displacement, petty trading and other business may be affected. Business leaders said temporal route cut –off

### 6.4.3 What are the possible negative impacts of the project on the environment (water bodies, flora, fauna, air, soil, etc.)?

Women said they are not aware of environmental problems to be caused by this project. Community leaders said pipes exposure and increased mosquitos. Business leaders said generation of mud of the project commences during the rains.

## 6.5 MITIGATION MEASURES

### 6.5.1 Suggest possible ways to avoid or reduce the negative impact of the project on people

Business sector, women and community leaders argued to compensate the affected persons by the project. And project affected persons must be involved

### 6.5.2 Suggest possible ways to avoid or reduce the negative impact of the project on community livelihood during construction.

Business sector agree creation of alternative routes and placements of sign posts where work is being constructed. Women argued the project could employ youth for their labour and purchase local materials to help the local economy

### 6.5.3 Suggest possible ways to avoid or reduce the negative impact of the project on the environment during construction.

Women argued constant public engagement on construction activities. Using safety tapes to conceal excavated - During construction process, there should be a focal person to direct places where the pipes should pass





through. The need for temporal source of water during construction for the community to survive on. Excavated areas should be covered again after the pipes are laid down areas.



## FGD Wellington/ Kissy Community

Date: 19<sup>th</sup> June 2018

Time: 1:00pm

### 7.1 GENERAL SITUATION OF COMMUNITIES WITHIN PROJECT AREA

#### 7.1.1 Identification of communities represented in FGD

- Loko town
- Koya town
- Peacock farm
- Wellington industrial estate
- Up tar road
- Mellon Street
- Tailor Street
- Maxwell Street
- Up Mountain
- Magnus street

#### 7.1.2 Congo water community Identify the predominant livelihood activities undertaken within your respective communities.

Women identified

1. Gardening
2. Stone mining
3. Petty trading
4. Wood gathering
5. Driving
6. Bike (okada) riding
7. Mechanics
8. Sand mining
9. Fishing

Businesses identified :

1. Gardening
2. Stone mining
3. Petty trading
4. Wood gathering
5. Driving
6. Bike (okada) riding
7. Mechanics
8. Sand mining
9. Fishing

Community leaders identified :

1. Stone mining
2. Driving
3. Petty trading





4. Sand mining
5. Industrial labour
6. Teaching

**7.1.3 What are the specific environmental problems experienced in your respective localities? (e.g. flooding, drought, landslide)**

Community leaders identified :

1. Flooding
2. Poor road network
3. Erosion
4. Poor waste management
5. Mud flow
6. Walls of houses collapse
7. Drought
8. Noise
9. Traffic congestion
10. Air pollution

Women identified flooding

**7.1.4 Outline the common water related diseases. For each of the common disease and epidemic, please give the possible cause.**

Group	Water related diseases	Possible cause
Business Sector	Diarrhoea	Impure drinking water
Business Sector	Cholera	Impure drinking water
Business Sector	Skin infection	Impure bathing water
Community leaders	Diarrhoea	Contaminated Water Source of water Poor waste management
Community leaders	Cholera	Contaminated Water
Community leaders		Contaminated Water
Community leaders	Mosquito Typhoid	Mosquito bite
Women	Diarrhoea	Poor waste management poor water quality
Women	Cholera	Poor waste management poor water quality
Women	Typhoid	Poor waste management poor water quality



**7.1.5 Identify the major infrastructural challenges faced by your respective communities. Which of the infrastructural changes requires the utmost attention and why?**

Women identified:

1. Lack of pipe borne water- ranked as the most needed
2. Inadequate electricity
3. Poor drainage facilities

Business sector identified :

1. Poor road network
2. Lack of pipe borne water
3. Provision of pipe borne water require the utmost attention because of the challenges women and children face in accessing water.

Community leaders identified :

1. Poor road network
2. Poor drainage
3. Water shortage
4. High population

**7.1.6 What are the water specific problems faced by youths in your communities?**

Community leaders identified:

1. Teenage pregnancy
2. It affect education
3. High risk to accident
4. Fighting in water sites

Women identified:

1. Walking long distances to search for water
2. Harassment from public and private water facility operators
3. Spending long hours to fetch water
4. Teenage pregnancy
5. Reduces school attendance
6. Reduces performance of school going pupil
7. Negative peer group influencing

Businesses said unemployment

**7.1.7 How have these problems being handled in your respective communities?**

Businesses said unemployment was being handled through lobbying to the required stakeholders. Women said the problems identified were being handled by community sensitization from local NGOs and other law enforcement agencies. Women also said other members of the household also fetching water further reduced burden on the youth. Community leaders said consultation with leaders for external support as well as individual household water wells

**7.1.8 What are the specific water-related problems faced by women in your communities?**

Community leaders said:





1. Quarrels and fighting in water sites
2. Lateness to work places

Women said :

1. Daily burdens of water availability for use
2. Maintaining the water and sanitation level of the home in order to maintain good health

Businesses said:

1. Covering of long distance and rough terrain to access water
2. Cholera, diarrhea and skin disease attacks as a result of the poor quality of water
3. Spends much of the household income in accessing water thereby depriving other areas of the home

#### **7.1.9 How have these problems being handled in your respective communities?**

Community leaders said:

1. Alternative water site
2. Enforcement of community bylaws
3. Community water project

Women said some community members with well or boreholes allow people to use their water facilities to certain limitations.

Businesses said :

1. Community water projects
2. Boiling before drinking and also apply chlorine before drinking
3. Other household members helps in fetching water

#### **7.1.10 What are the specific water related problems faced by children in your communities?**

Businesses said

1. Increase in the rate of teenage pregnancy
2. Spends much time in accessing water
3. Drops in school attendance
4. Reduces the performances of children in school

Community leaders said

1. High risk to accident
2. Reduction of study time affect education
3. Immoral lesson learnt from peer group influence
4. Stress to children leading to poor performance of children in schools

Women said :

1. Spending long hours at water points to fetch water
2. Bullied by some other bigger children in the process of fetching water

#### **7.1.11 How have these problems being handled in your respective communities?**

Businesses said:



1. Other household members helps in fetching water
2. Community water projects and stakeholders are involved in massive sensitization

Community leaders said

1. Provision of water sources
2. Community water tank erection

Women said nothing much had been done by their community

## **7.2 COMMUNITY AWARENESS AND PERCEPTION ABOUT THE PROJECT**

### **7.2.1 What do you know about the proposed GVWC water rehabilitation project in Freetown?**

Community leaders women and business leaders had little to no knowledge about the project.

What do you think about the project in terms of its relevance and timeliness?

All stakeholders thought the project was timely and relevant to their community

## **7.3 ENVISAGED PROJECT POSITIVE IMPACTS**

### **7.3.1 What are your opinions concerning the possible positive impacts of the project on people in your community?**

Community leaders said:

1. Employment
2. Reduce stress on the habitat
3. Improve academic performance

Women said :

1. Drastic reduction in water related diseases and teenage pregnancy
2. Increase school attendance and performance
3. Availability of good quality water supply at a reasonable cost, as compared to private vendors

Business leaders said:

1. Proper hygiene
2. Availability of pipe borne water
3. Reduction in the rate of water related diseases

### **7.3.2 What are the possible positive impacts of the project on community livelihoods?**

community leaders said:

1. Provide safe drinking water
2. Reduce the problem of inadequate water

Women said the construction phase will create jobs for the youth and increase local transactions in terms of selling local materials. Also the availability of good drinking water will increase community health and sanitation level to higher standards.

Business leaders said :





1. Improvements in school attendance
2. Savings to household income and time

**7.3.3 What are the possible positive impacts of the project on the environment (water bodies, flora, fauna, air, soil, etc.)?**

Community leaders said

1. Improvements in health status
2. Improvements in vegetation

Women said there will be minor impact on soil quality due to excavation and water quantity. Increase in air pollution if works are done in the dry season and increase in noise levels within the area.

## **7.4 ENVISAGED PROJECT NEGATIVE IMPACTS**

**7.4.1 What are your opinions concerning the possible negative impact of the project on people in your community?**

Business said

- 1 Destruction of private infrastructure and displacement of business places.
- 2 Temporal route cut-off
- 3 Accident
- 4 Generation of mud if the project commences during the rain

Women said :

- 1 Displacement of business centers
- 2 Traffic due to works
- 3 Possible erosion and contamination of some water bodies within the vicinity.
- 4 Possibility of accidents

Community leaders:

1. Employment
2. Reduce stress on the habitat
3. Improve academic performance
4. Provide safe drinking water
5. Reduce the problem of inadequate water
6. Saves can be made
7. Improve on health status
8. Improve vegetation plants

**7.4.2 What are the possible negative impacts of the project on community livelihoods?**

Women said :

- 1 Displacement of business centers
- 2 Traffic due to works
- 3 Possible erosion and contamination of some water bodies within the vicinity.
- 4 Possibility of accidents

Community leaders said :



1. Difficulty in relocation upon the way of identifying a new location
2. Water dependent traders can now be throw off the place
3. Reduces income level
4. Tampered with the vegetation
5. Disturb the water, soil, flora and fauna of the environment

Business said :

1. Destruction of private infrastructure
2. Displacement of business places
3. Route cut-off
4. Accidents

#### **7.4.3 What are the possible negative impacts of the project on the environment (water bodies, flora, fauna, air, soil, etc.)?**

Community leaders:

1. Difficulty in relocation upon the way of identifying a new location
2. Water dependent traders can now be throw off the place
3. Reduces income level
4. Tampered with the vegetation
5. Disturb the water, soil, flora and fauna of the environment

Women said they are not really aware of environmental problems to be caused by this project

## **7.5 MITIGATION MEASURES**

### **7.5.1 Suggest possible ways to avoid or reduce the negative impact of the project on people**

All stakeholders suggested compensation of affected persons

### **7.5.2 Suggest possible ways to avoid or reduce the negative impact of the project on community livelihood during construction.**

Community leaders recommended:

1. Adequate timely sensitization
2. Alternative livelihood diversification and provision of livelihood
3. Compensation
4. Adequate and prompt compensation
5. Community involvement in planning and implementation process
6. Participation of affected persons

**Women suggested** the project uses labour available in the community and buy local materials within the community if needed

Businesses suggested :

1. Relocate business places
2. Establishment temporal new routes
3. Placement of signs on working sites





**7.5.3 Suggest possible ways to avoid or reduce the negative impact of the project on the environment during construction.**

Businesses recommended :

1. Community involvement in the said project
2. Making use of local labor and expert
3. Making use of local material like stone and sand
4. Community sensitization about the said project

Women recommended:

1. Creation of diversions to control traffic and reduce accident probability
2. Use of safety signs and tapes where necessary
3. Immediate closure of excavated pits after pipe installation
4. Control noise levels, air pollution and spillage of hazardous materials into the soil and water bodies

Community leaders said :

1. We appeal Guma to embark on forestation project
2. Rehabilitation of abandoned community water sources/development of potential water supply



## Appendix 7: Questionnaire Form





## Appendix 7 – Questionnaire Form

This questionnaire is for the Environmental, Social and Health Impact Assessment of the Rehabilitation of Freetown's Water Supply Project. This will provide baseline information on how the communities are effected. Participation in the questionnaire is voluntary. No information will be released that could be used to identify the participants. Has informed consent been provided?

- Yes
- No

### SECTION A: Socio-economic and Demographic Characteristics

How many people are currently living in your household (indication the number of people in each age bracket)

- Under 15
- 15 to 35
- 35 to 60
- Over 60

Are you head of your household?

- Yes
- No

If no, what is your relationship to your head of household?6/21/2018 Freetown Water Supply Questionnaire v.2

- Spouse/Wife/Husband
- Father/Mother
- Son/Daughter
- Other

What is your tenure in your place of residence?

- Caretacker
- Owner/Landlord/Landlady
- Tentant
- Other

If other, please specify.

What is your monthly income?

- Less than Le 500,000
- Le 500,000 – Le 1,999,000
- Le 2,000,000 – Le 5,000,000
- Above Le 5,000,000
- Not in Employment

What is most important economic activity of your household head/main income?



How far is the workplace of the main income earner of your household?

- Less than 1km
- distance- 1km to 5km
- More Than 5km

## SECTION B: Sources of Potable water

What is the main source of water in dry season for you and members of your household?	Piped	Protected Well	Unprotected Well	Rainwater	Other
Drinking Water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Domestic Water (Cleaning, Laundry, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If other, please specify					

What is the main source of water in wet season for you and members of your household?	Piped	Protected Well	Unprotected Well	Rainwater	Other
Drinking Water	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Domestic Water (Cleaning, Laundry, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If other, please specify					

What is the quality of drinking water available to you and your household members?	Good	Indifferent	Poor	Don't Know
Taste	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Smell/Odour	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Colour	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Who is responsible for fetching drinking water for your household?

- Men
- Women
- Children

What is the average time spent per day to fetch drinking water for your household?

What are the top major problems you encounter with the source of drinking water





**1st choice**

- |                                    |                                     |   |
|------------------------------------|-------------------------------------|---|
| <input type="radio"/> Distance     | <input type="radio"/> Seasonality   | <input type="radio"/> Over Crowded        |
| <input type="radio"/> Poor Quality | <input type="radio"/> Poor Pressure | <input type="radio"/> Intermittent Supply |
| <input type="radio"/> Harassment   | <input type="radio"/> Other         |   |

**2nd choice**

- |                                    |                                     |   |
|------------------------------------|-------------------------------------|---|
| <input type="radio"/> Distance     | <input type="radio"/> Seasonality   | <input type="radio"/> Over Crowded        |
| <input type="radio"/> Poor Quality | <input type="radio"/> Poor Pressure | <input type="radio"/> Intermittent Supply |
| <input type="radio"/> Harassment   | <input type="radio"/> Other         |   |

**3rd choice**

- |                                    |                                     |   |
|------------------------------------|-------------------------------------|---|
| <input type="radio"/> Distance     | <input type="radio"/> Seasonality   | <input type="radio"/> Over Crowded        |
| <input type="radio"/> Poor Quality | <input type="radio"/> Poor Pressure | <input type="radio"/> Intermittent Supply |
| <input type="radio"/> Harassment   | <input type="radio"/> Other         |   |

If other please specify

What are the top major problems you encounter with the source of domestic water?

**1st choice**

- |                                    |                                     |   |
|------------------------------------|-------------------------------------|---|
| <input type="radio"/> Distance     | <input type="radio"/> Seasonality   | <input type="radio"/> Over Crowded        |
| <input type="radio"/> Poor Quality | <input type="radio"/> Poor Pressure | <input type="radio"/> Intermittent Supply |
| <input type="radio"/> Harassment   | <input type="radio"/> Other         |   |

**2nd choice**

- |                                    |                                     |   |
|------------------------------------|-------------------------------------|---|
| <input type="radio"/> Distance     | <input type="radio"/> Seasonality   | <input type="radio"/> Over Crowded        |
| <input type="radio"/> Poor Quality | <input type="radio"/> Poor Pressure | <input type="radio"/> Intermittent Supply |
| <input type="radio"/> Harassment   | <input type="radio"/> Other         |   |

**3rd choice**

- |                                    |                                     |   |
|------------------------------------|-------------------------------------|---|
| <input type="radio"/> Distance     | <input type="radio"/> Seasonality   | <input type="radio"/> Over Crowded        |
| <input type="radio"/> Poor Quality | <input type="radio"/> Poor Pressure | <input type="radio"/> Intermittent Supply |
| <input type="radio"/> Harassment   | <input type="radio"/> Other         |   |

If other please specify



### **SECTION C: Project Awareness and Importance**

Are you aware of the proposed GVWC water rehabilitation project in your area?

- Yes
- No

Brief Description of Project within the community area

### **SECTION D: Project Impacts**

Does this project has positive impacts on your livelihood activities?

- Yes
- No
- Don't Know

If Yes, describe the project's positive impacts on your livelihood activities

Does this project has negative impacts on your livelihood activities?

- Yes
- No
- Don't Know

If Yes, describe the project's negative impacts on your livelihood activities

» What are the possible impacts of the project on the following:

- Communication Networks (Roads, Telephone, Etc)
- Community Livelihoods
- Water, Sanitation and Hygiene
- Other

» What are the possible measures would limit these impacts on the following:

- Communication Networks (Roads, Telephone, Etc)
- Community Livelihoods
- Water, Sanitation and Hygiene
- Other

### **Research Control (to be completed by the interviewer)**

What is the gender of the main interviewee?

- Male
- Female

Did persons present contribute answers to the questions?

- Yes
- No





Main Language of Interviews

Community

Constituency

GPS coordinates (for area information only- to ensure fair representation within each area)



## Appendix 8: Key Informant Interviews Transcripts





# Appendix 8- Key Informant Interviews

## 1. Freetown City Council

### Meeting Details

<b>Attendees:</b>	Onassis Walker, Ibrahim Bah, Sheka Forna and Mayor Yvonne Aki-Sawyers
<b>Date and Time:</b>	17 <sup>th</sup> July 2018 time 12pm
<b>Location:</b>	Freetown City Council

### Meeting Structure

<b>Are they aware of this project?</b>	Yes / No  The Mayor is aware of the project and has been involved in the project since its inception. The Mayor helped shape the project's priorities through working to create the terms of reference working with DFID to get the project approved by Sierra Leonean Parliament. The Mayor has received informal updates on the progress of the project via DFID
<b>How does this project effect you?</b>	The Mayor noted the project affects the Freetown City Council as water is a major issue for the FCC and is in the right direction. She notes water or lack thereof is one of her 14 key sectors which will form the FCC's four-year transformation plan
<b>Possible Positive or Negative Impacts?</b>	<p>The Mayor notes this project provides GVWC the opportunity to receive feedback on their current policies. It also allows for collaboration between EDSA, GVWC, SLRA and other utility /road agencies to ensure when constructing they are consulting each other to prevent relaying of pipes and cables later.</p> <p>The Mayor notes although the project does remove some spaghetti pipelines it does not go far enough in removing all and as such the system will still experience leakages. Moreover the Mayor notes the project does not address the high alkaline levels in the water and GVWC's ability to maintain a customer database and collect revenue – the latter which may impact on the project's sustainability.</p>
<b>Waste Management for Construction Waste and Soil</b>	FCC do not have mechanisms to dispose of waste. Waste disposal is a challenge the FCC is currently facing and would suggest joint procurement strategy with GVWC to address this issue
<b>Street Training within the Project Area and Potential Effects</b>	The Mayor notes the FCC are in the process of moving street traders. They are using a phased approach to move the traders into a temporary location. The idea is to build markets for the traders, the FCC will tender the project in the rainy season and begin construction in the dry seasons. The Mayor says if the project can provide a list of areas with traders that will be affected she can take this into account.



<b>City Wide Policies that effect or are effected by this project?</b>	Notes the FCC are working on flood mitigation policies, however the FCC lack revenue so fundraising has been the main source of financing this initiative. The FCC will be conducting a ward by ward questionnaire to see what the key focus of each ward are and to bring forth a citywide policy towards the prioritises, the Mayor suspects water will be high on the list.
<b>How does this project fit within the aims of the FCC?</b>	The project is core to one of FCC's focus areas, the desire that pipe-borne water be available to more people.
<b>Other</b>	The Mayor notes she believes she should be closely involved in the general development & oversight of the project, given their central role in the city's management and development. FCC could be key to unblocking obstacles.

## 2. Ministry of Land, Planning and Environment

### Meeting Details

<b>Attendees</b>	Permanent Secretary; Environment Officer;
<b>Date and Time</b>	Friday 6 July 13:00
<b>Location</b>	Youyi Building, Freetown

### Meeting Structure

<b>Are they aware of this project?</b>	Yes – the Ministry is very aware of the project and has already been engaged and participating in particular site surveys that have been conducted. A representative of the ministry has been nominated to co-ordinate with the project.
<b>If no or limited:</b>	<p>Between 2017 and 2019, Freetown Water, a consortium of IMC Worldwide, BAM Nuttall, Atkins and 3BMD will design and implement the rehabilitation of the water network of Freetown. The Project aims to improve the living situation for the citizens of Freetown through the improved public service delivery of fresh, clean water. The impact of this will be to increase sustainable access to safe water in Freetown, reduce the risk of climate-related events and reduce morbidity and mortality rates linked to water-borne and vector-linked diseases.</p> <p>An initiative of the Government of Sierra Leone (GoSL), specifically the Ministry of Water Resources and this programme is funded by the UK Department for International Development (DFID).</p>
<b>We are undertaking an ESHIA for this</b>	The ESHIA process is to report the environmental and social impacts of the Freetown Water Rehabilitation Project with the aim of managing and mitigating its possible adverse impacts.





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GVWC, supported by IMC, applied for 3 no. EIA Licences in November 2017. The response to the screening report classed the overall project is assessed as Category A - the highest category. This is due to the potential scale of the social and environmental impacts.

The three licenses were submitted to cover elements of the Main Project as follows:

- 1) Work Package 1 – Guma Dam and Water Treatment Works (WTW).
- 2) Work Package 3, 5, 9 – Transmission and Distribution Mains at locations across the city.
- 3) Work Package 6 – Transmission and Distribution Mains Rehabilitation from Orugu Sources to Allen Town

IMC Worldwide and Njala Environmental Technicians (NET) undertook the Scoping study on behalf of GVWC, supported by the other consortium members.

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**How does this project effect you?**

The Ministry works in areas that will be affected by this project. Through managing land registrations and environmental issues there is a natural link between the two. Water supply has a direct link with forestation and henceforth the ministry feels it has a vital role to play.

You cannot design a major rehabilitation without considering the environment – it needs a holistic approach. This is where the ministry feels it can add real value to the project.

It is mentioned that the project needs to plan the network system in line with their planning regulations.

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**Possible Positive or Negative Impacts?**

**Positive:** This will of course benefit people if they are able to have better access to safe water supplies.

Information sharing could benefit the ministry e.g. a thorough audit of GVWC's assets including GIS data. Also the collection of GIS information in areas in which the project will be active.

**Negatives:** Deforestation; human encroachment. GVWC must ensure that they have environmental safeguards in place around their facilities.

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**Planning process within the project area**

GVWC must ensure they register their assets with the Ministry as at present they do not properly engage with them.

The ministry note two key issues for them:

1. GVWC must protect their current assets
  2. The utility company must engage with the Ministry regarding any new assets moving forward
-



<b>Land rights and ownership within the project area</b>	Data exists as to ownership. This is held in ledgers. The Ministry can provide information on request, and help validate claims.
<b>What data is available on land ownership?</b>	There is data available and they would be able to provide layouts/access maps. However, the ministry is keen to know what kind of data the project/GVWC would be able to provide them with. They would like to know where GVWC assets are.
<b>Resettlement</b>	The Ministry are able to help the process of resettlement as they will be able to validate certain claims. While at present there is not a specific policy or Act that can be utilised there are other statutory instruments to help the RAP consultants.

### 3. Ministry of Health

#### Meeting Details

**Attendees:** Brima Kargbo, Chief Medical Officer, Ansumana Sillah, Director of Environmental Health, Ministry of Health

**Date and Time** Wednesday 4 July @ 15:00

**Location** Youyi Building, Freetown

#### Meeting Structure

<b>Are they aware of this project?</b>	No
<b>If no or limited:</b>	<p>Between 2017 and 2019, Freetown Water, a consortium of IMC Worldwide, BAM Nuttall, Atkins and 3BMD will design and implement the rehabilitation of the water network of Freetown. The Project aims to improve the living situation for the citizens of Freetown through the improved public service delivery of fresh, clean water. The impact of this will be to increase sustainable access to safe water in Freetown, reduce the risk of climate-related events and reduce morbidity and mortality rates linked to water-borne and vector-linked diseases.</p> <p>An initiative of the Government of Sierra Leone (GoSL), specifically the Ministry of Water Resources and this programme is funded by the UK Department for International Development (DFID).</p>
<b>We are undertaking an ESHIA for this</b>	<p>The ESHIA process is to report the environmental and social impacts of the Freetown Water Rehabilitation Project with the aim of managing and mitigating its possible adverse impacts.</p> <p>GVWC, supported by IMC, applied for 3 no. EIA Licences in November 2017. The response to the screening report classed the overall project is</p>





	<p>assessed as Category A - the highest category. This is due to the potential scale of the social and environmental impacts.</p> <p>The three licenses were submitted to cover elements of the Main Project as follows:</p> <ol style="list-style-type: none"><li>1) Work Package 1 – Guma Dam and Water Treatment Works (WTW).</li><li>2) Work Package 3, 5, 9 – Transmission and Distribution Mains at locations across the city.</li><li>3) Work Package 6 – Transmission and Distribution Mains Rehabilitation from Orugu Sources to Allen Town</li></ol> <p>IMC Worldwide and Njala Environmental Technicians (NET) undertook the Scoping study on behalf of GVWC, supported by the other consortium members.</p>
<b>How does this project effect you?</b>	<p>The Ministry were very keen to hear of a project of this nature, particularly the distribution networks and the spaghetti pipes. As the project seeks to improve health through access to safer water, the project aligns with much of the work the ministry carries out.</p>
<b>Possible Positive or Negative Impacts?</b>	<p><b>Positive impacts:</b> Burying the distribution network will reduce the incidence of contamination through proximity to waste. <b>A ‘sealed’ system will help guarantee the quality of water.</b> Reducing waterborne diseases; raising livings standards; increased economic activity</p> <p><b>Negative impacts:</b> It was made clear that the project must make a conscious decision and effort to involve communities to ensure they feel involved and have a strong sense of ownership over the rehabilitation works. This will help to mitigate vandalism in the long term.</p>
<b>Water Related Diseases-</b> <ul style="list-style-type: none"><li>• Causes</li><li>• Locations</li></ul>	<p>There is a city-wide danger of disease - due to water contamination and intercepted pipes with waste, water related diseases are widespread. Such diseases include Cholera, Typhoid, Bilhartzia and Scabies.</p>
<b>Sanitation Issue</b>	<p>There is a huge sanitation problem within Freetown. There is extensive contamination of the water as sewage, rubbish and waste frequently intercepts into the water system. Moreover, matters are made worse as transit points across parts of the town have been removed.</p>
<b>Benefits of improved access to water on Health</b>	<p>Improved access to water would have tremendous impacts on health and wellbeing. Water-related diseases such as cholera would decrease significantly if people were able to access safe supplies.</p>
<b>Other</b>	<p>The ministry would like to be involved. FCC should also be included.</p>



## 4. Ministry of Water Resources

### Meeting Details

<b>Attendees:</b>	Minister
<b>Date and Time</b>	9/07/2018
<b>Location</b>	Brookfields, Freetown

### Meeting Structure

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<b>Are they aware of this project?</b>	Yes
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<b>If no or limited:</b>	<p>Between 2017 and 2019, Freetown Water, a consortium of IMC Worldwide, BAM Nuttall, Atkins and 3BMD will design and implement the rehabilitation of the water network of Freetown. The Project aims to improve the living situation for the citizens of Freetown through the improved public service delivery of fresh, clean water. The impact of this will be to increase sustainable access to safe water in Freetown, reduce the risk of climate-related events and reduce morbidity and mortality rates linked to water-borne and vector-linked diseases.</p>
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An initiative of the Government of Sierra Leone (GoSL), specifically the Ministry of Water Resources and this programme is funded by the UK Department for International Development (DFID).

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<b>We are undertaking an ESHIA for this</b>	
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The ESHIA process is to report the environmental and social impacts of the Freetown Water Rehabilitation Project with the aim of managing and mitigating its possible adverse impacts.

GVWC, supported by IMC, applied for 3 no. EIA Licences in November 2017. The response to the screening report classed the overall project is assessed as Category A - the highest category. This is due to the potential scale of the social and environmental impacts.

The three licenses were submitted to cover elements of the Main Project as follows:

- 1) Work Package 1 – Guma Dam and Water Treatment Works (WTW).
- 2) Work Package 3, 5, 9 – Transmission and Distribution Mains at locations across the city.
- 3) Work Package 6 – Transmission and Distribution Mains Rehabilitation from Orugu Sources to Allen Town

IMC Worldwide and Njala Environmental Technicians (NET) undertook the Scoping study on behalf of GVWC, supported by the other consortium members.

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<b>How does this project effect you?</b>	<p>The ministry is directly affected by this project as it is mandated to manage the country's water resources. The Minister makes it clear that at present GVWC reports to the National Privatisation Commission (NPC) and not to the Ministry itself. This is something the government seeks to change, placing it back under supervision of the state and not private sector. This is addressed in the 2017 Guma Valley Water Company Act, which mandates the ministry with some oversight responsibilities for GVWC.</p> <p>The Minister further mentioned that they are looking at alternative sources of water supplies outside of GVWC - potentially a source from Rokel River to help supply water to the East. This project is at pre-feasibility stage &amp; is at least 3 years away from implementation.</p> <p>The ministry indeed supports GVWC and would like to see it reach a financial situation where it can pay for itself.</p> <p>We mentioned the possibility of bringing together Ministers from the key infrastructural Ministries (Energy; Transport; Works&amp; Public Assets; Water Resources) to discuss the project across the board to ensure collaboration and communication is occurring within government. The Minister responded saying he would rather discuss the project at Cabinet Level first.</p>
<b>Possible Positive or Negative Impacts?</b>	<p><b>Positive:</b> The Ministry is ultimately responsible for the supply of water across Sierra Leone, therefore this project is undoubtedly seen as good for the people of Freetown as well as the Ministry itself. Dry season shortages, in particular, may be addressed.</p> <p><b>Negative:</b> The Minister perceives no real negative – water supply is a serious concern and hence this project is a necessity.</p> <p>The increased supply of water may have effects with regard to waste water.</p>
<b>Water situation within the project area and Freetown</b>	<p>The water situation is a serious concern in Freetown due to a number of compounding factors: At present, it is only providing approximately 40% of the population. During the dry season this drops to 20%. The majority of citizens are dependent upon wells or have to walk large distances to collect water. The minister was keen to understand how this project would tie in with the planned Rokel River project.</p>
<b>Sanitation situation within and Freetown</b>	<p>Again, Freetown has a huge sanitation problem. The Minister notes that he aims to set up a department looking specifically at developing sewage/treatment plants for Freetown. Ideally, he would like to have seen this implemented before the implementation of the FWRP.</p>
<b>Sector wide Policy</b>	<p>The Ministry is currently working with the MCC on softer policies. A new institution will be set up which has already passed through Parliament called the Water Resources Agency that will become the source for policy development. The Minister referred us to meet with a member of the ministry for obtain more specific policy details.</p>
<b>WASH Information Management Unit- What data is</b>	<p>There is some data available but it is limited and mainly focuses on the water rural supply system.</p>



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**available of this unit?**

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**Other** In relation to work item 6.5 the Minister said he would be willing to send a letter to the NPAA asking for the surrounding area to be converted into protected area. For him to do this, we need to provide him with detailed technical information and reasoning behind it.

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## 5. Ministry of Works

### Meeting Details

**Attendees:** Permanent Secretary

**Date and Time** 9/7/2018

**Location** New England

### Meeting Structure

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**Are they aware of this project?** Some have knowledge, but it is limited.

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**If no or limited:** Between 2017 and 2019, Freetown Water, a consortium of IMC Worldwide, BAM Nuttall, Atkins and 3BMD will design and implement the rehabilitation of the water network of Freetown. The Project aims to improve the living situation for the citizens of Freetown through the improved public service delivery of fresh, clean water. The impact of this will be to increase sustainable access to safe water in Freetown, reduce the risk of climate-related events and reduce morbidity and mortality rates linked to water-borne and vector-linked diseases.

An initiative of the Government of Sierra Leone (GoSL), specifically the Ministry of Water Resources and this programme is funded by the UK Department for International Development (DFID).

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**We are undertaking an ESHIA for this** The ESHIA process is to report the environmental and social impacts of the Freetown Water Rehabilitation Project with the aim of managing and mitigating its possible adverse impacts.

GVWC, supported by IMC, applied for 3 no. EIA Licences in November 2017. The response to the screening report classed the overall project is assessed as Category A - the highest category. This is due to the potential scale of the social and environmental impacts.

The three licenses were submitted to cover elements of the Main Project as follows:

1) Work Package 1 – Guma Dam and Water Treatment Works (WTW).

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	<p>2) Work Package 3, 5, 9 – Transmission and Distribution Mains at locations across the city.</p> <p>3) Work Package 6 – Transmission and Distribution Mains Rehabilitation from Orugu Sources to Allen Town. IMC Worldwide and Njala Environmental Technicians (NET) undertook the Scoping study on behalf of GVWC, supported by the other consortium members.</p>
<b>How does this project effect you?</b>	<p>The Ministry stated that it is fundamentally important that the project engages with them on three key areas:</p> <ol style="list-style-type: none"><li>1) Communities: It is noted that the project must formally inform the ministry in regard to resettlement.</li><li>2) Procurement &amp; Quality of materials: The ministry must ensure quality of materials that are being utilised in the project. They are currently working with Angelique International – an Engineering Procurement Construction Company whom deal with the ministries procurement processes.</li><li>3) Compensation: The Ministry is in charge of evaluating and issuing compensation to civilians. Henceforth, when it comes to resettlement they will need to be involved.</li></ol>
<b>Possible Positive or Negative Impacts?</b>	<p><b>Positives:</b> Water is a necessity for humans and so any project that aims to increase access is good.</p> <p><b>Negatives:</b> Lack of communication could become a real issue. It is suggested the project engages with the Ministry of Information in order to create real awareness amongst communities. This will in turn help to mitigate vandalism in the long term and improve sustainability.</p> <p>It is also noted that in order to mitigate conflict across government ministries and increase collaboration, the project should hold a meeting with the key infrastructure-related departments. This will also help to clarify everybody's role.</p>
<b>National Strategy on construction and maintenance?</b>	<p>There is no national strategy for construction and maintenance. Rather, the ministry has basic standards and guidelines that need to be upheld across various sectors.</p>
<b>Building Permits?</b>	<p>BAM must be registered with the Ministry of Works and Public Assets as well as Institute of Architecture and Institute of Engineers.</p>

## 6. National Protected Areas Authority

### Meeting Details

<b>Attendees:</b>	NPAA
<b>Date and Time</b>	10/7/2018 @ 14:00
<b>Location</b>	NPAA Office



## Meeting Structure

<b>Are they aware of this project?</b>	<b>Yes</b>
<b>If no or limited:</b>	<p>Between 2017 and 2019, Freetown Water, a consortium of IMC Worldwide, BAM Nuttall, Atkins and 3BMD will design and implement the rehabilitation of the water network of Freetown. The Project aims to improve the living situation for the citizens of Freetown through the improved public service delivery of fresh, clean water. The impact of this will be to increase sustainable access to safe water in Freetown, reduce the risk of climate-related events and reduce morbidity and mortality rates linked to water-borne and vector-linked diseases.</p> <p>An initiative of the Government of Sierra Leone (GoSL), specifically the Ministry of Water Resources and this programme is funded by the UK Department for International Development (DFID).</p>
<b>We are undertaking an ESHIA for this</b>	<p>The ESHIA process is to report the environmental and social impacts of the Freetown Water Rehabilitation Project with the aim of managing and mitigating its possible adverse impacts.</p> <p>GVWC, supported by IMC, applied for 3 no. EIA Licences in November 2017. The response to the screening report classed the overall project is assessed as Category A - the highest category. This is due to the potential scale of the social and environmental impacts.</p> <p>The three licenses were submitted to cover elements of the Main Project as follows:</p> <ol style="list-style-type: none"> <li>1) Work Package 1 – Guma Dam and Water Treatment Works (WTW).</li> <li>2) Work Package 3, 5, 9 – Transmission and Distribution Mains at locations across the city.</li> <li>3) Work Package 6 – Transmission and Distribution Mains Rehabilitation from Orugu Sources to Allen Town. IMC Worldwide and Njala Environmental Technicians (NET) undertook the Scoping study on behalf of GVWC, supported by the other consortium members.</li> </ol>
<b>How does this project effect you?</b>	<p>The NPAA works to promote biodiversity conservation, wildlife management, research and provides for the sale of ecosystems services in the National Protected Areas. Henceforth, the work of the FWRP overlaps extensively with the NPAA in terms of the socio-environmental impacts of the works.</p> <p>A primary concern of the NPAA is deforestation.</p> <p>The NPAA will be engaged in oversight with regard to works.</p>
<b>Possible Positive or Negative Impacts?</b>	<b>Positives:</b> This is undoubtedly a positive project for the people of Freetown who are in need of increased access to water supply as well as and better quality.





	<p>The NPAA view this as essential development related work, which they fully support.</p> <p><b>Negatives:</b> A key concern is increased encroachment. The NPAA are concerned that through the creation of pathways people will have better access to the National Park.</p> <p>There is a particular concern regarding tree cutting for access, which was requested be kept to a minimum.</p> <p>There is also lack of clarity on the part of the NPAA around responsibility of guarding the area of works. Does this fall to GVWC or to the NPAA itself or a combination of the two?</p>
<b>Biodiversity around Mongegba/ Mortem/ Guma Dam</b>	NPAA are willing to share their biodiversity reports which cover the entire National Park. The reports do not relate to specific areas but are a general reflection of the area in question. They have no record of any particular unique species in the area of planned works, although they view it as equally important as the rest of the Protected Area.
<b>Encroachment into the National Park /How to limit encroachment</b>	<p>The NPAA mention two specific ways to limit encroachment into the National Park:</p> <ol style="list-style-type: none"> <li>1. Collaboration between invested parties such as Tacugama, GVWC and the NPAA itself. In order to protect the Park, it is a necessity that the parties work as a team and provide the necessary resources together.</li> <li>2. Workers/Guides/Guards need to be identifiable in order to limit access.</li> </ol>
<b>Enforcement of the buffer zone?</b>	More resources need to be utilised to patrol these buffer zones.
<b>National Park Policies?</b>	There are not specific policies that relate to the National Park. The NPAA recommend to read the Act in order to obtain more information.
<b>Other</b>	The NPAA endorse the work of the FWRP and are willing to engage and help in any way needed. Moreover, the organisation stated it would be prepared to put in an application to the Ministry of Land, Planning and Environment in relation to work item 6.5 and the expansion of the protected areas.

## 7. Sierra Leone Electricity and Water Regulatory Commission

### Meeting Details

**Attendees** Tamba Kellie, Director General, Sierra Leone Electricity and Water Regulatory Commission; Mohamed Kargbo, Head of Water; Sesay, Head of Electricity



**Date and Time** Wednesday 4 July 9:00

**Location** 55 Berwick Street, Freetown

### Meeting Structure

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**Are they aware of this project?** Yes they are aware of the project but there is limited understanding around the scope and timeline.

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**If no or limited:** Between 2017 and 2019, Freetown Water, a consortium of IMC Worldwide, BAM Nuttall and Atkins will design and implement the rehabilitation of the water network of Freetown. The Project aims to improve the living situation for the citizens of Freetown through the improved public service delivery of fresh, clean water. The impact of this will be to increase sustainable access to safe water in Freetown, reduce the risk of climate-related events and reduce morbidity and mortality rates linked to water-borne and vector-linked diseases.

An initiative of the Government of Sierra Leone (GoSL), specifically the Ministry of Water Resources and this programme is funded by the UK Department for International Development (DFID).

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**We are undertaking an ESHIA for this** The ESHIA process is to report the environmental and social impacts of the Freetown Water Rehabilitation Project with the aim of managing and mitigating its possible adverse impacts.

GVWC, supported by IMC, applied for 3 no. EIA Licences in November 2017. The response to the screening report classed the overall project is assessed as Category A - the highest category. This is due to the potential scale of the social and environmental impacts.

The three licenses were submitted to cover elements of the Main Project as follows:

- 1) Work Package 1 – Guma Dam and Water Treatment Works (WTW).
- 2) Work Package 3, 5, 9 – Transmission and Distribution Mains at locations across the city.
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IMC Worldwide and Njala Environmental Technicians (NET) undertook the Scoping study on behalf of GVWC, supported by the other consortium members.

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**How does this project effect you?** The Commission state that this project intertwines with their work in a significant way as it addresses much of the issues the Commission have been working on. For example, as the project seeks to improve distribution, the Commission are focused on improving the quality of water supply for consumers. Furthermore, they note consumers' dissatisfaction with GVWC/utility companies' lack of response to issues and thus hope this project will address some of these problems.

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**Possible Positive or Negative Impacts?**

**Positive:** As the quality of service improves the consumer will be more willing to pay and therefore GVWC will begin to accumulate capital for future investment.

Illegally connected consumers will be brought into the formal sector.

**Negative:** As works progress, issues will arise around disruption to water supply and resettlement. To mitigate these risks, it is a necessity to continually communicate effectively to communities about what is happening.

There was also mention that while the project seeks to increase effectiveness, GVWC must work to build capacity in order to manage and maintain the network.

- The Commission has just conducted a study on the informal water sector and off-grid water provision. It is important to engage civilians who are illegally accessing water supplies in order to mitigate damage to the rehabilitation works.
- Furthermore, the project must seek to include the informal sector both as a moral obligation as well as being an economic benefit in the long run.
- **Action required:** The Commission noted it is a requirement to obtain a permit from them in order to carry out the works.
- The Commission requested that IMC Worldwide/GVWC share with them the feasibility study related to the project.
- It was suggested that a baseline study be conducted, so as to allow for measurement of benefits accruing from works.

## 8. WASH NET

### Meeting Details

<b>Attendees</b>	Musa Ansumana Soko, Chairman, WASH NET;
<b>Date and Time</b>	Wednesday 4 July
<b>Location</b>	Jomo Kenyatta Road, Freetown

### Meeting Structure

**Are they aware of this project?**

**No – explanation required**

**If no or limited:**

Between 2017 and 2019, Freetown Water, a consortium of IMC Worldwide, BAM Nuttall, Atkins and 3BMD will design and implement the rehabilitation of the water network of Freetown. The Project aims to improve the living situation for the citizens of Freetown through the improved public service delivery of fresh, clean water. The impact of this will be to increase sustainable access to safe water in Freetown, reduce the risk of climate-



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related events and reduce morbidity and mortality rates linked to water-borne and vector-linked diseases.

An initiative of the Government of Sierra Leone (GoSL), specifically the Ministry of Water Resources and this programme is funded by the UK Department for International Development (DFID).

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**We are undertaking an ESHIA for this**

The ESHIA process is to report the environmental and social impacts of the Freetown Water Rehabilitation Project with the aim of managing and mitigating its possible adverse impacts.

GVWC, supported by IMC, applied for 3 no. EIA Licences in November 2017. The response to the screening report classed the overall project is assessed as Category A - the highest category. This is due to the potential scale of the social and environmental impacts.

The three licenses were submitted to cover elements of the Main Project as follows:

- 1) Work Package 1 – Guma Dam and Water Treatment Works (WTW).
- 2) Work Package 3, 5, 9 – Transmission and Distribution Mains at locations across the city.
- 3) Work Package 6 – Transmission and Distribution Mains Rehabilitation from Orugu Sources to Allen Town

IMC Worldwide and Njala Environmental Technicians (NET) undertook the Scoping study on behalf of GVWC, supported by the other consortium members.

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**How does this project effect you?**

**WASH-Net's** mission is to contribute to the development of Sierra-Leone by supporting the poor and marginalized groups to access safe water, improved sanitation and hygiene as a human right, engage government and other stakeholders to ensure that these services are delivered effectively to all. We will do this by advocating for increasing numbers of poor households and vulnerable groups to be able to enjoy the benefits of safe water and sanitation services for domestic and productive use that is reducing poverty.

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**Possible Positive or Negative Impacts?**

**Positive:** Positive on the lives of people in a general sense. Providing water to certain areas will help alleviate certain social vices e.g. sexual predation & extortion at public water points. Reduction of leakages will help guarantee supply. A long term strategy is preferable over quick fixes.

**Negative:** As supply is assured, so demand will rise. Capacity needs to be increased to manage it. Has GVWC the structures in place to deal with aggrieved consumers? Robust customer relations will be required to meet increased expectations.

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**Understanding of the water and hygiene sector**

There are compounding sector challenges; while WASH has undergone transformations in the last few years there are still numerous barriers. The expectations of citizens have risen, yet GVWC has not had the capacity to

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deal with consumer issues. GVWC has focused on short term solutions rather than long term sustainability.

WASH NET state that liquid and solid waste are a fundamental priority and to truly increase the success of the project, wastage and leakages need to be tackled so it does not intercept with water systems.

It is mentioned that there is not a separate body for sanitation in the Ministry of Health and there should be.

Many stakeholders, including private entities are wanting to enter into the sector as it develops itself however, capacity to deal with challenges still remains low.

**What are the stakeholder views in common areas of implementation?**

Many perceive that the WASH sector needs to be people-centred work. It must engage and involve communities from the grass-roots. In doing so, it is noted that behaviours and practices are more likely to shift in relation to services of this nature.

WASH NET see a vital role of civil society to educate civilians to sustain the facilities and to pay for these services. It needs a people-centred approach.

**How to maximise benefits from increasing access to water?**

This comes back to engaging with communities. If households are legally and officially connected to water supplies this will help develop attitudes and behaviours and thus increase sustainability of the network.

Things to add or done differently:

- GVWC need to focus on building relations with consumers
- GVWC need to have a presence in areas of weak connections

## 9. Tacugama Sanctuary

### Meeting Details

<b>Attendees</b>	Bala Amarasekaran, Founder & Director
<b>Date and Time</b>	10/7/2018
<b>Location</b>	Tacugama

### Meeting Structure

**Are they aware of this project?** Yes

**If no or limited:** Between 2017 and 2019, Freetown Water, a consortium of IMC Worldwide, BAM Nuttall, Atkins and 3BMD will design and implement the rehabilitation of the water network of Freetown. The Project aims to improve the living



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situation for the citizens of Freetown through the improved public service delivery of fresh, clean water. The impact of this will be to increase sustainable access to safe water in Freetown, reduce the risk of climate-related events and reduce morbidity and mortality rates linked to water-borne and vector-linked diseases.

An initiative of the Government of Sierra Leone (GoSL), specifically the Ministry of Water Resources and this programme is funded by the UK Department for International Development (DFID).

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**We are undertaking an ESHIA for this**

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- 2) Work Package 3, 5, 9 – Transmission and Distribution Mains at locations across the city.
- 3) Work Package 6 – Transmission and Distribution Mains Rehabilitation from Orugu Sources to Allen Town

IMC Worldwide and Njala Environmental Technicians (NET) undertook the Scoping study on behalf of GVWC, supported by the other consortium members.

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**How does this project effect you?**

The project extensively overlaps with the work that Tacugama carries out. One of the key aims of the conservation park is to protect the catchment areas and therefore Tacugama sees this project as an *opportunity* to continue environmental protection.

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**Possible Positive or Negative Impacts?**

**Positive:** This project is seen as a real step in the right direction towards rehabilitation, environmental protection and community engagement in and around the National Park. Work on additional weirs could provide an excuse for increased protection activity. It is perceived as only a positive.

**Negative:** A potential negative impact could be the damage caused by taking equipment to and from the sites, but this should be minimal.

There is also concern that opening up pathways could encourage encroachment, which could be addressed by closing & re-routing access post works.

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<b>Biodiversity around Mongegba; Moretm and Guma Dam</b>	Tacugama Rangers carry out biodiversity monitoring on a yearly basis and have extensive data that they would be willing to provide to the project. The organisation monitors endangered species in the area such as Picathartes bird, chimpanzees.
<b>Encroachment into the National Park</b>	It is put forward that GVWC need to liaise more with the National Protected Area Authority (NPAA). The NPAA is under-funded and therefore does not have all the resources required to guard the necessary areas. However, if GVWC were to provide some additional funding this would increase the chances of protection and limit encroachment into the National Park.
<b>How to limit encroachment</b>	<p>In more general terms, limiting encroachment could be done in two key ways:</p> <p>Firstly, it is suggested that GVWC work to provide some form of corporate social responsibility towards the communities where it extracts water from. If Guma were to give something back to these communities and were seen to be engaging with them, this would work to limit encroachment and damage to assets.</p> <p>Secondly, employment would be a beneficial mechanism to limit encroachment. It is suggested that employing members from the local community as guides would again help to engage the community in a productive way.</p>
<b>Enforcement of the buffer zone?</b>	Put a gate on the main road as opposed to closer to the Dam. This would provide protection to the entire area.
<b>Human Disturbance?</b>	<p>Again, CSR needs to be utilised as a means to involve communities.</p> <p>It is also noted that waterways are being severely polluted and contaminated by fertiliser utilised for marijuana farms. This is a serious concern for Tacugama and needs to be addressed – it is about protecting these water sources.</p>
<b>Climate and disaster resilience? Data?</b>	No data on this.
<b>Other</b>	Tacugama work under the NPAA



## **Appendix 9: Newspaper Advertisements for Public Disclosure**




**SIERRA LEONE COMMERCIAL BANK LIMITED**

# PUBLIC NOTICE ON RESUMPTION OF SATURDAY BANKING

SIERRA LEONE COMMERCIAL BANK LIMITED IS PLEASED TO INFORM ITS ESTEEMED CUSTOMERS AND THE GENERAL PUBLIC THAT THE BANK WILL RESUME SATURDAY BANKING AT ITS FREETOWN AND PROVINCIAL BRANCHES DURING THE LAST TWO SATURDAYS IN EVERY CALENDER MONTH WITH EFFECT FROM 18TH AUGUST 2018 COMMENCING AT 9.30 AM TO 2.00 PM

IN ADDITION, SATURDAY BANKING SERVICE WILL BE AVAILABLE EVERY SATURDAY AT THEM IYONE SLCB KIOKS IN WILBERFORCE AND ADONKIA, GODERICH.

**BY ORDER OF MANAGEMENT  
DATED 3RD AUGUST 2018**

# PUBLIC NOTICE

**GUMA VALLEY WATER COMPANY,  
FREETOWN SIERRA LEONE**

NOTIFICATION FOR PUBLIC DISCLOSURE ON THE ENVIRONMENTAL, SOCIAL AND HEALTH IMPACT ASSESSMENT (ESHIA) DOCUMENT ON THE DFID FUNDED REHABILITATION OF THE WATER SUPPLY IN FREETOWN.

An initiative of the Government of Sierra Leone, through the Ministry of Water Resources and the Guma Valley Water Company, the Freetown Water Supply Rehabilitation project is intended to improve the living situation of Freetowners, through rehabilitation of the water infrastructure for increased sustainable access to safe water. Better water management and supply will reduce incidences of diarrhoea, malaria and other water-borne and vector-linked diseases as well as improving non-revenue water management.

The project commenced in May 2017. Construction is planned to take place predominantly between November 2018 and June 2019, with the programme completed by December 2019.

The Freetown Water Supply Rehabilitation Project requires a licence under the EPA Act of 2008 as amended in 2010. An Environmental, Social and Health Impact Assessment (ESHIA) is being undertaken to report on the environmental and social impacts of the project with the aim of managing and mitigating possible adverse impacts.

To this end we are engaging with individuals and groups who may be affected by, or who can impact on, water delivery operations, to notify and disclose the works and ESHIA study; identify potential impacts; respond to concerns and grievances; promote collaborative efforts; and improve our knowledge of local conditions and settings.

All affected and interested stakeholders/parties/persons will be brought together during the public disclosure session for discussions and participatory dialogue.

The results of the study will be discussed on following dates and locations:

Meeting	Date	Time	Location
West	20th August	10am	Adonkia Community Centre
East	21st August	10am	Mongebga Community Centre
East	22nd August	10am	Pamuronko Community Centre
Central	23rd August	10am	CDB, British Council

A copy of the Draft Final Environmental, Social and Health Impact Assessment (ESHIA) Report shall be available at any of the following locations:

1. EPA & SL Oco, 21 Old Railway Line, Brooks Fields, Freetown
2. IMC Worldwide Ltd, 3 Jalloh Close, O Spur Loop, Freetown
3. Guma Valley Water Company, Guma Building,
4. GVWC Central Oco, PWD Compound, Pademba Road
5. GVWC East oco, Africanus Road, Kissy
6. GVWC West Oco, Regent Road, Wilberforce
7. GVWC Babadorie Oco

**Contacts:**

bahareawest@gmail.com | 088 275 876  
wessel.vandermeulen@imcworldwide.com





## SIERRA LEONE COMMERCIAL BANK LIMITED

# PUBLIC NOTICE ON RESUMPTION OF SATURDAY BANKING

SIERRA LEONE COMMERCIAL BANK LIMITED IS PLEASED TO INFORM ITS ESTEEMED CUSTOMERS AND THE GENERAL PUBLIC THAT THE BANK WILL RESUME SATURDAY BANKING AT ITS FREETOWN AND PROVINCIAL BRANCHES DURING **THE LAST TWO SATURDAYS IN EVERY CALENDER MONTH** WITH EFFECT FROM 18TH AUGUST 2018 COMMENCING AT 9.30 AM TO 2.00 PM

IN ADDITION, SATURDAY BANKING SERVICE WILL BE AVAILABLE **EVERY SATURDAY** AT THEM IYONE SLCB KIOKS IN WILBERFORCE AND ADONKIA, GODERICH.

**BY ORDER OF MANAGEMENT**

**DATED 3RD AUGUST 2018**

# PUBLIC NOTICE

## GUMA VALLEY WATER COMPANY, FREETOWN SIERRA LEONE

NOTIFICATION FOR PUBLIC DISCLOSURE ON THE ENVIRONMENTAL, SOCIAL AND HEALTH IMPACT ASSESSMENT (ESHIA) DOCUMENT ON THE DFID FUNDED REHABILITATION OF THE WATER SUPPLY IN FREETOWN.

An initiative of the Government of Sierra Leone, through the Ministry of Water Resources and the Guma Valley Water Company, the Freetown Water Supply Rehabilitation project is intended to improve the living situation of Freetowners, through rehabilitation of the water infrastructure for increased sustainable access to safe water. Better water management and supply will reduce incidences of diarrhoea, malaria and other water-borne and vector-linked diseases as well as improving non-revenue water management.

The project commenced in May 2017. Construction is planned to take place predominantly between November 2018 and June 2019, with the programme completed by December 2019.

The Freetown Water Supply Rehabilitation Project requires a licence under the EPA Act of 2008 as amended in 2010. An Environmental, Social and Health Impact Assessment (ESHIA) is being undertaken to report on the environmental and social impacts of the project with the aim of managing and mitigating possible adverse impacts.

To this end, we are engaging with individuals and groups who may be affected by, or who can impact on, water delivery operations, to notify and disclose the works and ESHIA study; identify potential impacts; respond to concerns and grievances; promote collaborative efforts; and improve our knowledge of local conditions and settings.

All affected and interested stakeholders/parties/persons will be brought together during the public disclosure session for discussions and participatory dialogue.

The results of the study will be discussed on following dates and locations:

Meeting	Date	Time	Location
West	20th August	10am	Adonkia Community Centre
East	21st August	10am	Mongegba Community Centre
East	22nd August	10am	Pamuronko Community Centre
Central	23rd August	10am	CDB, British Council

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FREETOWN WATER  
SUSTAINABLE | COMMUNITY FOCUSED | ACCOUNTABLE



The Oversight Committee,  
Management & Staff of

**ROKEL COMMERCIAL  
BANK (S.L.) LTD**  
Wishes  
His Excellency the  
President  
**Rtd. Brigadier  
Julius Maada Bio**

The  
**Vice President  
Dr. Juldeh Jalloh**

Our valued customers, the  
Government and  
People of Sierra Leone



**A BLESSED EID-UL-ADHA**

# PUBLIC NOTICE

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## Kono District Council to account for Le500 Million ...Parliament investigates

BY: ABU BAKARR KARGBO

As part of its continued public hearings, in respect of the queries raised in the Auditor General's Report of 2016, the Public Accounts Committee met today with some of the Councils in the Eastern Region.

The Chairman of the PAC, Hon. Segepoh Solomon Thomas had issued stern warnings "that in future if officials working for Councils could not tender prudent transaction documents during audits, they will risk losing their jobs, including benefits such as NASSIT, subject to the conclusion of a stakeholders meeting, where the terms and conditions will be developed and agreed on".

Speaking on over bloated contracts, the Committee spoke largely against profiteering by contractors "colluding with officials of Councils", when deliberating on the construction of Kundi Bridge in Kono, with a value of Le 790 Million.

The Committee has also restated that "sitting fees should not be paid to Councilors without minutes, attendance lists and valid written excuses".

All the officials of Kono District Council have been summoned to Parliament



Hon. Segepoh Solomon Thomas,  
Chairman of PAC

not later than August 24, 2018 in respect of the purchase of XL 125 motor bikes for Le72 Million, four receipt books, and the provision of supporting documents for over Le500 Million.

Hearings for Kailahun District Council were deferred because of the absence of the suspended and former Chief Administrator and Finance Officer of the said Council.

Officials of Koidu New Sembehun City Council have been summoned to appear in Parliament on the 5th September 2018 because the "former Finance Officer is dead and the former Chief Administrator is seriously ill".



Filming and Photography Company to support the UNFPA country office in the development of videos and photography products.

## Request for Quotation-2018/033

UNFPA is seeking the services of a film and photography company to develop a number of videos that provide visibility and increase awareness of UNFPA programmes and services. Firstly, the company is required to develop a video highlighting a number of our model Safe Spaces located in various districts.

Secondly, UNFPA, with generous funds from the UK government through the Saving Lives Programme, and funds from JICA and Government of Japan, has rehabilitated and constructed a number of health facilities across the country. Most of the health facilities will be completed and the country office would like to develop a short video covering the completed facilities and ensure emphasis is placed on how the new health facilities will contribute towards reducing maternal mortalities and ultimately contribute to strengthening the health system in the country.

Lastly, a number of successful activities have been achieved with funding from UK aid through the Saving Lives Programme in 2017. A video to highlight the key activities is required and shared with the donors for promotional and wider visibility purposes.

All the videos will be used for wider dissemination for the public through social media channels, websites and shared with donors, regional office and headquarters.

### Key deliverables:

Production of the following videos/documentaries and high quality photographs:

1. Production schedule
2. UNFPA Safe Spaces
3. UNFPA/UK aid funded constructed/rehabilitated health facilities (CHCs and hospitals)
4. UNFPA/JICA/Government of Japan constructed/rehabilitated health facilities (CHCs)
5. Saving Lives Programme - successful activities in 2017
6. Develop four photo databases which include high quality photographs to accompany each video

In addition, UNFPA Sierra Leone requires the following:

- Separate electronic files with the unedited raw footage.
- A copy of all video interviews to be used individually according to UNFPA's discretion.

### Quotations:

- Full Terms of Reference can be accessed on <https://sierraleone.unfpa.org/en/vacancies>
- Send quotation to [registry-sl@unfpa.org](mailto:registry-sl@unfpa.org) or to UNFPA Sierra Leone, 12-16 New Signal Hill Road, Congo Cross, Freetown.

### Additional Information:

- We will only be able to respond to those quotations which the Country Office has further interest.

Deadline for applications: 24 August 2018

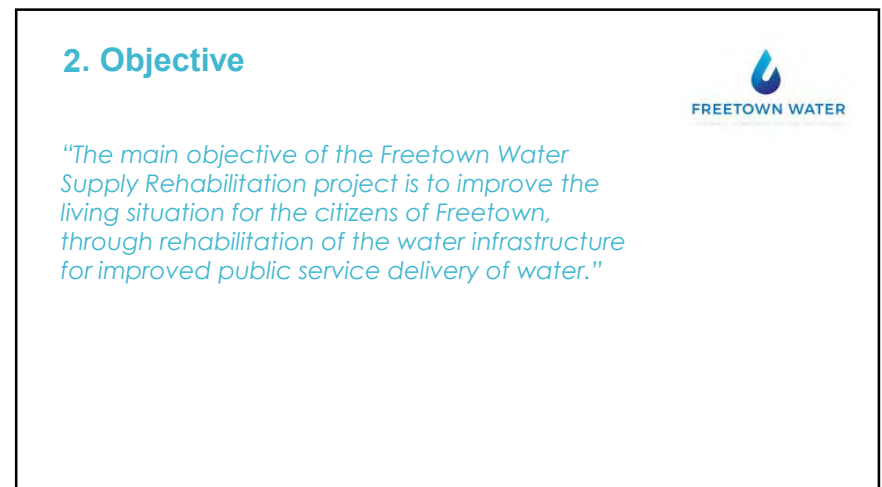




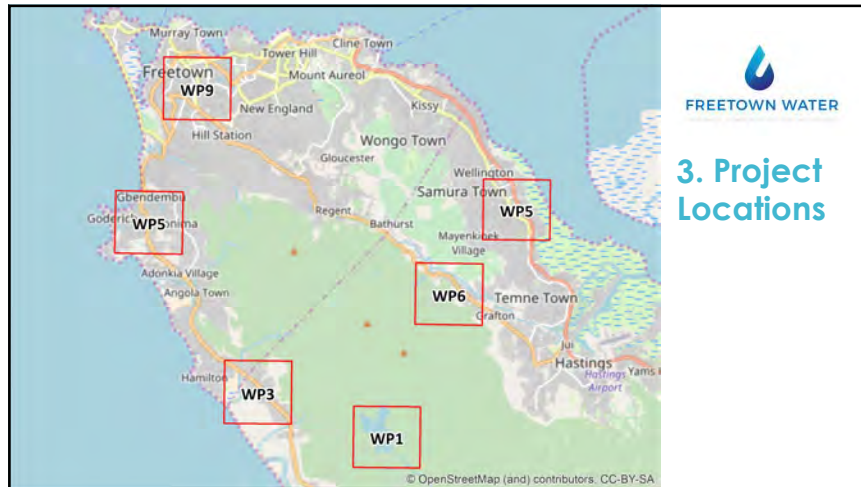
## Appendix 10: Presentations for Public Disclosure



## Appendix 10- Public Disclosure Presentation for British Council







## Works within the West of Freetown



### What we are doing?

- Service reservoirs in Angola Town and Marjay Town
- Rehabilitation of pipelines and construction of new networks
- Lay down area- Temporary area to store equipment and house workers
- Water Kiosks



## Works within the East of Freetown



### What we are doing?

- Construction of Weir,
- Install transmission line from the Weir, to Allen Town and across the Orugu River
- Extend and rehabilitate 8.75 km of Distribution network from Allen town Water Treatment Plant
- Install Bulk transfer system and Bulk Flow Metering
- Rehabilitation of networks from East End Police to Wellington



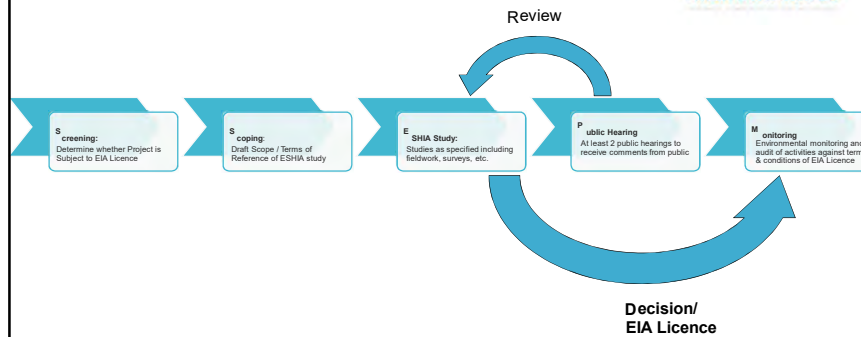
## 4. Environmental, Social and Health Impact Assessment (ESHIA)



- IMC Worldwide Ltd and Njala Environmental Technicians, with support GVWC, have completed an ESHIA
- The ESHIA assess the positive and negative impacts of the project
- For this, your opinions matter...
  - We have undertaken Group Discuss, Interviews and Questionnaires
  - We are undertaking four public disclosures (this is one of them)



## EIA Licence Application Process



## ESHIA study - Methods



- **Desk Review**
  - studies, reports, information pertinent to water rehabilitation works
  - Government policies and strategies
  - Legislation
- **Field Work**
  - Environmental and Socio-Economic Baseline Surveys
  - Biodiversity Assessment
  - Social Studies
- **Impact Assessment**
  - Environmental and Socio-Economic Baseline Surveys
  - Biodiversity Assessment
  - Social Studies / Consultations
- **Impact Identification and Significance Assessment**
  - Compared to Baseline, Rating of each impact based on Magnitude, Duration, Scale and Probability



## 5. Benefits



- Increase Water Supply
- Improve Reliability of Water Supply
- Extension to the water network
- Reduce Water Loss at the Dam and from Damaged and Old Pipes
- Increase Worker Safety
- Increase Water Quality
- Increase Water Pressure
- Improved capacity of GVWC

## 6. Impacts and Mitigations



Key Impacts	Mitigation*
Traffic Disturbance	Traffic Management Plan
Resettlement	Stakeholder Engagement Plan Resettlement Action Plan (Being completed by Mott MacDonald)
Disruption of Public Utilities and Services	Communications Plan Connection Policy Minimise duration
Access to homes and other places (trenches)	Phased plan Short Work Sections
Noise generation	Daytime working
Encroachment on Weir	Stakeholder Engagement Limit Accesses

\*Stakeholder communication is key to implement the mitigation measures!



## 6. Impacts and Mitigations



Key Impacts	Mitigation*
Worker and Public Safety	Health and Safety Plan Appropriate protective equipment, fencing and more
Air Pollution/Dust	Appropriate use of equipment Cover loose material
Waste	Waste secure stored and appropriate disposal
Biodiversity	Minimise vegetation clearing Turn off lights and avoid excess noise where possible to prevent disturbance

\*Stakeholder communication is key to implement the mitigation measures!

## 7. Questions



- Questions and Answers Section



AOB and Close

Thank You

Contact details:  
Ibrahim Bah – GVWC  
088 275 876

Freetown Water Supply Rehabilitation Project  
Public Consultation – British Council  
23/08/2018





## Appendix 11: Public Disclosure Transcripts

## Appendix 11- Public Disclosure Transcripts

Four Public Disclosure meetings were held between the 20<sup>th</sup> and 24<sup>th</sup> of August 2018. We present transcripts for each of these meetings below:

### Adonkia – Angola Town, 20<sup>th</sup> August, 2018, 10:00-12:00

**Venue:** Adonkia Community Centre

**Communities:** Angola Town and Adonkia

**Demographics:** 99 attended: 47 Women and 52 Men.

#### **Key Stakeholders;**

- Alfred T Johnnie Dean- EPA-Senior Environment Officer
- Madam Kargbo- EPA- Environment officer
- Lamin Koroma- Assistant Secretary to the community leader (Headman)
- Sheka Forna-IMC Consultant.
- Georgina Bassett -IMC Representative
- Wessel Van der Meulen-IMC Representative
- Allie Kabba- GUMA
- Mohamed Jalloh- NET Lead Consultant
- Ambrose Bundeh- NET Consultant

#### **OPENING**

A brief opening ceremony was done by Mr. Sheka Forna (Chairman) from IMC, followed by individual prayers. Individual introduction were also provided starting with IMC Worldwide representatives, Njala Environmental Technicians (NET), Environmental Protection Agency Sierra Leone (EPA-SL) representatives followed by the Angola community Secretary.

The chairman gave a brief introductory (overview) of the above mentioned proposed project and said that the disclosure was based on the report gathered from the field and aims to share the results of the ESHIA study

Lamin Koroma the assistant secretary to the community leader expressed his joy of having this project in his community and hopes the project becomes a success.

Allie Kabba representing GUMA explained to the community that he is here to consult with the community and inform the community of how the project will affect them positively and negatively. "The EIA study takes an in-depth look into how the project affects the community. GUMA is happy to be involved in every stage of the rehabilitation project".

#### **PRESENTATION OF REPORT**

This section was done by the lead consultant (Mr. Mohamed Jalloh) of NET. He explained to residents that this public disclosure session is the second session IMC has conducted in the community. The initial visit was conducted through focus group discussions. Mr. Jalloh, stressed that the community needs to be aware of the work being completed in the community and approved by EPA, he explained that the project is funded by the UK government and the community should be involved in the continuous discussion of what was discovered during the Environmental, Social Health, Impact Assessment.

Before the commencement of the project, Environment Protection Agency-Sierra Leone (EPA-SL) recommended that the project requires the acquisition of an Environmental Impact Assessment License and hence an ESHIA study was necessary. The ESHIA study will help to ensure that negative impacts are mitigated as appropriate and the positive impacts are maximized.

The proposed project is called REHABILITATION OF FREETOWN WATER SUPPLY PROJECT. The consultant explained that the rationale of the project is to assist GVWC improve its capability to supply Freetown. The main justification of this project is that after the Ebola outbreak, there was need to improve service delivery in Freetown and the country at large, and one of the key areas of concern was the water sector. GVWC's capacity to supply water in Freetown diminished drastically due to damages along the supply network and also due to wastage in the intake tunnel because of damaged valves. The project aims to rehabilitate and add more water services in all the outlined areas to solve water shortage issue in the urban and rural areas of Freetown.

The outline of the presentation was:

- i) Background of the project
- ii) Project Objectives
- iii) Project Location
- iv) Environmental Social and Health Impact Assessment (ESHIA)
- v) Works within West of Freetown

## **PROJECT BACKGROUND**

The consultant informed the disclosure participants that the proposed project is funded by the Department for International Development in UK; The project is being implemented as a partnership between Guma Valley Water Company (GVWC) Sierra Leone and a consortium of IMC Worldwide, ATKINS and BAM Nuttall who are responsible for the engineering design and construction supervision, and overall management of the project; MOTT McDonald is the project supervisor.

## **PROJECT OBJECTIVES**

In his presentation, the consultant explained that the main aim of the Freetown Water Rehabilitation Project is to improve the living status of the people living in Freetown by improving water delivery services.

## **PROJECT LOCATION**

The consultant stated that the project is categorized by work packages and spread from West to East of Freetown with six work packages based on the type of installations, construction and rehabilitation that is to be carried out in the different locations.

## **ENVIRONMENTAL, SOCIAL AND HEALTH IMPACT ASSESSMENT**

In his presentation Mr Jalloh explained that IMC and NET have done the environmental, social and health impact assessment (ESHIA) study in all the project locations to identify the expected positive and negative impacts of the proposed project and data has been collected in all the outlined areas. The main object of the ESHIA is to identify positive and negative impacts of the project on the environment, people and society; and to recommend mitigation measures for the identified project negative impact and also to present measures to maximize the project's positive impacts.

He gave a brief explanation of the meaning of the "environment" and the need to preserve the environment for the continued existence of man and other living organisms. Sustainability, he said, through the appropriate use of natural resources is crucial for our survival.



He briefed the audience of the Environment Protection Agency – Sierra Leone (EPA-SL) as the national government parastatal that is responsible for overseeing all activities and projects that interact with the environment.

The consultant stressed the fact that community engagement is an essential and mandatory component of the ESHIA process to incorporate community people's concerns and contributions to the ESHIA process. He also stated that this is the second of such community engagement sessions that have been held during the ESHIA study of Freetown Water. The first community engagement, he stressed, was to have people concerns and opinion incorporated into the ESHIA report and focus group discussion was used as a research tool to achieve this objective. This second community engagement meeting is being held to present the ESHIA Report to community members (since they made valuable inputs during the baseline assessment) and to also give them the opportunity to ask questions and raise concerns about issues of the project that are not clear to them.

The consultant assured the community members that all their concerns and what is being discussed will be presented in the form of a Disclosure Report to EPA-SL and is a requirement for the issuance of the EIA licence for the project.

### **WORKS WITHIN THE WEST OF FREETOWN**

The consultant explained the works that will be carried out within West of Freetown which include but not limited to the following:

- Replacement of valves in the intake tower at GVWC's facility in Mile 13
- Works within the treatment plant in Mile 13
- Construction of storage facility for equipment and staff at Mile 13
- Construction of reservoirs at Marjay town and Angola Town
- Rehabilitation and/or replacement of several km of pipeline along the Peninsula High Way

### **Project Benefits**

The consultant further explained that when the above project works are accomplished, the following will be the associated benefits of the Angola Town Community, Marjay Town, Adonkia and the entire municipality of Freetown:

- Increased water supply and supply pressure to Angola town and Marjay Town
- Improved water supply across the entire Freetown

### **IMPACT AND MITIGATION MEASURES**

The consultant noted that this is the most important aspect of the report: the project has both positive and negative impacts and measures to minimise the negative impacts. Mitigation measures have been proposed to reduce or avoid the negative impacts of the project to the environment, people and society; whilst measures have been presented to maximise the positive impacts of the project.

He noted that projects of this nature are not prone to causing widespread environmental degradation and that the project's negative impacts are temporal, mostly reversible and are short lived.

The following are the negative impacts that the Freetown water supply rehabilitation project may have during the implementation period:

- i. **Traffic disturbance:** there will be traffic disturbance in the areas where the works will be carried out due to increase vehicular and equipment movement by the contractors. To minimise this impact, there will be a traffic management plan.
- ii. **Resettlement:** many structures that have been built in the areas of pipes passage are likely to be affected, especially business structures like tele centers, kiosks etc., however a Resettlement Action Plan has been put in place for those structures as a way to resettle and/ to compensate the project affected persons (PAPs). PAPs have been mapped and engaged to formulate a way forward. The Resettlement Action Plan is being completed.
- iii. **Disruption of public utilities and services:** consultant explained that there will be some disturbances in public utility delivery during the implementation period. Mostly, water supply to

those that have access to Guma's pipe born water will be affected. Other utilities and services (e.g. EDSA, SierraTel, and other mobile phone networks) will not be affected by the implementation of the project. As a way of mitigating this impact, beneficiaries of the affected communities will be notified at least three days before the anticipated disturbance. Works will be carried out in phases to reduce the level of impact and duration of utility disruption. Furthermore, the implementing partners and the contractors are in constant consultations with public utility and service providers (EDSA, SLRA, etc.) to ensure that they are ready for any emergency during the implementation period and to foster coordination amongst them.

- iv. **Access to homes and other places:** some of these places have to be disturbed during construction, but there are measures (phased implementation plan) that have been put in place to minimise the impact in the shortest possible time.
- v. **Noise generation:** the implementation of the project will increase to some extent the noise level of the areas where works will be carried out. This will be due to the use of machines and other construction equipment. This will be mitigated by carrying works during day time when most community members are out and engaged in their various livelihood activities.

## QUESTION AND ANSWER SESSION

Participants were given the opportunity to ask questions, seek clarifications and raise concerns based on the presentation and the project as a whole.

This section of the disclosure was facilitated by Mr Ambrose Bundeh of NET. Mr. Alfred T. Jondie of Environmental Protection Agency Sierra Leone (EPA-SL) further encouraged the community people to ask any question pertaining the project, as EPA-SL is responsible to protect the environment.

Respondent	Question/Query/Comment	Answer:
<b>Mustapha Moai</b> (Angola Town)	What is the benefit for the area youths from this project?	<b>Ambrose Bundeh (NET):</b> Youths will be involved by implementing the local content policy through labour and procurement. Recruitment will occur outside the community if the skills needed are not available in the community.
<b>Alusine Keita</b> (Angola Town)	When will the project implementation start? Where will the pipes be located? Is it only affected pipes that which will be replaced?	<b>Ambrose Bundeh (NET):</b> the work will start as soon as EPA-SL issue out the licence
<b>Hawanatu Cole</b> (Angola Town Resident)	Will (community members) will be included (recruited) during implementation period and how their community (Potor community) will benefit from this water supply project.	<b>Ambrose Bundeh (NET):</b> Youths will be involved by implementing the local content policy through labour and procurement. and the Potor may likely benefit from the project by increased water accessibility and reliability.
<b>Chief Lamin</b> (Adonkia)	The is a water way in front of my home blocking my view, spaghetti pipes are all over in my area. I live in Adonkia and I want to know which pipes will be changed.	<b>Alie Kabba (GVWC):</b> The rehabilitation component of the project will ensure that all pipes are buried underground.
<b>Sheka Conteh</b> (Angola Town)	What is the mechanism for the water rate? Appeals to GUMA to remove spaghetti pipes.	<b>Alie Kabba (GVWC):</b> Through the rehabilitation project, communities which have limited access to water will have access to water through expansion. Spaghetti pipes will be replaced with pressure resistant pipes.
<b>Adama Kamara</b> (Angola Town Resident)	What is the alternative to water when the access is limited because of the project (such as in the case of Angola community??	<b>Alie Kabba (GVWC):</b> since the construction of water supply will be by stages, Guma has to connect all outlined areas.
(Angola community secretary)	if there is traffic disturbance and disruption of community public utilities in their community what will be the mitigation measure	<b>Ambrose Bundeh (NET):</b> there are measures (traffic management plan) put in place address the issue of traffic disturbance. Also, the disrupted public utilities will be quickly fixed as soon as work within the affected areas has been accomplished. The consultant also noted that no other public service utility other than water supply is expected to be disrupted during the implantation of the project.
<b>Ayodele Rasheed</b> (Adonkia Resident)	How will residents living on the pipes be located?	<b>Ambrose Bundeh (NET):</b> Resettlement plan will be implemented with home owners and GUMA,



<b>Kadijatu Kamara</b> (Adonkia)	Are the pipes being renovated or pushed back?	<b>Alie Kabba:</b> Pipes will be rehabilitated and not pushed into homes. the project is about rehabilitation of pipes and installation of new pipes where necessary. The rehabilitated or replaced pipes will be in their same locations within SLRA's right of way
<b>Lamin Dumbaya</b>	Does GUMA use tissue to stuff pipes?	<b>Alie Kabba:</b> Cutting and stuffing of pipes is a criminal act and is not endorsed by GUMA.

#### **WRAP UP**

Conclusively, the chairman of the meeting encouraged and disclosed GVWC's contact details to the community people to contact them if there is any issue arises during implementation period

## **Pamuronkoh Community, Calaba Town, 22<sup>nd</sup> August, 2018.**

**Venue:** Pamuronko Community Centre

**Communities:** Calaba and Allen Town

**Demographics:** 80 Attendees in total; 18 Women and 62 Men

**Key Stakeholders:**

- Sheka Forna-IMC Consultant.
- Mohamed Jalloh- NET Consultant
- Georgina Bassett -IMC Representative
- Wessel Van der Meulen-IMC Representative
- Mohamed Jalloh- IMC Consultant
- Alfred T Johnnie Dean- EPA-Senior Environment Officer
- Madam Kargbo- EPA- Environment officer
- Ambrose Bundeh- NET Consultant
- Madam Kamara-Counsellor
- Allie Kabba-GUMA Representative

**Introduction:**

IMC Worldwide and Njala Environmental Technicians (NET) held a meeting (Disclosure) for the Freetown Water project at Pamuronko Community, Calaba Town on the 22<sup>nd</sup> August, 2018. The meeting started at 10:30 am.

The meeting was chaired by Mr. Sheka Forna. In his opening remarks, he welcomed all participants to the disclosure meeting.

This was followed by opening prayers and the introductions of representatives IMC Worldwide, NET, GVWC and EPA-SL.

The chairman gave a brief background of the proposed project for the rehabilitation of Freetown water supply and the purpose of the disclosure meeting.

The welcome note was given by the host councillor Mrs. Mary Kamara. She encouraged her community members to embrace the development efforts of local and international partners in an effort to improve water supply. She underlined her understanding of that the water issue is pressing in her community, and welcomed GUMA for their efforts in rehabilitating pipes in the community. She welcomed the youths who man the water kiosk and the women who are most in need for water to cook and take care of the children.

Mr. Alie Kabba of GVWC said that the Rehabilitation of Freetown Water Supply Project follows the from the 2012 cholera outbreak in Sierra Leone, the 2015 dry season and more recently the Ebola crisis, which triggered UK DFID funding for the improvement of basic service delivery and rehabilitation of the Guma dam which was built in 1960. Because of this outbreak the Sierra Leone Government sought help from donors to help improve water quality and its services in Freetown. He said that main purpose of the project is to replace damaged pipes in several locations in Freetown to stop the leakages of water in the affected areas.

He concluded that when the project works are completed, there will be increased water supply and GVWC has the potential to extend its water supply services to six hundred thousand beneficiaries across Freetown.

## **PRESENTATION OF ESHIA REPORT**

The lead local consultant (Mr. Mohamed Jalloh) explained to participants that the purpose of this meeting is to disclose the ESHIA report following community engagement sessions held in all project locations (including Calaba town, Allen Town, Wellington and Kissy) across Freetown during the baseline assessment studies. He elaborated that the disclosure will ensure that community concerns are incorporated into the ESHIA report and all discussions during the disclosure session will be documented in the disclosure report that will be submitted to EPA-SL in fulfilment of the requirement for the issuance of EIA licence.

He stated that Environment Protection Agency Sierra Leone (EPA-SL) required the project proponents to conduct an ESHIA study before the commencement of the project. To accomplish this, IMC Worldwide partnered with Njala Environmental Technicians to conduct the ESHIA studies. The ESHIA studies revealed that the project has both positive and negative impacts to the environment, people and society. Measures have been recommended to mitigate minimise and avoid (where possible) the negative impacts and measures have also been presented to maximise the positive impacts.

## **OUTLINE OF PRESENTATION**

The consultant gave the outline of the report as follows:

- i. Background
- ii. Objectives
- iii. Project Location
- iv. Environmental Social and Health Impact Assessment (ESHIA)
- v. Works within Freetown

## **PRESENTATION**

A PowerPoint presentation of the project was shared with the participants.

### **Project background**

The consultant informed the disclosure participants that the proposed project is funded by the Department for International Development in UK; The project is being implemented as a partnership between Guma Valley Water Company (GVWC) Sierra Leone and a consortium of IMC Worldwide, ATKINS and BAM Nuttall who are responsible for the engineering design and construction supervision, and overall management of the project; MOTT McDonald is the project supervisor.

### **Objectives**

The Freetown Water Supply Rehabilitation Project aims to improve the lives of the people residing in Freetown through the improvement in service delivery and particularly the rehabilitation of the water infrastructure for the delivery of potable water.

### **Project location**

The consultant stated that the project is categorized by work packages and spread from West to East of Freetown with six work packages based on the type of installations, construction and rehabilitation that is to be carried out in the different locations. The work items vary from one location to another but are focused on the rehabilitation of networks, construction of reservoirs and weirs, replacement and



rehabilitation of existing pipelines, laying out of new pipelines to connect newly constructed reservoirs and weirs to existing networks and more.

### **Works Within East of Freetown**

In his presentation, the consultant stated the following as being entailed in the work packages within East of Freetown:

- i. Construction of weirs at Mongegba and Mortem
- ii. Installation of new transmission lines from the constructed weir in Mogegeba and Mortem to Allen Town across the Orugu River
- iii. Extension and rehabilitation up to 8.75km of existing distribution network from Allen town treatment Plant to various communities
- iv. Rehabilitation of supply networks from East End Police to Wellington
- v. Installation of bulk transfer system and bulk flow metering.

### **Benefits of works within East of Freetown**

The consultant explained that once the above works within the East of Freetown are accomplished, the following benefits will result:

- Increased water supply across the East network
- Improved reliability of water supply for the Eastern Network
- increased access to potable water.

### **Project Impacts and Mitigation Measures**

The consultant noted that this is the most important aspect of the report: the project has both positive and negative impacts and measures to minimise the negative impacts. Mitigation measures have been recommended to reduce or avoid the negative impacts of the project to the environment, people and society; whilst measures have been presented to maximize the positive impacts of the project.

He noted that projects of this nature are not prone to causing widespread environmental degradation and that the project's negative impacts are temporal, mostly reversible and are short lived.

The following are the negative impacts that the Freetown water supply rehabilitation project has during the implementation period:

- a) **Traffic disturbance:** there will be traffic disturbance in the areas where the works will be carried out due to increase vehicular and equipment movement by the contractors. To minimise this impact, there is a traffic management plan that will be implemented during the project's implementation phase.
- b) **Resettlement:** structures that have been built in the areas of pipes passage may be affected, in particular business structures like tele centers, kiosks etc. A Resettlement Action Plan has been put in place for those structures as a way to resettle and/ to compensate the project affected persons (PAPs). PAPs have been mapped and engaged to formulate a way forward. The Resettlement Action Plan is being completed.
- c) **Disruption of public utilities and services:** the consultant explained that there will be disturbance in public utility delivery during the implementation period. Mostly, water supply to those that have access to Guma's pipe born water will be affected. Other utilities and services (e.g. EDSA, SierraTel, and other mobile phone networks) will not be affected by the implementation of the project. As a way of mitigating this impact, beneficiaries of the affected communities will be notified at least three days before the anticipated disturbance. Works will be carried out in phases to reduce the level of impact and duration of utility disruption. Furthermore, the implementing partners and the contractors are in constant consultations with

public utility and service providers (EDSA, SLRA, etc.) to ensure that they are ready for any emergency during the implementation period and to foster coordination amongst them.

- d) **Access to homes and other places:** some of these places have to be disturbed during construction, but there are measures (alternatives) that have been put in place to minimize the impact in the shortest possible time.
- e) **Noise generation:** the implementation of the project will increase to some extent the noise level of the areas where works will be carried out. This will be due to the use of machines and other construction equipment. This will be mitigated by carrying works during day time when most community members are out and engaged in their various livelihood activities.

## QUESTION AND ANSWER SESSION

Participants were given the opportunity to ask questions, seek clarifications and raise concerns based on the presentation of the ESHIA report and the project as a whole.

Respondent	Question/Query/Comment	Answer:
<b>Councilor Mohamed J. Tholley</b> (Ward 405- Looko, pick up Town and Industrial Estate) Hassan Turay (Kabal Town)	Freetown is a mountainous community; how will this project positively impact those living in the mountains?	<b>Ambrose Bundeh (IMC):</b> The project's priority is existing pipe rehabilitation, GUMA will continue with new pipe development in the future.
	How will this project be sustained after completion and who will be responsible?	<b>Alie Kabba (GVWC):</b> The needs of communities in mountainous areas will indeed be served by GVWC though not directly through this project, as the aim here is to rehabilitate existing pipes, and the money is insufficient to cater for those areas that have no existing networks. To reach the mountainous areas, GVWC is looking for suitable areas to build (smaller) dams in all those areas, but a study of potential dam sites has to be done gradually.
<b>Hassan</b>	How will exposed pipes be secured and	<b>Alie Kabba (GVWC):</b> In response to the question of the sustainability of the project, Mr Kabba explained that GVWC has an M&E system in place, GUMA's log frame system keeps track of our will high achievements and areas where assessment is needed. Measures have been put in place by the company to quantify the amount of water supplied in a particular area and to also add spaghetti pipes for more connections. Moreover, illegal connection of pipes is a big challenge for GVWC. He pleaded to community leaders and community members to (beneficiaries) to help the company and its partners to realise project objectives by maintaining the structures put in place during project implementation

<p><b>Turay</b> (Kabala Town)</p>	<p>not be vulnerable to those cutting pipes? What are the penalties of cutting pipes?</p> <p>Are ward development committees included in the project?</p>	<p>Cutting of pipes is a major challenge in GUMA. He pleaded to community leaders and community members to (beneficiaries) to help the company and its partners to realise project objectives by maintaining the structures put in place during project implementation</p> <p>Packages for ward committee members are not included in the project. Water kiosk system will be put in place for community members who do not have access to water in homes.</p>
<p><b>Councillor Mansaray</b> (Old Wharf)</p>	<p>How will the projected 600,000 inhabitants benefit from the water supply.</p> <p>Will the project install new pipes/construct dams in all the outlined areas?</p> <p>Will there be street pumps?</p>	<p><b>Alie Kabba (GVWC):</b> There will be water points to access water supply so that these people will have clean and safe drinking water in their respective areas.</p> <p>The project will install new pipes at Allen town and Orugu areas and that weirs will be constructed in Mortem and Mongegba.</p> <p>Water kiosk system will be put in place for community members who do not have access to water in homes.</p>
<p><b>Isheka Idrissa Dumbuya</b> (Kabala Town – Head Teacher)</p>	<p>What will the priority will be for schools, especially Pamurunko Community Schools to access water supply? Highlighting importance of hygiene.</p>	<p><b>Alie Kabba (GVWC):</b> Hygiene is indeed a challenge during the dry season but GUMA formed a new pro poor community water service unit which focuses on areas that do not have existing water supply. They erect Millia water tanks in schools and health centres to supply their needs. Community Water Services in your area will guide you on how to obtain the services needed in schools and hospitals.</p>
<p><b>Councillor Lucky M. Mansaray</b> (Wellington / Constituency 115)</p>	<p>How will the people in the mountains benefit? Factories in Wellington benefit from Guma's water supply than residents? Why is that?</p>	<p><b>Alie Kabba (GVWC):</b> Mountainous communities will benefit from an optimised design which will have a mini water source, this has been laid out in the Master Plan.</p> <p><b>Ishmail Bundu (GVWC):</b> Most of the factories have boreholes and water tanks in their compounds to ensure they have sustainable supply of water since this is one of their major raw materials He emphasised Guma's commitment to community service and stated that the company supplies water three days in a week to all their services areas with no special interest for companies.</p>
<p><b>Counsellor Marie Kamara</b> WARD 114</p>	<p>We need assistance with solar boreholes. We believe solar boreholes are more sustainable than water kiosk.</p>	<p><b>Ishmail Bundu (GVWC):</b> GVWC aims to supply clean and safe drinking water to all community members in their target areas. GVWC is now focused on building water kiosks to those</p>



		<p>most communities that have no existing network.</p> <p>GVWC did not focus on boreholes because they have high repair charges and are not sustainable in all areas.</p>
<p><b>Allie Kamara</b> (Kabala Town / Pamarankoh Community)</p>	<p>What the measures being put in place to protect animals and trees in their community during the project's implementation phase.</p>	<p><b>Ambrose Bunde (NET):</b> During the study species areas were mapped out and it has been established that there will be no damage/disruption to plants and animals in Pamurankoh community.</p> <p><b>Mr Alfred Jondie (EPA):</b> The Agency is also concerned about plants and animals and to protect the environment. He recommended tree planting in Pamurankoh community to ensure environmental protection<sup>1</sup></p>
<p><b>Mohamed Kamara</b> Meyenkeh Community</p>	<p>Calls on GVWC to consider extension of more services in his community: Mayenkeh community has a water source, he therefore asked GVWC to help in the development of that water source.</p>	<p><b>Alie Kabba (GVWC):</b> The project has experts that will handle every aspects of the rehabilitation process and there will be no contamination.</p>
<p><b>Salimatu Kamara</b> (Kola Tree)</p>	<p>Kola Tree community has a health centre but is constrained by acute water shortage due to lack of water supply in the community. She pleaded to Guma to help with water supply to the health center in her community.</p>	<p><b>Alfred Jondie (EPA-SL)</b> With regards environmental activities that are resulting to the depletion of water resource: most of those challenges have to be handled at community level and require community commitment to environmental protection. He furthered that communities can file formal complaints to EPA-SL for activities within the communities that will lead to environmental degradation. The Agency, upon receipt of such complaints, will send a team to investigate and environmental violations are found to have happened, defaulters will be prosecuted by the Agency's legal department in a law court</p>
<p><b>Abbas Kamara</b> (Ward 403)</p>	<p>What will be the protection of pipes will be laid in the drainage areas especially if the works are to be carried during the rainy season?. He also raised a concern that there are many challenges that results to water scarcity in his community due to environmental activities.</p>	

## WRAP UP

EPA-SL representative Mr. Alfred T. Jondie gave a short statement that their responsibility as an Agency is to ensure that the environment is protected and this body can only recommend ESHIA studies base on the type of work a particular project wants to carry out in the environment. This project has submitted its ESHIA report based on the responses gathered from different localities. And further said the EPA.SL is the mediator between the mentioned project and it beneficiaries. With regards to that the community has the right to point anything that may disturb them in the mere future.

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<sup>1</sup> Mr Jondie's comments have been noted, however the will be minimal vegetation clearing within Calaba Town. Consideration to tree planting has been given at WP6.5 and Mile 13.

In concluding the meeting, the chairman encouraged the community members to contact them (Project team) if they have any issue to discuss.

**Venue:** British Council

**Communities:** Central

**Demographics:** 22 Attendees; 2 Women and 20 Men

**Key Stakeholders:**

- Bankole Mansaray – GM GVWC
- Sheka Forna-IMC Consultant
- Amy O Connell-IMC Deputy Team Leader
- Prince Maysoe-GVWC
- Mohamed Jalloh- IMC Consultant
- Wessel Van der Meulen-IMC Representative
- Alfred T Johnnie Dean- EPA-Senior Environment Officer
- Georgina Bassett - IMC Representative

**Background:**

IMC Worldwide and Njala Environmental Technicians (NET) held a meeting (Disclosure) for the Rehabilitation of Freetown Water Supply project at British Council on the 23<sup>rd</sup> of August, 2018. The meeting started at 10:19 am.

The meeting was chaired by Mr. Sheka Forna who gave a briefly overview of the proposed project followed by self-introduction of members of the presentation panel.

**STATEMENT BY GVWC**

In his statement on behalf of the company, Mr. Mansaray, GVWC's Chief Engineer, welcomed all those that were present in the meeting. He gave an overview of their company and expatiated on the constraints experienced by the inhabitants of Freetown which triggered the necessity for a project that will help increased the quality, quantity and reliability of water supply within Freetown. The company was able to secure funding from the British government through DFID for the Rehabilitation of Freetown Water Supply programme. He continued by indicating that the project entails many components including the construction of new weirs, rehabilitation of existing networks, laying of new pipes, and further infrastructure improvements. He stated that before construction can commence in all those areas an Environmental Social and Health Impact assessment (ESHIA) study is required to ascertain the positive and negative impacts of the project. Under the EPA act GUMA successfully undertook an assessment to engage the community on the effects this project will have on the environment. These on-going discussions will assist in guiding the process to improving the water system in Freetown.

**STATEMENT BY EPA-SL**

EPA-SL's representative Mr Alfred T. Jondie, explained that the EPA-SL is a Government Institution that was established through an Act of Parliament in 2004. The Institution is responsible to look into environmental affairs and its protection. According to the institution's act, any project that seeks to carry work in any locality/environment must conduct an impact assessment in order to secure an EIA licence. He further explained that the ESHIA report that has been submitted to them for this project is currently under review. He concluded by stressing EPA is committed to ensure that the environment is protected and they are ready to answer any question.



## PRESENTATION OF ESHIA REPORT

IMC representative Amy O'Connell thanked and welcomed all those that were present in the meeting. In her presentation, she stressed that the impacts have been thoroughly studied and their mitigation measures have been proposed accordingly. She pointed out the background, objectives, locations, and explained in details how the water supply situation will be in Freetown after project implementation phase. She stressed that IMC are committed in engaging with the community, public and private sectors and look forward to continuous cooperation needed to have a successful project, this is the 3rd public disclosure.

Another presenter from IMC worldwide, Wessel, van der Meulen said that the Environmental Social and Health Impact Assessment (ESHIA) study was carried out by IMC and NET with the support from GVWC and it has been completed in all the mapped localities. The ESHIA has assessed the positive and negative impacts of the project and the study has also recommended mitigation measures for the negative impacts and has prepared an ESMP which will be a guiding document for environmental best practice during the implementation phase.

He explained the EIA license acquisition process (steps) and stated the stages in the EIA process.

IMC's Georgina Bassett explained in details the benefits of the project and the expected negative impacts and their mitigation measures.

## QUESTION AND ANSWER SESSION

Participants were given the opportunity to ask questions about the project and to raise concerns for clarification.

Respondent	Question/Query/Comment	Answer:
<b>Mr Rogers</b> (African Development Bank)	i) What is the level of significance of each of the impacts highlighted in the presentation? Particularly noting the issue of encroachment?	<b>Georgina Bassett, IMC</b> Encroachment referees to areas around weirs in Mongegba and Mortem.(...)
	ii) What are the mechanisms that the project has put in place to do the monitoring and to safeguard the public utilities services.	<b>Ibrahim Bah, GVWC:</b> Mott Macdonald will monitor the management of the ESMP while BAM is indeed committed and fully capable to implement this document, which adopts mitigation measures highlighted in the ESHIA study.
	iii) How will the project implementers minimise noise pollution	He stressed the fact that GVWC has structures to handle project implementation and to ensure environmental compliance.
	iv) How will the rehabilitation will be done in Allen Town	In response to the concern about disruption of public utilities, he stated that some of the public utilities services like roads and footpaths will unavoidably be affected by project implementation. However GVWC has put mechanisms in place for public utilities by coordinating with other public utility providers (EDSA, SLRA, etc.) who are key stakeholders of this project and there will be a GVWC focal person to keep the affected community members adequately

		<p>informed in case of any interference with the public utilities. GVWC will engage utilities five days in advance, noise and traffic mitigations are in ESMP. The full ESHIA reports detailed which looks into each impact individually.</p> <p><b>Mr. Jondie, EPA-SL:</b> With regards to the monitoring of the implementation of the ESMP: EPA-SL has a framework in place for monitoring during the project implementation phase. The EIA licence is issued with terms and conditions that should be adhered to by the proponent and that for the life span of the EIA licence, the proponent is required to submit a quarterly report every three months which EPA will use to monitor ESMP implementation. There are financial penalties when terms and conditions are not met.</p> <p>With regards to noise pollution, Mr Jondie explained that this this depends on the severity of the noise and if the noise is beyond the allowable limit, the project proponent will be charged and may be required to pay a fine.</p> <p><b>Mr Mohamed Jalloh, NET:</b> With regards to Allen town, this will be phased step by step by replacing wear out pipes, the staggered approach will help reduce issues of accessibility.</p> <p>In response to the level of impacts, he clearly stated that projects of this nature are not prone to cause widespread environmental degradation and explained that the project was required to conduct a full ESHIA study not on the basis of the severity of the impacts it poses to the environment, but due to the geographical spread of project work items from West to East of Freetown.</p> <p><b>Timothy Cookson, BAM:</b> All work will be governed by our internal policies which is in line with SL policies as well as British law.</p>
<b>Suleiman Rashid (Mot McDonald)</b>	Are their any penalties if the monitoring isn't up to par? What is being down about squatters?	(answered in comments above)

## **Mongegba, 24<sup>th</sup> of August, 2018.**

**Venue:** Mongegba Community Centre

**Communities:** Mongegba and Mortem

**Demographics:** 170 Attendees: 36 Women and 134 Men

### **Key Stakeholders:**

- Sheka Forna-IMC Consultant.
- Mohamed Jalloh- NET Consultant
- Georgina-IMC Representative
- Wessel Van der Meulen-IMC Representative
- Alfred T Johnnie Dean- EPA-Senior Environment Officer
- Ambrose Bundeh- NET Consultant
- Ishmail Bundu-GUMA Representative
- Abu Sesay- Community leader (headman) Mogegeba Community
- Santigie Kamara- Deputy Community leader (Deputy headman) Mortem Community
- Daniel Konyingba- Counsellor's Representative
- Chief Pa Alimamy Conteh
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### **Background:**

IMC Worldwide and Njala Environmental Technicians (NET) held a meeting (Disclosure) for the Rehabilitation of Freetown Water Supply proposed project at Mogegeba Community on the 24th August, 2018. The meeting started at 10:10am. The meeting was chaired by Mr Sheka Forna.

Individual prayers were observed.

This was followed by the introduction of stakeholders of the two communities (Mortem and Mogegeba).

The following is the list of some of the Stakeholders present in the meeting for both communities

The chairman of the meeting gave a brief background of the proposed project.

### **STATEMENT BY GVWC**

Mr Ishmail Bundu of GVWC explained that this project came about after the Ebola epidemic, DfiD committed funds to rehabilitate the GUMA network and repair some aspects of the GUMA dam, the project will also install small water kiosks which will be the responsibility of the various committees to uphold. Mongegba Community assisted Freetown during the 2015 water crisis, where we used the water source in the area to supply other communities in Freetown through water browsers.

He further gave an overview of the disclosure and further reminded the participants for the Focus Group Discussions (FGD) that were held in their communities. This presentation, he said, is aimed to inform the communities of the outcome of the ESHIA studies for which they were consulted and engaged. He concluded by calling on community stakeholders and community members to be active participants and be vigilant in order to ensure the sustainability of the project.

### **STATEMENT BY EPA-SL**

EPA-SL representative (Mr. Alfred Jondie) extended greeting from the Executive Chairperson of EPA-SL and informed the participants that the EPA chairperson would have loved to attend this disclosure session and interact with community people but he is on another national assignment. Mr. Jondie explained to the participants that their responsibility as an Agency is to protect the environment and to



help solve environmental issues in the country. They are also responsible to ensure that all projects adhere to environmental best practice and the Agency is very strict in conducting environmental monitoring to make sure that environmental degradation is avoided as much as possible. He concluded by confirming that the project's ESHIA study has been completed and submitted to EPA-SL and is currently under review; that this disclosure is part of the process to give them (the communities) the opportunities to participate in the ESHIA process by means of making valuable inputs. He encouraged all to listen carefully to the proceedings of the disclosure to ask questions and seek clarifications where they have doubts.

## **PRESENTATION OF THE ESHIA REPORT**

The lead local consultant (Mr. Mohamed Jalloh) clarified to community members of Mongegba and Mortem who attended the session that the purpose of this meeting is to disclose the ESHIA report following community engagement sessions held in all project locations (including Mortem and Mongegba) across Freetown during the baseline assessment studies. He stated that the disclosure will ensure that community concerns are incorporated into the ESHIA report and all discussions during the disclosure session will be documented in the disclosure report that will be submitted to EPA-SL in fulfilment of the requirement for the issuance of EIA licence, confirming statement of EPA's Alfred Jondie that it is a requirement for the issuance of EIA license.

He stated that Environment Protection Agency Sierra Leone (EPA-SL) required the project proponents to conduct an ESHIA study before the commencement of the project. To accomplish this, IMC Worldwide partnered with Njala Environmental Technicians (a local environmental consulting firm consisting of mostly lecturers from Njala University) to conduct the ESHIA studies. The ESHIA studies revealed that the project has both positive and negative impacts to the environment, people and society. Mitigation measures have been recommended to minimize and avoid (where possible) the negative impacts.

## **OUTLINE OF POWERPOINT PRESENTATION**

The consultant gave the outline of the report as follows:

- i. Background
- ii. Objectives
- iii. Project Location
- iv. Environmental Social and Health Impact Assessment (ESHIA)
- v. Works within Freetown

### **Project background**

The consultant informed the disclosure participants that the proposed project is funded by the Department for International Development in UK; The project is being implemented as a partnership between Guma Valley Water Company (GVWC) Sierra Leone and a consortium of IMC Worldwide, ATKINS and BAM Nuttall who are responsible for the engineering design and construction supervision, and overall management of the project; MOTT McDonald is the project supervisor.

### **Objectives**

The Freetown Water Supply Project aim to improve the life of the people residing in Freetown through improvement in service delivery and particularly the rehabilitation of the water infrastructure for the delivery of potable water.

## **Project location**

The consultant stated that the project is categorised by work packages and spread from West to East of Freetown with six work packages based on the type of installations, construction and rehabilitation that is to be carried out in the different locations. The work items vary from one location to another but are focused on the rehabilitation of networks, construction of reservoirs and weirs, replacement and rehabilitation of existing pipelines, laying out of new pipelines to connect newly constructed reservoirs and weirs to existing networks and further infrastructure improvements.

## **Works Within East of Freetown**

In his presentation, the lead local consultant stated the following as being included in the work packages within East of Freetown:

- a) Construction of weir at Mongegba and Mortem
- b) Installation of new transmission line from the constructed weir in Mongegba and Mortem to Allen Town across the Orugu River
- c) Extension and rehabilitation up to 8.75km of existing distribution network from Allen town treatment Plant to various communities
- d) Rehabilitation of supply networks from East End Police to Wellington
- e) Install bulk transfer system and bulk flow metering.

## **Benefits of works within East of Freetown**

Mr Jalloh stated that once the above works within the East of Freetown have been completed, the under mentioned benefits associated to it:

- Increased water supply across the East network
- Improved reliability of water supply for the Eastern Network
- Potential for increased access to potable water.

## **Project Impacts and Mitigation Measures**

The consultant noted that this is the most important aspect of the report: the said project has both positive and negative impacts and measures to minimise the negative impacts. Mitigation measures have been recommended to reduce or avoid the negative impacts of the project to the environment, people and society; whilst measures have been presented to maximise the positive impacts of the project.

He noted that projects of this nature are not prone to cause widespread environmental degradation and that the project's negative impacts are temporal, mostly reversible and are short lived.

The following are the negative impacts that the Freetown water supply rehabilitation project has during the implementation period:

- i) Traffic disturbance: there will be traffic disturbances in the areas where the works will be carried out due to increased vehicular and equipment movement by the contractors. To minimise this impact, there is a traffic management plan that will be implemented during the project's implementation phase.

ii) Resettlement: many structures that have been built in the direct vicinity of pipes may be affected, especially business structures like tele centres, kiosks etc. There is a structure (Resettlement Action Plan) that has been put in place for those structures as a way to resettle and/ to compensate the project affected persons (PAPs). PAPs have been mapped and engaged to formulate a way forward. The Resettlement Action Plan is being completed.

iii) Disruption of public utilities and services: NET's consultant explained that there will be disturbance in public utility delivery during the implementation period. Mostly, water supply to those that have access to Guma's pipe born water will be affected. Other utilities and services (e.g. EDSA, SierraTel, and other mobile phone networks) will not be affected by the implementation of the project. As a way of mitigating this impact, beneficiaries of the affected communities will be notified at least three days before the anticipated disturbance. Works will be carried out in phases to reduce the level of impact and duration of utility disruption. Furthermore, the implementing partners and the contractors are in constant consultations with public utility and service providers (EDSA, SLRA, etc.) to ensure that they are ready for any emergency during the implementation period and to foster coordination amongst them.

iv) Access to homes and other places: some of these places have to be disturbed during construction, but there are measures (such as a phased implementation approach) that have been put in place to minimize the impact in the shortest possible time.

v) Noise generation: the implementation of the project will increase to some extent the noise level of the areas where works will be carried out. This will be due to the use of machines and other construction equipment. This will be mitigated by carrying works during day time when most community members are out and engaged in their various livelihood activities.

## QUESTION AND ANSWER SESSION

This session was facilitated by Mr. Ambrose Bundeh of NET.

Participants were given the opportunity to ask questions, seek clarifications and raise concerns based on the presentation of the ESHIA report and the project as a whole.

Respondent	Question/Query/Comment	Answer:
<b>Abu Kargbo</b> (Mortem)	What will be the benefit for the youth in this community?	<b>Mr Ambrose Bundeh (NET):</b> The communities will benefit by way of employment and the stakeholders will work in collaboration with the youth before and during the implementation phase of the project.
<b>Mohamed S Binya</b> (Mongegba)	What is the time duration of the project and what is the commitment of the community?	<b>Mr Ambrose Bundeh (NET):</b> The implementation phase of the project will commence as soon as the EIA licence is issued by EPA-SL upon the completion of the ESHIA study.  The commitment of community people will include collaboration with the project team to ensure the project is sustainable. He also stated that attending this disclosure session and participation during the FGD sessions are all aspects of community commitment to the project.
<b>Mohamed Tunakara</b> (Mongegba)	What is the benefit of the community? Will the community benefit directly from the project?	
<b>Yabom</b>	How will the water pipes be installed, as	<b>Ishmail Bundu (GVWC)</b>




<b>Kargbo</b> (Mongegba)	there is no existing network in the community?	The project will install new pipeline to carry water from the weirs that will be constructed at Mortem and Mogegeba to connect to the existing pipe system to the Treatment works in Allen Town.
<b>Santigie S. Kamara</b> (deputy headman)	Raised his concern about the protection of water sources where the weirs will be constructed. He made a commitment on behalf of the other head men and chiefs present that they will formulate by-laws that will prevent charcoal burning, bush clearing and encroachment around the water sources	<b>Mr. Jondie, EPA-SL:</b> Thanked the deputy head for such a wonderful environment concern and community commitment to the protection of water sources.
<b>Daniel Moriba</b> (secretary to councilor)	The site where the proposed weir is to be constructed is a valley: in case there is an eruption or landslide, what will be the response to solve that problem?	<b>Ishmail Bundu (GVWC):</b> GVWC has many experts and the project has contractors that have outlined the areas where weir will be constructed and these are not sites that are prone to landslides or eruptions.
<b>Ibrahim Moriba (Mortem)</b>	The community has identified a specific area that is suitable for the construction of a dam. If GVWC is interested they can request for that site from the community and it will be given to the company.	<b>Ishmail Bundu (GVWC):</b> The project has experts that have assessed the suitability of the locations where the weirs will be constructed for sustainable water supply.

Conclusively, the chairman of the meeting thanked and appreciated all those that were present in the meeting.



## Appendix 12: Health and Safety Plan

<b>Freetown Water Rehabilitation Project</b>			
Employer	IMC Worldwide (DFID)	Project Number	003089 / BAS.2020
Engineer	Atkins	Document Number	FW-IMC-BAM-HSS-PSP-001
Contractor	BAM International/ BAM Nuttal (Bam)	Revision	03
<b>Project HSS Plan</b>			
<b>Reference Sheet</b>			
<b>Document Number</b>	<b>Description</b>		
ISO 45001, 2018	International standard – Occupational Health and Safety Management Systems		
UK HSWA	Health & Safety at Work etc Act-1974, Health & Safety Executive		
CDM	Construction ( Design & Management ) Regulations 2015		
<b>Revision History</b>			
<b>Revision</b>	<b>Date</b>	<b>Revision Description</b>	
03	20/08/2018	Updated to latest revision of HSS Plan Rev 07	
02	22/05/2018	Updated after reviewed by client	
01	07/05/2018	Updated after review by Mott MacDonald	
00	02/04/2018	First revision	
<b>Prepared by</b>		<b>Checked by</b>	
Deepak Senapati		Ben Goodman	
Project Safety Manager		Construction Manager	
		Fegal Kelly	
		Corporate Safety Manager	
<b>Status Definition</b> (latest revision)		<b>Approved by</b>	
03		Eric Jan Bergsma	
		Project Manager	
<b>Status Definition</b> (latest revision)		<b>Total number of pages</b> (including attachments)	
03		63	
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# 1. Introduction

## 1.1 General

The purpose of this plan is to ensure that all HSS aspects on the Freetown Water Rehabilitation Project are managed effectively. The Project Health and Safety Plan (PSP) describes the BAM arrangements for implementation, maintenance and continual improvement of the Management system in accordance with ISO 45001, 2018 International Standard and other applicable and identified legal / client requirements.

The PSP references additional procedures including Operational Controls, forms and other plans which must be read in conjunction with this document. These references are detailed throughout the PSP. The maintenance of the PSP is an ongoing and interactive process. The document is reviewed on a quarterly basis or if there are any significant changes to the requirements including legal, client, corporate, scope etc.

In addition, various references are included for the BAM Online **SAFER** management system.

## 1.2 Scope of the PSP

The scope of the PSP is applicable to all works under the management of BAM and applies in full to all subcontractors, suppliers, visitors and 3<sup>rd</sup> parties entering the worksite.

In addition, the requirements related to management of design are included in the planning section of this document.

## 1.3 Interested Parties Information

(Client / Consultant, Designer etc.)	Organisation Name	Address	Contact Details
Employer	DFID	22 Whitehall London SW1A 2EG, England	Simon Kenny <S-Kenny@dfid.gov.uk>
Client	Guma Valley Water Company	12/14 Lamina Sankoh Street, Freetown, Sierra Leone	Patrick Senesie <p-senesie@dfid.gov.uk>
Supervisor	Mott MacDonald	24 Regent Road, Hill Station, Freetown, Sierra Leone	Rashid Suleiman <Suleiman.Rashid@Mottmac.com>
Consortium Leading Stage 1	IMC Worldwide Ltd	64-68 London Road Redhill, Surrey RH1 1LG, United Kingdom	Jarrett Boltman <Jarrett.Boltman@imcworldwide.com>
Consortium designer	Atkins	Woodcote Grove, Ashley Road, Epsom, Surrey, KT18 5BW	Richard Shepherd
Consortium Contractor	BAM/ Nuttal	BBIN.SL.Ltd 58 Cape Road, Aberdeen, Freetown. SL	Bergsma, Eric-Jan <ericjan.bergsma@bam.com>

## 1.4 Project Overview

The works include the design, procurement, construction and testing and commissioning of the following:

Engineering Management services to rehabilitate the water supply system in Freetown, Sierra Leone, in connection with the various workpackages more particularly described in the Works information. The works comprise of the following workpackages:

Workpackage 1 :Rehabilitate bulk treatment facilities, refurbish filters and improve the reliability of the existing Guma Dam and treatment works.

Workpackage 3: Rehabilitate the transmission system, remove the spaghetti connections and reduce supply pressures.

Workpackage 4: Rehabilitate the distribution network in the west of Freetown, extend the network reducing pressures and removing spaghetti lines.

Workpackage 5: Rehabilitate the distribution network

Workpackage 6: Enhance the Allen Town water supply system in the East by upgrading Charlotte weir

Workpackage 9: Enhance water supply to Wilberforce and surrounding communities by replacing old and dilapidated plant at Spur Road.

Numbers of workpackages are not matching the numbering in the deliverables received due to descopeing in the received deliverables.



## Main work activities:

- Traffic Management in different areas with contact with pedestrians and vehicles
- Bush clearing (by hand and with equipment)
- Setting up of Contractors fenced site camp and lay down pipeyard
- Excavation works in rock and hard soils
- Backfilling, compaction of trenches by small compaction equipment
- Transport of different sizes of steel pipe from lay down area to work sections (diameters from 80 to 500 mm)
- Lifting of containers, pipes,
- Lifting and installing valves and pumps
- Upgrading of electrical control panels in treatment facilities



### 1.5 References

Reference	Description
BMS	BAM Management System
ISO 45001 : 2018	Occupational Health and Safety Management Systems – Requirements
Operational Controls	Documents outlining the HSS related Standards for Operating on Freetown Water Rehabilitation Project
LP / TMP	Logistics Plan / Traffic Management Plan
ERP	Emergency Response and First Aid Management Plan
UK HSWA Act 1974	Health & Safety at Work etc Act 1974

### 1.6 Key Personnel / Contract Details

The Organisational chart for the project team and the HSS Department are detailed in **Appendix B and C** of this document. Roles, responsibilities and authorities are detailed in **Appendix D**.

### 1.7 OH&S Policy

The board of directors of BAM have committed to ensuring the Project HSS Management System is a success and is appropriate to the nature and scale of our Operations on Freetown Water Rehabilitation Project. The OH&S Policy is reviewed annually to ensure it remains relevant and appropriate to the works being carried out. The policy is communicated to all BAM Staff, workers, visitors, clients, client representatives through various streams including but not limited to;

- Project Specific Induction (both supervisor / worker level)
- TBTs
- Sign Boards / Notice Boards
- Interflash to all Staff

- 
- Via Document Control
  - Training
  - SAFER Management System
  - Site staff to lead by example
  - Periodic site visits by Senior BAM members
  -

The policy will also be translated and consider poor levels of literacy in the workforce.

## 2. Planning

### 2.1 References

#### 2.1.1 General References

Reference/ Definition	Description
ISO 45001 – 2018	1 – Scope
ISO 45001 – 2018	3 – Definitions
ISO 45001 – 2018	4 – Context of the Organisation
ISO 45001 – 2018	5.- Leadership and Worker Participation
ISO 45001 – 2018	6.1 – Actions to address risks and opportunities
ISO 45001 – 2018	6.2 – OH&S Objectives and how to achieve them
ISO 45001 – 2018	9.1 – monitoring, measurement, analysis and performance evaluation

#### 2.1.2 Referenced Forms

Form Reference	Title	Completed By	Support By (if applicable)	Filed / Recorded
BMS-HSS-F-001	Risk Assessment	Project HSS Manager	Project Team / Corporate / Area	SAFER / F1
BMS-HSS-F-001A	Design Risk Assessment	Design Team Inc. 3 <sup>rd</sup> party	Tender Mng / Eng Mng / HSS Mng	SAFER / F1
BMS-HSS-F-002	Temporary Works Design Certificate	Appointed Temporary Works Coordinator	Project Team	F1 / Engineering
BMS-HSS-F-003	MS Amendment Sheet	MS Originator	Project Team / HSS	F1 / MS Originator
BMS-HSS-F-004	Activity Plan	MS Originator (MS) or Engineer / CM if used as Minor MS	HSS / Engineering	F1 / MS Originator
BMS-HSS-F-005	Evaluation of Legal / Other Requirements Register	Project HSS Manager	Project Team / Corporate / Area / Legal Department / Commercial Department	F2 / SAFER
BMS-HSS-F-005A	Summary sheet for Legal and Other Requirements	Project HSS Manager	Project Team / Corporate / Area / Legal Department / Commercial Department	F2 / SAFER

#### 2.1.3 Legal / Client Reference

Heading / Decree / Law / Act etc.	Clause	Brief outline
CDM Regulation 2015	Regulation 15	Duties of contractor
CDM Regulation 2015	Regulation 17	Safe places of construction work

### 2.2 Introduction

BAM recognises that planning is critical to the fulfilment of the commitments approved in the OH&S Policy. To this end, BAM will establish, implement and maintain the following elements for the project as an integral part of the planning process;

- Risk Management - Identification of hazards and risks, identification of opportunities plus the implementation and monitoring of control measures
- Identification of all applicable legal & other requirements and evaluation on a quarterly basis.
- Management of Temporary Works.
- The setting of Objectives, predominantly leading (proactive) plus the implementation of a program to implement and a structured approach for review.

### 2.3 Risk / Opportunities Management

Further to project award the project risk assessments are completed coordinated by the PSM in conjunction with the Project Team and support from the Area / Corporate Office, taking in to account the scope, legal, contractual and other requirements.

The template **BMS-HSS-F-001** will be used to document all hazards / risks on the Freetown Water Rehabilitation Project in addition to the **SAFER** online system.

All risk assessments are also maintained in a live environment on the **SAFER** online system with all project personal having access.



All persons completing risk assessments in the Company must have attended an internal risk assessment training delivered by the PSM.

### Step 1 – Identify Hazards

The following should be considered when identifying hazards - i.e., those aspects of work (for example substances or equipment used, work processes, or work organization) which have the potential to cause harm;

- Routine / non-routine activities
- Activities of all persons having access to the workplace.
- Human behaviour, capabilities and other human factors (Social including workload / bullying / leadership / culture etc.
- Identified hazards originating outside the workplace capable of adversely affecting the health and safety of persons under the control of BAM.
- Hazards created near the workplace by work related activities under the control of BAM.
- Infrastructure, equipment and material at the workplace whether provided by BAM or others.
- Changes or proposed changes in BAM.
- Legal Requirements

### Step 2 – Assess Risks

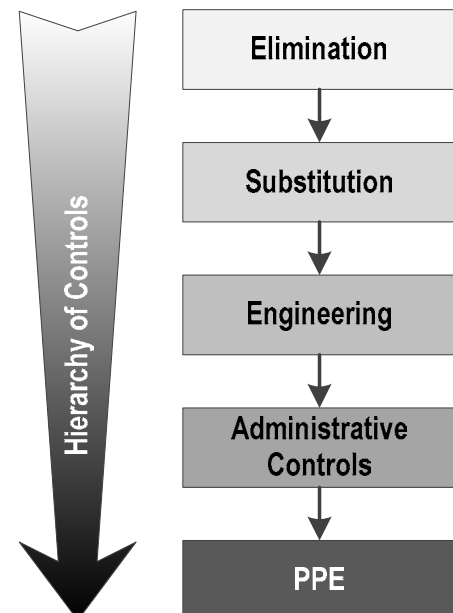
Once the hazard is identified, the risk that the hazardous event may occur plus who may be exposed is assessed. A hazard may have more than one associated risk, for example, precast – working at height and the failure of temporary works are risks that need to be highlighted separately.

### Step 3 – Determine Controls

This is the main element of the assessment where the hierarchy of controls, must be considered. The section of the risk assessment must contain text detailing what is required to reduce the risk level to an acceptable level. The control measures should be described in a clear and unambiguous language. It should principally contain what actions the Project team are going to implement during the Construction Process. Control measures need to be communicated to all persons carrying out the activity with a focus on management / supervisors / engineers.

The approved controls must be implemented for the identified hazard. All personnel, including workers / supervisors / project management are required to ensure the controls are in place and monitored. In addition to the implementation, the BAM reference may also be included. This will be documents such as Operational Controls, PSP, Emergency Procedures and other site specific supporting documents

Control measures must be realistic and achievable with inputs from those experienced in the activity being undertaken. The most important factor when determining controls is the hierarchy of risk management.



#### Elimination

Risk may be 'eliminated' by redesigning a job sequence and removing a hazardous step. This may take place at design stage, for either permanent or temporary works.

#### Substitution

Risk can be reduced through, for example, the 'substitution' of hazardous materials / substances for less hazardous materials / substances. This may take place at design stage for either permanent / temporary works.

#### Engineering

Engineering Controls' are an effective means of managing risk. Engineering controls use physical measures to separate workers from hazards. Typical examples include barriers or guarding of machinery. The use of local exhaust ventilation in a workshop is another example of engineering controls. In construction, the use of engineering controls is a major factor in the development of a safe place of work. Much construction equipment has built in engineering controls such as automatic cutoff switches, interlocks etc. This may take place at design stage for either permanent / temporary works.

#### Administrative Controls

Administrative Controls' include the development of procedures, method statements, risk assessments etc. (Operational Controls). Administrative controls also include training. Administrative controls can be effective as workers become more aware of hazards and more competent in carrying out their duties in a safe manner. Administrative controls may also include work scheduling. For example, reducing shift times may reduce workers exposure to hazards.

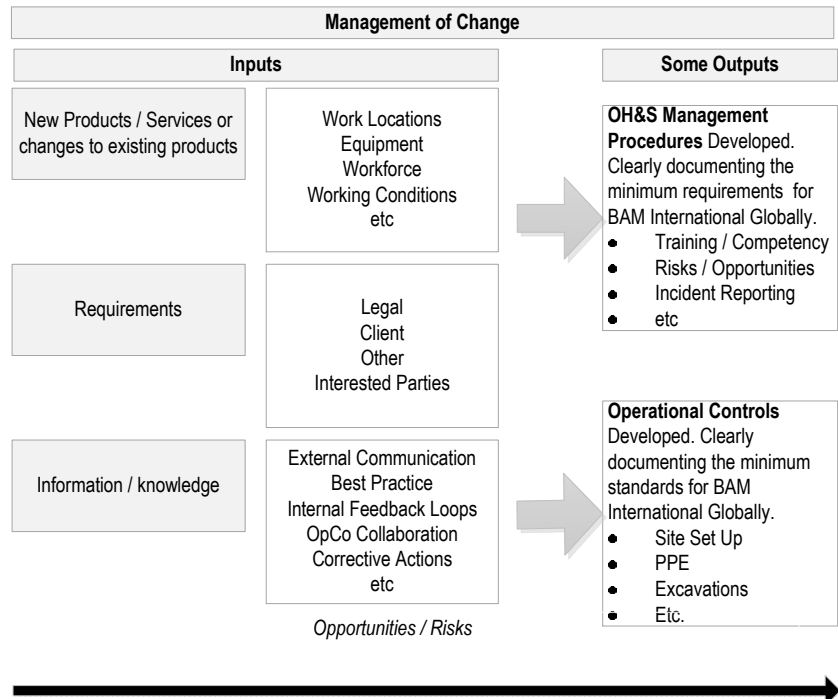
#### PPE

PPE is the final element in the hierarchy of risk management. PPE should be used where no 'reasonably practicable' alternative is available. PPE will include general personal safety equipment and RPE (Respiratory Protective Equipment).

## 2.4 Management of Change

BAM has a robust system in place to effectively manage change that has the potential to introduce new hazards / risks to the project

The chart provides a broad overview of the process; however, the OH&S system is designed to ensure all changes (internal / external) can be highlighted at the planning process and subsequently addressed.



### 2.4.1 Monitor and Review

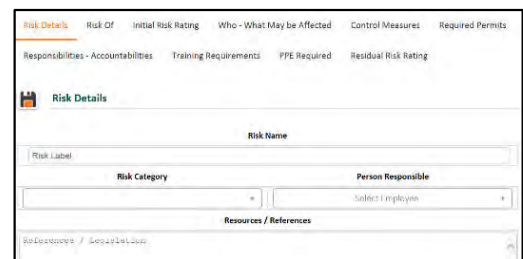
The PM and his supporting project team (construction managers, engineers, foremen, supervisors etc) shall monitor compliance with the planned arrangements and intervene where unsafe conditions / behaviours exist. In addition, the onsite HSS team will provide feedback / improvement recommendations.

## 2.5 Risk Assessment Template

The Risk Assessment template, **BMS-HSS-F-001** is to be utilised for all Risk Assessments, unless alternative requirements are required by the Client and / or legal requirements exist.

Each risk assessment is a "standalone" document / record which has the following;

- Section 1 – Risks
- Section 2 – Who / What may be affected
- Section 3 – Initial Risk Rating
- Section 4 – Controls
- Section 5 – Required Permits
- Section 6 – Responsibilities and accountabilities
- Section 7 – Training Requirements
- Section 8 – PPE Requirements
- Section 9 – Residual Risk Rating (Further to the implementation of Controls)
- Section 10 – BAM References (Including Risk Assessments)
- Section 11 – Opportunities



The screenshot shows the 'Risk Details' section of the Risk Assessment Template. It includes tabs for 'Risk Details', 'Risk Of', 'Initial Risk Rating', 'Who - What May be Affected', 'Control Measures', and 'Required Permits'. Below the tabs, there are sections for 'Responsibilities - Accountabilities', 'Training Requirements', 'PPE Required', and 'Residual Risk Rating'. The 'Risk Details' section is expanded, showing fields for 'Risk Name', 'Risk Label', 'Risk Category', 'Person Responsible', and 'Resources / References'.

The sections below provide a brief overview of the risk assessment template. Wherever possible, the **SAFER** system is to be utilised as the source for risk assessments. Risk assessments are made site specific by the project, referencing the mandatory requirements outlined within the "Corporate Library"

**Section 1** highlights the risks associated with the activity plus the details of consequences, i.e. – what can be the result further risks.

**Section 2** is a tick box and highlights who or what may be affected. One or more options may be highlighted within this section.

**Section 3** assesses the risk rating prior to controls being in place. See section 6 below for further information.

**Section 4** is the critical element of the risk assessment process. This section details the controls that must be implemented. Where required, projects / Areas may add to the control measures but are not permitted to remove any section from the approved list.

**Section 5** is a tick box and highlights what are the permits required. One or more options may be ticked within this section. Permits not listed can be added as applicable.

**Section 6** is a tick box and highlights who are the responsible and accountable for the implementation and supervision of the control measures that have been identified.

**Section 7** details the internal / external training requirements associated with the risk assessment and essentially form part of the control measures included in section 4.

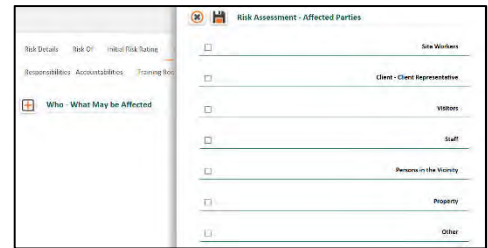
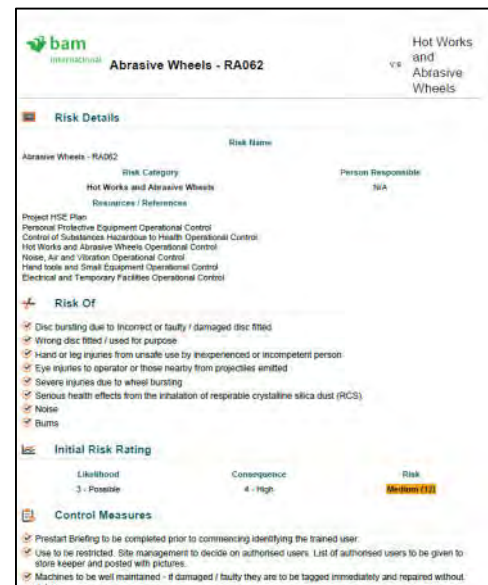
**Section 8** details of Personal Protective Requirements

**Section 9** is the assessment of the residual risk further to the control measures being implemented. Where the risk rating is not acceptable, additional controls may be required. Where the residual risk rating is 8 or above (Orange), the works / activity is not permitted to take place. Further review required.

**Section 10** provides a reference to additional risk assessments plus Project Specific Documents.

**Section 11** provides the tool to identify / add opportunities further to the assessment, ie a circumstance or set of circumstances that can lead to an improvement in OH&S Performance.

Note that all risk assessments completed on the **SAFER** are printable further to completion.

## 2.6 Risk Matrix

When calculating the risk / impact both the likelihood and severity are considered. The matrix below, details how the assessment takes place. How to assess the Risk Rating is detailed in the figure below. Where the rating is rated at Medium High or High, additional controls are required to reduce the risk prior to the works taking place. Where the risk is rated as Medium or Medium Low, the works may proceed.

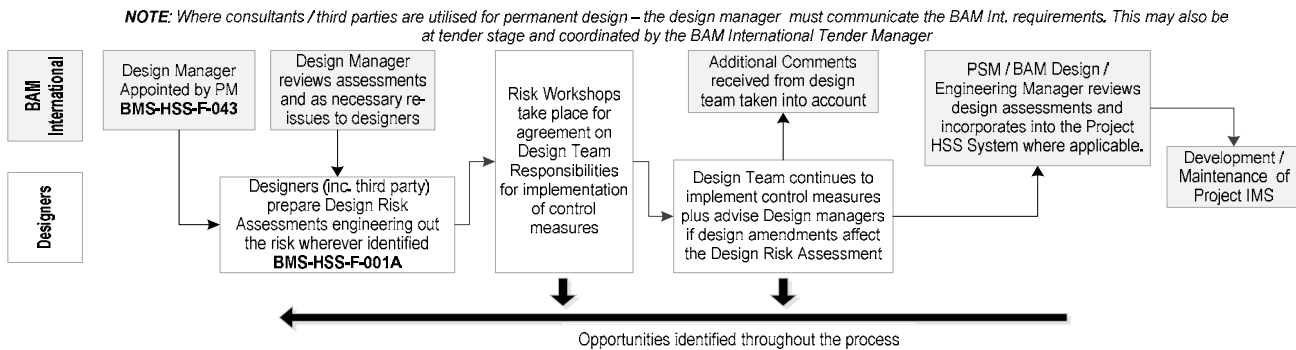
Likelihood of Risk Occurring		Severity of Risk	
Highly unlikely but maybe an occurrence in exceptional circumstances. It could happen but probably never will.	1	Causing minor injury (scratch etc)	
Not expected but there's a slight possibility there may be an occurrence at some time.	2	Potentially causing injuries that may be a Category 4 (First Aid) or a Cat 6 (near miss)	
The event might occur at some time, medium probability.	3	Causing significant injury (Stitches, Sprain, laceration with the potential for a Cat 2,3 or 5 incident)	
There is a strong possibility of occurrence	4	The potential to cause a lost time / serious injury and / or a high potential near miss.	
Very likely, high chance of occurrence	5	The potential to cause a Cat 1 (Fatality / permanent disability) or an incident of greater damage than 50,000 euro	

Severity X Likelihood - Risk Rating (RR)	1	Insignificant
	2 to 3	Medium Low
	4 to 6	Medium
	8 to 12	Medium High
	15 to 25	High

Likelihood of the incident occurring	Severity				
	1	2	3	4	5
	1	2	3	4	5
	2	4	6	8	10
	3	6	9	12	15
	4	8	12	16	20
	5	10	15	20	25



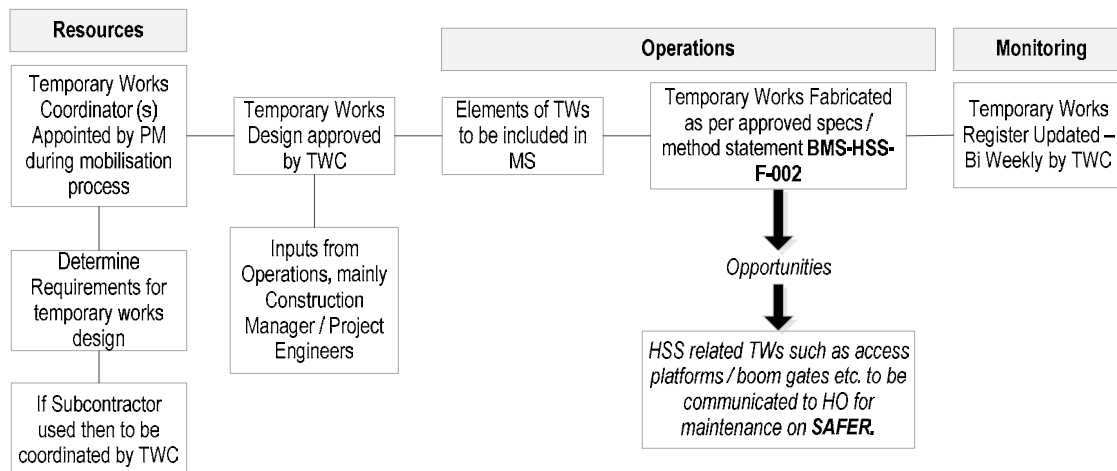




The list below gives an idea of what constitutes temporary works

Note that propriety products once installed / erected correctly do not need a check but still need to be registered. (Herras Fencing)

- Scaffold of height equal or greater than 7 meters or a scaffold design that is not included within the Manual.
- Handrails / Edge Protection.
- Welfare Facilities / Car Parking Shades / Workshops etc.
- Lighting Towers.
- Formwork / Falsework.
- Hoarding, fencing and Gates.
- Propping schemes.
- Internal hoarding and temporary partitions.
- Frames / Stillage's for storing piles.
- Specialised lifting accessories / or attachments.
- Access Bunds / Excavations



During the premobilisation HSS Meeting, the list of temporary works is clarified and documented.

## 2.9 Method Statements

In addition to Procedure Work Method Statements this section details OH&S requirements for management of method statements. A list of method statements is a topic for discussion in the Project premobilization safety meeting.

For all Method Statements, a Risk Assessment is a mandatory requirement. It is permitted that additional controls may be added to risk assessments, however under no circumstances are Projects permitted to remove controls from the approved list of risk assessments.

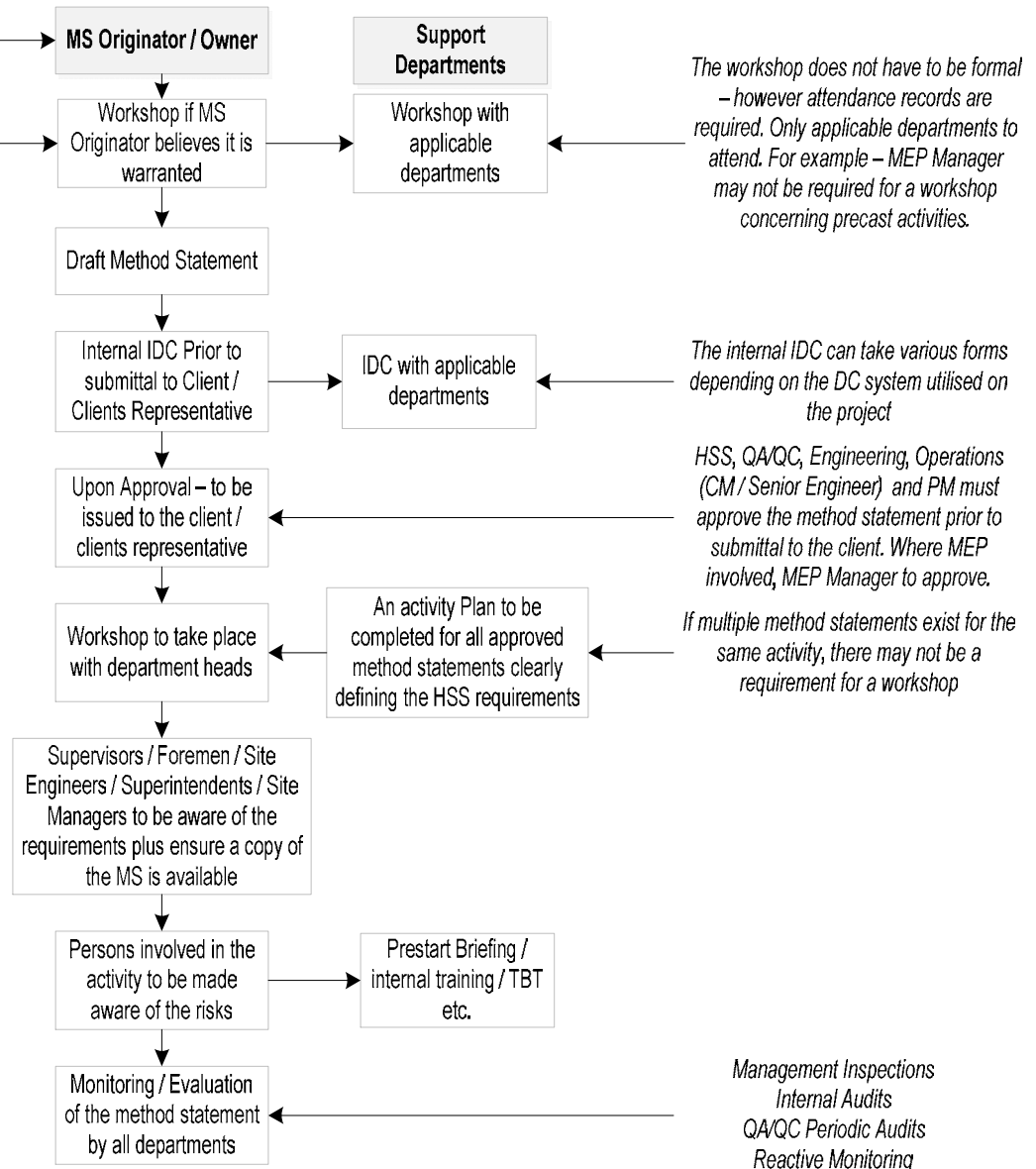
Upon rare occasions, with the approval of the PSP, an activity plan may be completed, **(BMS-HSS-F-004)** This is for works such as concrete wash outs, low risk fencing / traffic management etc.

If there is a slight deviation from the approved methodology, the method statement originator may introduce the method statement amendment template. The MS originator is then required to ensure the updated requirements are communicated / implemented.

### 2.9.1 Method Statement Process

**Note** – Where a subcontractor method statement is being utilised – the appointed person from BAM is the MS Owner and is responsible for the approval / communication process of the MS.

Workshops are mandatory for high risk activities such as Steel erection, commissioning, glazing, piling, formwork, precast etc. The MS Originator in conjunction with the PSM determine the requirement.



Method Statements, further to client / legal requirements will be drafted / approved under the following headings;

- Introduction
  - Scope of Work
    - SIMOPS (Simultaneous Operations)
  - Anticipated Duration
  - Subcontractor Information if applicable
- Reference Documents
  - Specifications
  - Operational Controls
  - Quality
  - Engineering
  - Etc.
- Sequence of Work
  - Step by step overview of the activity(s) involved in the process
- Plant / Equipment
  - List of ALL plant / equipment including static / mobile involved in the activity
- Temporary Works
  - List of temporary works for the activity.
- Responsibilities

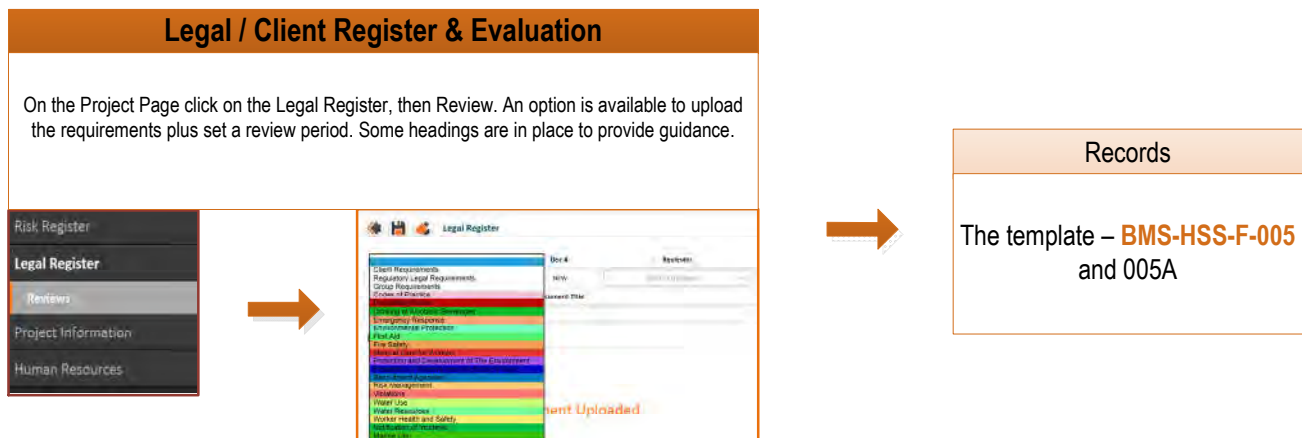


- Clear list of who is involved in the activity plus their accountabilities / responsibilities including appointed persons such as;
    - Temporary works coordinator
    - Lifting Coordinator
    - Etc.
- Occupational Safety
  - Risk assessment list
  - Training Requirements (Competencies)
  - Permits required
  - Emergency Response
- QA/QC
  - Add
- Environmental
  - Add
- Sustainability
- Appendixes
  - Risk Assessments
  - ITP
  - Activity Plan (Summary of the method statement with an emphasis on sequence of works / risks)
  - Other

Wherever possible, method statements will incorporate a full sequence of works. This particularly applies to MEP related methodologies and should be coordinated by the applicable department head such as CM / MEP Manager etc. The aim is to reduce the volume of method statements which by definition, increases the approval process and subsequently execution.

## 2.10 Legal and Other Requirements

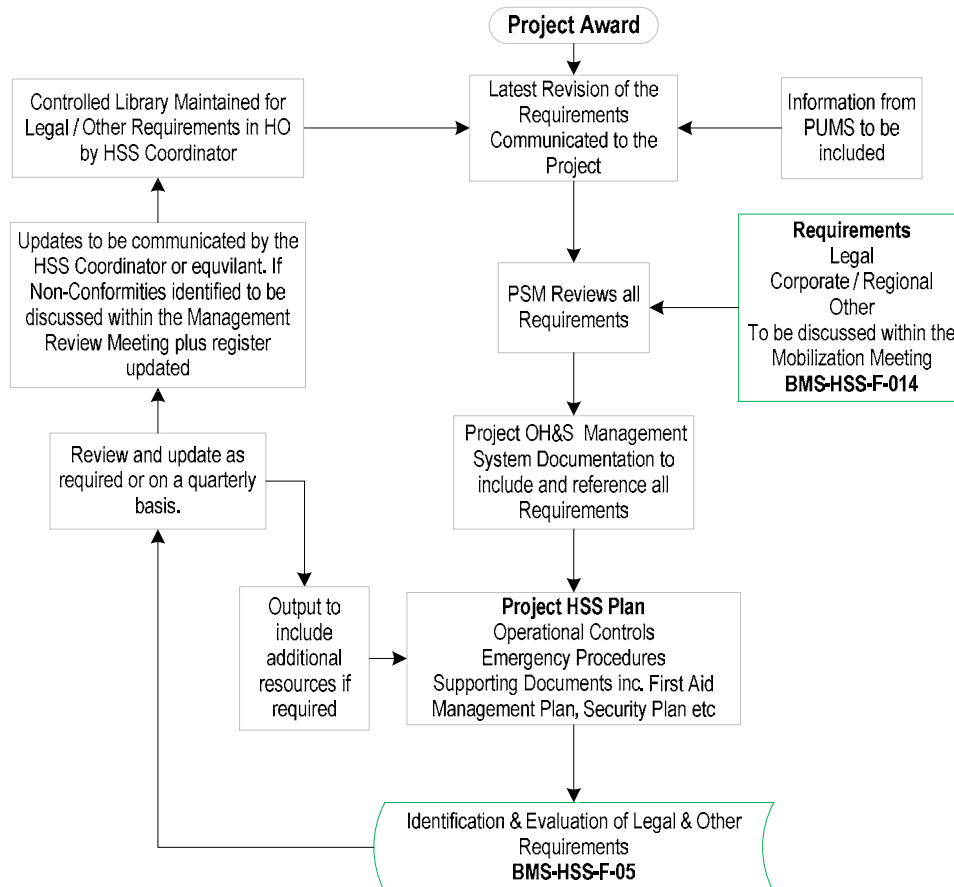
BAM will ensure that all applicable legal and other HSS requirements (Client, Contractual, interested parties etc.) are identified and subsequently evaluated.



Copies of all requirements will be maintained in the Project HSS office plus on the **SAFER** System. An assessment of the requirements will take place on a quarterly basis, led by the PSM utilising **BMS-HSS-F-005** plus the **SAFER** online tool. The evaluation of the requirements will be communicated internally plus may be a topic for discussion where changes are identified that may affect our activities.

Applicable regulatory requirements that may influence the workforce will be communicated during the project specific inductions. In addition, opportunities identified will be reviewed by the team and, wherever applicable introduced into the OH&S System.

### 2.10.1 Evaluation of Requirements Process



## 2.11 Objectives, Targets and Programmes

BAM realises that setting objectives is an integral part of the continual improvement for the project. Objectives are set as an additional focus point to achieve the commitments outlined in the OH&S Policy. Objectives are primarily utilised to facilitate continuous improvement.

There are two main types of objectives;

### Leading (Proactive) Indicators

Leading indicators identifies the implementation of vital aspects HSS during periodic checks on the operation of critical activities contained within the Management System. Examples could be training targets, management inspections, implementation of new initiatives etc.

### Lagging (Reactive) Indicators

A lagging indicator reveals a breakdown in vital aspects of the Management System following an incident or adverse event. The incident does not necessarily have to result in an injury or property damage and can be seen as a Dangerous Occurrence or Near Miss or an undesired outcome. Examples are reportable injury frequency rates, first aid frequency rates etc.

A minimum of 80% of objectives need to be proactive or leading. All objectives must be specific, measurable, achievable, relevant and timely (SMART). All objectives must be evaluated on a quarterly basis for effectiveness. The objectives for Freetown Water Rehabilitation Project are set / agreed during the premobilisation meeting.

When planning objectives, BAM will ensure that the following is included;

What is to be done and by when

- Resources required
- Responsibility
- How results / indicators will be evaluated

All objectives must be updated on a quarterly basis and maintained on the **SAFER** System. Additional objectives may be added further to lessons learned, corrective actions, campaigns, opportunities, quarterly reports etc.

All objectives are reviewed / signed off on a quarterly basis. The figure below provides the template for objectives and subsequently updated on the **SAFER** Project Page.

Category	Objective	Plan for achieving Objective	Resources / Accountability	Indicator	Progress Update			
					Q1	Q2	Q3	Q4
Planning / Leadership etc.	What is the objective – ie increase supervisor OH&S Awareness	Detailed plan to achieve the objective – what will be done – must be tangible	Resources and persons allocated to achieve the objective	KPI - % of persons trained, number of workshops etc.	Update the KPI in this section plus add additional resources or update the plan if objective not being achieved.			

For Freetown Water Rehabilitation Project a full list of all objectives is contained in **Appendix N** of this document.

### 3. Support

#### 3.1 Reference

##### 3.1.1 General References

Heading	BS ISO 45001 2018 #	Overview
Resources	7.1	Clarification on the commitment to provide resources to maintain and improve the OH&S System.
Competence	7.2	Overview of the competency requirements including determination of competence requirements plus actions required.



Awareness	7.3	Overview of Awareness requirements – policy / objectives / corrective actions / risks etc.
Communication	7.4	General overview of communication requirements with the OH&S - both internal / external
Documented Information	7.5	Outline of how documents are controlled within BAM including referencing, record retentions, archiving, version control and access.

### 3.1.2 Referenced Forms

Form Reference	Title	Completed By	Support By (if applicable)	Filed / Recorded
BMS-HSS-F-006	Training Attendance Record	Trainer	All	F3 / Safer
BMS-HSS-F-007	Prestart Briefing	Supervisors	All	F3A / Safer
BMS-HSS-F-008	Visitor Induction	HSS / Project	All	F3A / Safer
BMS-HSS-F-009	Health Screening / Screening Form (Note – May be used as Health Surveillance also)	Clinical Nurse	HSS / All	Clinical Register
BMS-HSS-F-010	Weekly Training Program	HSS	All	N/a
BMS-HSS-F-043 to XX	Letters of Appointment	Appointed Person / PM	HSS	F3C / Safer
BMS-HSS-F-011	HSS Minutes of Meeting	Chair	Attendees	F4 / Safer
BMS-HSS-F-012	HSS Meeting Attendance Sheet	Chair	Attendees	F4 / Safer
BMS-HSS-F-013	HSS Award Certificate	Issuer of Award	All	F4A / Safer
BMS-HSS-F-014	HSS Premobilisation Meeting Template	HSS Mng	All	F4 / Safer
BMS-HSS-F-015	HSS Good Practice	HSS / All	All	F4A / Safer
BMS-HSS-F-015A	HSS Bulletin	HSS	All	F4A / Safer
BMS-HSS-F-016	HSS Subcontractor Evaluation	HSS / Operations	All	F5 / SAFER
BMS-HSS-F-017	HSS KO Meeting Guidance	HSS	Operations	F5 / SAFER
BMS-HSS-F-018	HSS Prestart Letter	Subcontractor / BAM	HSS	F5
BMS-HSS-F-020	Periodic Testing Report	HSS / Operations / All	All including supply chain	F6 / SAFER

### 3.1.3 Legal / Client Reference

Heading / Decree / Law / Act etc.	Clause	Brief outline
CDM Regulations 2015	Regulation 15	Duties of contractor <ul style="list-style-type: none"> <li>1. Appointing workers</li> <li>2. Training workers</li> <li>3. Providing supervisor</li> <li>4. Providing information and instructions</li> </ul>
CDM Regulations 2015	Regulation 29	Prevention of risk from fire, flooding or asphyxiation
CDM Regulations 2015	Regulation 30	Emergency procedure
CDM Regulations 2015	Regulation 31	Emergency routes and exits
CDM Regulations 2015	Regulation 32	Fire detection and fire fighting

## 3.2 Resources

BAM Top Management ensures that adequate resources are in place to effectively implement, maintain and continually improve the OH&S System.

## 3.3 Competence

This section provides an overview of the OH&S related competence requirements including general and specific both for BAM employees and subcontractors / suppliers. A detailed responsibility matrix is contained in the **Appendix M** of this Plan which defines both the internal / external training requirements for various job functions. Additionally, the BAM Operational Controls detail various internal and third-party trainings such as Plant Operators, Crane Operators etc.

Within BAM the **SAFER** system is utilised to track all training companywide. All employees are issued with a unique identity card which provides a link to their training history. When project teams are on site, verification of training\* can be completed by scanning the unique employee card on their android phone which in turn provides all applicable information.

*\*Note: In some cases, depending on the scope / client requirements / ICT issues training attendance can be recorded using the training attendance sheet.*

The BAM Risk assessments also identifies the required training for persons involved in the activity.

Various levels of training take place in the organisation including;

- Project Inductions (Supervisor / Visitor / Worker).
- Internal Trainings.
- External Trainings.
- Training as per the competency requirements in **Appendix M** of the PSP.
- Incident Investigation Training.
- Various e-learning modules related to the overall BMS.
- Trainings further to Personal Appraisals.
- Job Performer.
- Supervisor Training.
- Emergency Response.
- Toolbox Talks / Prestart Briefings.
- Etc

Competence of Workers	
Internal	How?
Legal / Other Requirements	Criteria identified during legal / other requirements evaluation. Included at all levels of training
Risk Assessment	Controls include training requirements
General Awareness	Project Specific Induction – which remains live and applicable to all activities taking place. Includes expectations
Compliance / Non-compliance both from a disciplinary and health / safety factor	In Project Induction plus internal training modules plus TBTs
Operational Standards	Set of Operational Standards which reflect the activities taking place – general dos and donts!

Workers, via training and confirmation of competence are empowered not to carry out any activity they feel may pose a risk to their health / safety.

Two-way communication is encouraged during the delivering of all internal trainings. Where a worker does not meet or no longer meets the competency requirements actions must be taken including retraining, mentoring or simplifying the training.

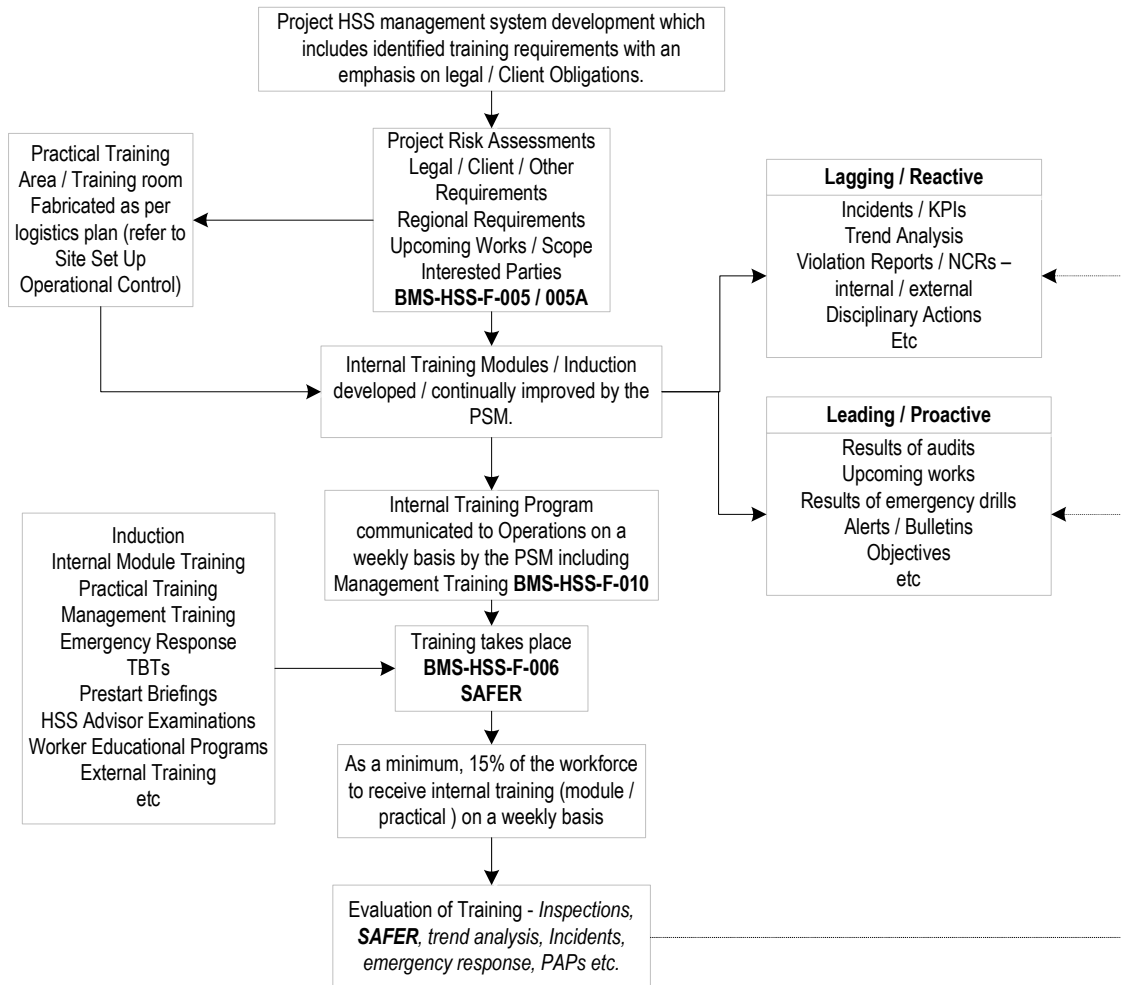
### 3.4 Awareness

All workers, including outsourced (subcontractors / suppliers) will be made aware of the following at induction stage;

- The Project Policy and Project Objectives.
- The benefits of improved performance.
- The consequences – including both ill health and disciplinary of not conforming to the management system.
- Hazards, OH&S Risks and controls that may influence them.
- Empowerment – the emphasis on not carrying out work if they feel it is unsafe to do so.

Other applicable information such as results of incident investigation, corrective / preventive actions further to audit results, bulletins, best practice will be communicated via internal training and / or TBTs.

### 3.5 Process Chart for Training



### 3.6 Training Types

This section deals primarily with the various types of trainings that take place within BAM.

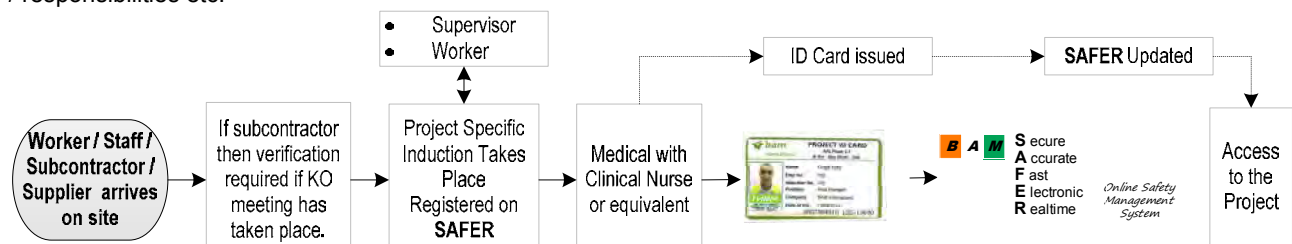
#### 3.6.1 Induction Requirements

##### Project Induction

It is a requirement that all persons accessing the Freetown Water Rehabilitation Project complete the Project Specific OH&S Induction. Induction timings for Freetown Water Rehabilitation Project are 7.30am every working day and located at DMG yard training room or IMC meeting room

Upon successful completion of the induction, the attendees are required to complete a brief medical with the clinical nurse. During this process, their information is uploaded to the **SAFER** System and the project specific ID Cards printed.

The content of the inductions to be revised when there is a change in the scope / legal / client requirements. Two levels of inductions are required, a supervisor induction focusing on accountabilities / responsibilities and a worker level induction which address the identified Project Hazards plus additional information on emergency response, policy, roles / responsibilities etc.



For subcontractors / suppliers – if the company has not attended the HSS KO meeting, inductions are not permitted to take place as per the **SAFER** System.

##### Visitor Induction



A visitor induction also takes place as required. A visitor induction is valid for the duration of that visit and no longer than 12 hours. Persons who receive the visitor induction are issued with a unique visitor card and registered on the **SAFER** system. All visitors must be accompanied by a BAM member of staff who has completed the full induction always.

All Vehicles / Equipment accessing the project are issued 'BAM Gate Passes' prior to entry. Refer to the Operational Control, Vehicles & Mobile Plant OC. **FW-IMC-BAM-HSS-OC-009**

### 3.6.2 Internal Training Requirements

#### Internal Module Training

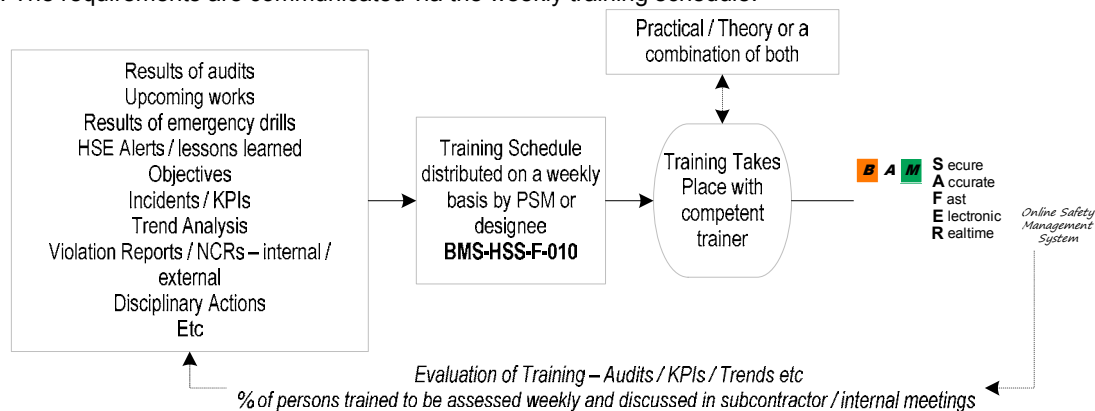
Upon Project award, the PSM begins preparation of the internal training requirements. Upon completion of the modules. A list of generic training modules is stored **SAFER** System within the Corporate HSS Page.

A training room plus a practical training area is required and the detail to be included in the Project Logistics Plan. The training room will be equipped with comfortable seating, projector, sufficient space to display training aids and an area, dust free, to be allocated for the hardware for the i-BAM device. Refer to Site Set Up Operational Control for further information. As a minimum, **15%** of the workforce are required to be trained on a weekly basis. Project Health and Safety Advisors (PSA) generally complete the internal training, however all internal trainers must be evaluated by the PSM.

The PSM or designated person forwards the module training schedule to all staff / subcontractors on a weekly basis (**BMS-HSS-F-010** OH&S, Weekly Training Program). Training requirements are based on the following information;

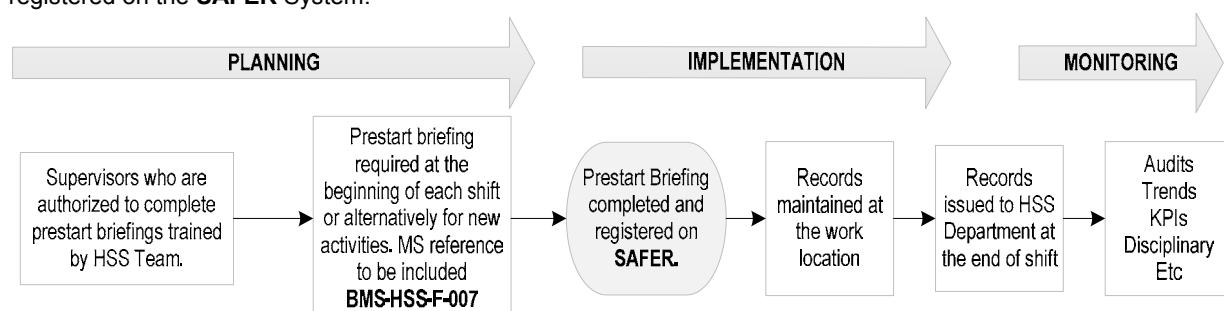
- Incidents / KPIs
- Trend Analysis
- Violation Reports / NCRs
- Disciplinary Action
- Results of audits (1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> party)
- Results of emergency drills
- Bulletins / Alerts / Lessons learned
- Objectives
- Etc.

Upon successful completion of the training, the attendee's registers attendance via the **SAFER** System or, if unavailable via **BMS-HSS-F-006**. Management are also required to be actively involved in both delivering and attending training. The requirements are communicated via the weekly training schedule.



#### Prestart Briefing

Prior to any activity taking place on Freetown Water Rehabilitation Project, a documented prestart briefing is mandatory. (**BMS-HSS-F-007** OH&S Pre-Start Briefing) The supervisor in charge completes the brief OH&S talk and focuses on the activity to be carried out. The briefing also references the approved method statement for that work. All supervisors must complete internal awareness training on how to complete the Briefing. Prestart briefings are retained at the worksite and at the end of the shift, issued to the Project HSS Department. Prestart briefing attendance is also registered on the **SAFER** System.



### Toolbox Talks

As a minimum, all persons at the worksite are required to complete 1 TBT per week. (this includes supervisors / foremen) Toolbox talks are informal, documented H&S Meetings that can be completed by workers, supervisors, HSS Staff etc. on the Project.

### Supervisor Training

On a weekly basis, the PSM is required to issue a training plan which details the schedule for Management Training. (**BMS-HSS-F-010**, HSE Weekly Training Program).

The allocated staff member is required to complete the training as per the schedule. The emphasis is on the practical element and it is required the manager walks the project with the workers / supervisors highlighting non-conformances and giving suggestions for improvement. Training should take no longer than 30 minutes.

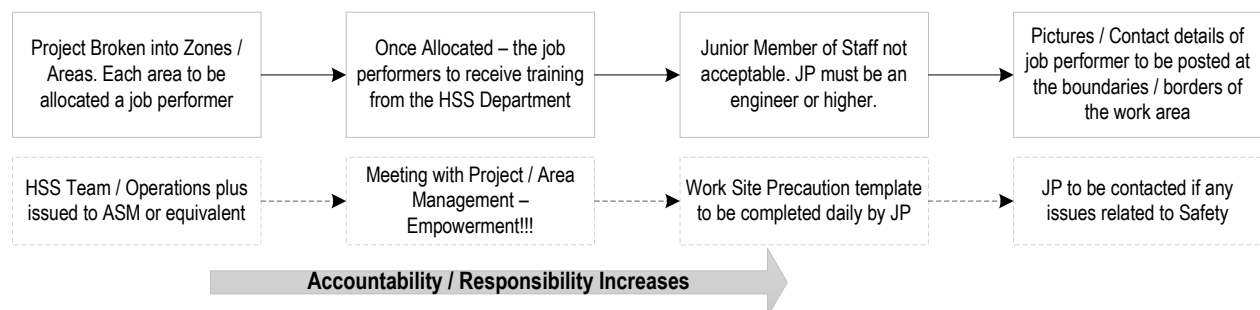
#### 3.6.3 Job Performer

A job performer is a designated person, nominated by and empowered by Senior Management to ensure that his / her work area and activities are set up in a safe manner daily. This person is both responsible and accountable to ensure all works are carried out in a safe & controlled manner.

The functions of the job performer or JP are as follows;

- The JP is empowered to stop or suspend an activity should they deem it unsafe or feels the HSS precautions are not in place.
- Ensures that he/she is aware of the HSS rules and regulations, work procedures, job locations, tools and equipment to be used.
- Ensure that the correct activity/tool is performed / used for the activity.
- Implements the Work Site Precautions template for the activities within their area.
- Ensures that any corrections identified by the Project teams are addressed in a timely manner.
- Adheres to and maintains the worksite precautions identified throughout the duration of the job.
- Immediately suspends work in the event of the Emergency Siren or General Alarm being activated.
- Returns the Work Site Precautions to the HSS Office on suspension of work, at end of the working day, or on completion of the work.

On completion or suspension of the job he must ensure that the work site is left in a clean-clear and safe condition



### 3.7 Appointed Persons

At mobilization stage (**BMS-HSS-F-014** – OH&S Premobilization Meeting Template) and throughout the contract phase, various letters of appointment for OH&S Critical roles are issued by the Project Manager. This will include but are not limited to the following;

- Lifting Coordinator\*
- Lifting Supervisor\*
- COSHH Coordinator
- Emergency Response Teams\*
- Temporary / Permanent Works Coordinator\*
- Scaffold Coordinator\*
- Etc.

Training takes place with all appointed persons and their responsibilities are clearly defined within the letters. The Project Safety Plan is required to contain the Project Specific Information related to accountabilities on the Project in addition to the letters of appointment. Letters of Appointment will utilize the templates as per **BMS-HSS-F-043 to 46 & BMS-HSS-F-048 to 51**

Those highlighted with \* require external training.

### 3.8 Communication, Participation and Consultation – Engagement

The purpose of this section is to detail the various methods of communication, participation and consultation among various interested parties or stakeholders on Freetown Water Rehabilitation Project. BAM has an effective two-way communication and consultation process which allows the free flow of information, involving and motivating individuals to think, act and live in a safe manner.

Any works that interfere with the public must be planned, communicated and approved by the respective authorities / Client and any relevant permits procured along with the relevant documentation.

#### 3.8.1 Mechanisms for Communication

On Freetown Water Rehabilitation Project a range of mechanisms are utilised to communicate applicable HSS information including but not limited to;

- BAM Safety policy;
- HSS meetings;
- Project Meetings
- Client Meetings
- Notice boards;
- Safety promotions and incentive schemes;
- Tool box talks;
- HSS Bulletins
- **SAFER** Online system applications
- Internal memo's
- Practical Training Room
- Induction Room
- Workshops

#### Safety Notice Board Requirements

Safety notice boards shall be placed at appropriate, prominent locations. These notice boards shall be located in positions that are clearly visible to the Contractor's employees and anyone entering the work place. Safety signs shall be selected that describe the appropriate hazards and relevant emergency contact information and shall be in English, Krio and the other most common languages of the workforce.

All persons shall be made fully aware of the safety signs and the emergency contact information, prior to commencing work on site, generally via the project HSS induction.

The main HSS notice board shall contain the following;

- OH&S Policy
- Incident Reporting Escalation Chart with an emphasis on Critical Incidents
- Bulletins if applicable
- Site Emergency / evacuation plan
- Site HSS Rules
- List of project emergency contact numbers
- List of local emergency service information and numbers

In addition to the main notice board, an additional statistics board will be in place at each work location entrance point and will be procured further to the Site Set up Operational Control **FW-IMC-BAM-HSS-OC-001**

#### 3.8.2 Good Practice / Opportunities

A Good practice in an innovative undertaking on Freetown Water Rehabilitation Project that serves to improve the HSS Standard. It is not a requirement within the Project Management System. The template **BMS-HSS-F-015**, HSS Good Practice is utilized when reporting good practices. Included is the following;

- Description of Findings
- Benefits
- Author of the Report
- Where did the idea come from?
- Supporting documents including testimonials, pictures etc.

#### 3.8.3 Meeting schedules

Two main types of meetings take place on Freetown Water Rehabilitation Project, internal (those arranged by BAM) and external (those arranged by the Client / Consultant) on the Project.



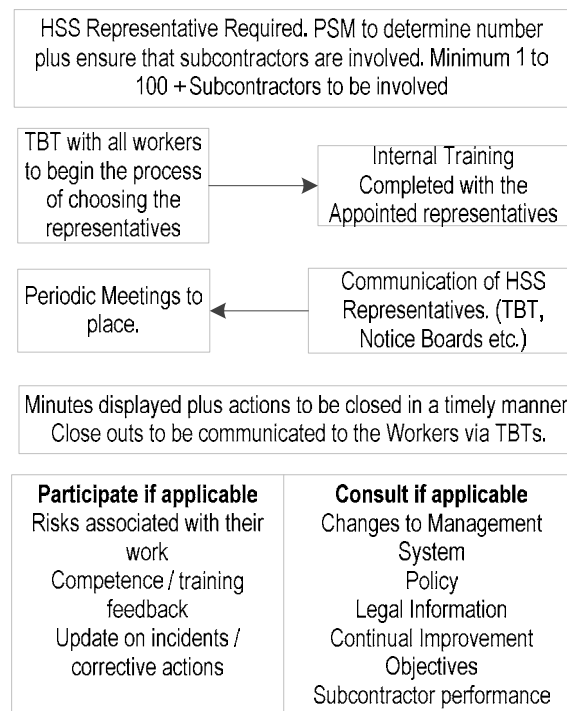
### Internal Meetings

Meeting Type	Frequency	Attendees	Overview / Agenda
Project HSS Meeting	Weekly (Till construction start the HS matter will discuss in weekly progress meeting)	PSM or designated person Project Manager Construction Manager	<p>Chaired by the PSM or designee.</p> <ul style="list-style-type: none"> <li>Review of Previous Minutes</li> <li>Incidents – outstanding corrective actions from previous reports</li> <li>Audits – internal / external</li> <li>KPIs / Trends</li> <li>Management Inspections</li> <li>Upcoming Trainings</li> <li>Upcoming Works</li> <li>Resources</li> <li>Reward / Disciplinary</li> <li>Areas of Concern – (where support is required)</li> <li>AOB.</li> </ul>
Subcontractor HSS Kick off Meeting	Prior to the mobilisation of the subcontractor	PSM or designated person Subcontractor Owner PM / CM may attend further to requirements from the PSM Subcontractor senior representative.	<p>To be chaired by the PSM or designee. Topics to be discussed as per the HSS KO meeting agenda contained in <b>BMS-HSS-F-014</b>.</p> <p>During this meeting a controlled copy of the Project HSS Management System will be handed over to the Subcontractor senior representative. The minutes of the meeting to be uploaded to the <b>SAFER</b> System.</p>
Weekly Subcontractor HSS Meeting	Weekly	PSM or designated person Subcontractor HSS Representative HSS Advisors as required Subcontractor senior manager as required.	<p>Meeting to discuss overall HSS performance of all subcontractors with an agenda as per set schedule;</p> <ul style="list-style-type: none"> <li>Introduction</li> <li>Previous Minutes / Actions</li> <li>Incidents</li> <li>Audits / Inspections</li> <li>Summary of required submittals</li> <li>Training status</li> <li>Upcoming trainings</li> <li>Rewards / Disciplinary</li> <li>Resourcing (HSS Staff / Supervision)</li> <li>AOB</li> </ul>
Emergency Meeting	As Required	PSM PM / PD Construction Manager Engineering Manager (Subcontractors if Required)	An emergency meeting takes place either internally / externally. It is as a result of a serious breach in HSS on the Project or as a result of a repetitive issue not being closed. The PSM chairs the meeting and if a subcontractor is involved, a senior representative is required. There may be occasions where the ASM / AD will attend, further to the severity of the non-conformity.
Safety Representative Meeting	Bi-Weekly	PSM or designee Safety Committee Members	<i>See below for worker representation requirements</i>
Method Statement Review Meeting	Bi – weekly as a minimum	Method Statement Owner Construction Manager QA Manager HSS Manager Other applicable staff	Meeting to discuss the status of live method statements and identify, wherever applicable changes that are required plus to ensure that those changes are communicated in a structured manner to the site teams and persons carrying out and who may be affected by the activity.
HSS Review Meeting	Monthly	All Project Management	Presentation in the form of a meeting to discuss overall performance including objectives, incidents, opportunities, resources, upcoming works etc.

### 3.8.4 Worker Representatives

Workers shall be informed about their participation arrangements to ensure consultation where there are changes that affect their Health and Safety. A Safety Representative Committee will be formed, and meetings are carried out to

provide the opportunity for all levels of personnel and interested parties to be heard and to receive feedback, particularly in respect to HSS matters.



Safety representatives will be elected by workers and contact details will be posted on site notice boards for consultation. Where there are changes to legal requirements this will be passed to the workers. This meeting is a forum for the workers to express both concerns and positive issues about Health and Safety. Project Management at least a ratio of 1 to 100 is maintained and all members are elected by the workforce. Subcontractors must also be represented. The PSM communicates the issues to the Project Management for action. Minutes will be recorded, filed and displayed throughout the Project Site.

### 3.8.5 External Meetings

Meeting Type	Frequency	Attendees	Overview / Agenda
Client/ Client Representative	TBA		

Minutes of all meetings are maintained on the **SAFER** system page under project documents in addition to distribution via the stipulated document control system.

## 3.9 Participation

All Management / Supervisors are to directly correct on the spot any unsafe acts, behaviours or conditions. Similarly, all Management / Supervisors should comment on good HSS Observations. This is recorded utilizing the 'Don't Walk By' booklet. All supervisors, management, subcontractors are issued with a booklet at induction stage and are encouraged to document instances where they have intervened. Drop boxes are in place throughout the Freetown Water Rehabilitation Project or alternatively recordings can be submitted to the HSS Department.

## 3.10 Documentation and Control of Records

All Safety documents and records relevant to the construction works are kept and stored in accordance with the Project Quality Plan. The retention of all safety records is detailed within the applicable sections of this document.

For Freetown Water Rehabilitation Project here, a detailed list of filing requirements is included in **Appendix L** of this PSP.

The PSP will be revised on a 3-monthly basis; however, any changes within that period will be tracked and amended to **Appendix G** of this Document. The appendix will be communicated to all applicable personnel including subcontractors / suppliers.

For the Freetown Water Rehabilitation Project, the all safety document will be kept in SAFER online system.

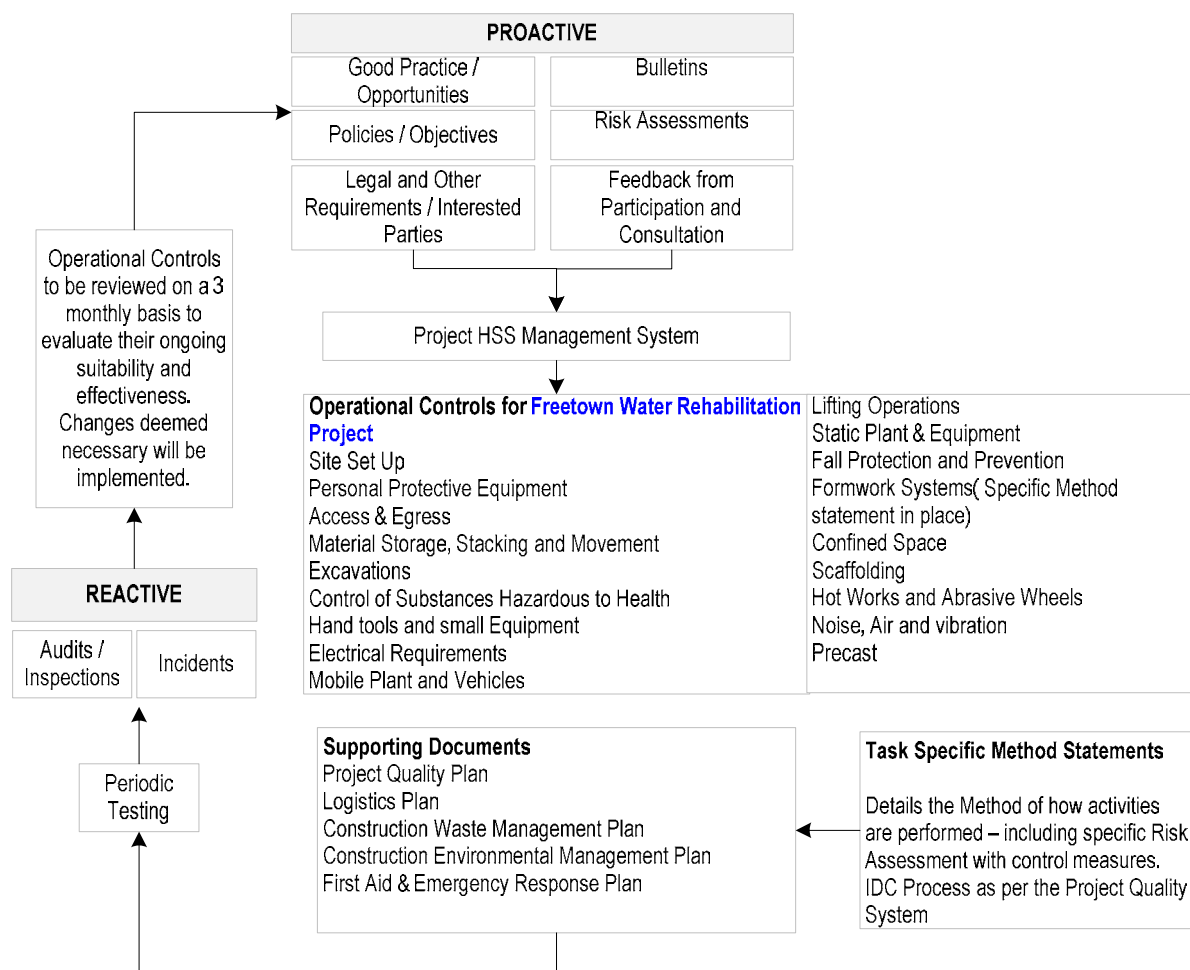
### 3.11 Operational Controls

Bam has established and implemented a set of **FW-IMC-BAM-HSS-OC-001 – 18** for the Freetown Water Rehabilitation Project. The process below details the structured technique used when developing the Project Specific Operational Controls. Operational Controls must be revised on a 3-monthly basis and updated if required. A full list of the Project Operational Controls is included in **Appendix H** of this document.

Project Specific Operational Controls are also maintained on the **SAFER** System.

Wherever it is identified that subcontractors / suppliers are implementing a good practice or exceed the BAM requirements, the initiative will be incorporated into the BAM Internal Documents.

The contents of Operational Controls will form the basis for the internal training modules. The Operational Controls for Freetown Water Rehabilitation Project form an integral element of the overall Project Safety Management System and **MUST** be complied with always.



### 3.12 Supporting Procedures / Documents

**Project Quality Plan** - Details how quality assurance / quality control is managed on the Freetown Water Rehabilitation Project considering project client requirements.

**Logistics Plan - FW-IMC-BAM-HSS-LP-001** - Details the location of security, offices, welfare facilities, haul routes, first aid clinic, workshops, concrete wash out areas etc. Multiple work fronts foreseen - Logistics plan will be updated once facilities are complete.



Emergency Response & First Aid Management Plan – Gives an overview on how first aid and the clinics are management on the Project considering legal and client requirements. Emergency contact details are also included. Provides details of the required actions to be taken in the event of an incident / emergency scenario.

Traffic Management Plan – A detailed procedure which ensures the risks associated with working on a live road is mitigated. Traffic Management plan will be updated as per the scope of the works.

Forms & Templates – Various HSS forms and templates further to the Project HSS Plan and supporting documents including operational controls. See below for brief structure of the HSS Management System.

### 3.13 Management of Subcontractors / Suppliers

BAM ensures that a robust system is in place for the management of subcontractors on the Freetown Water Rehabilitation Project HSS Contractual Provisions are required to be in place to facilitate effective management of activities.

During the prequalification process (BMS-SUB-A-001 - Subcontractor Management Procedure), an OH&S assessment is included and must be inputted by the individual leading the "pre-qual".

When subcontractors are pricing potential work with BAM, it is at the onus of the project / commercial team to ensure all Project HSS requirements are issued to ensure that no misunderstanding arise during the construction phase.

Further to the contract award subcontractors a dedicated HSS Meeting premobilisation meeting is required. All safety requirements are communicated in this meeting. At the discretion of the PSM, there may be occasions where a "subcontractor owner" is formally appointed.

All subcontracts contain HSS Provisions that enable BAM to effectively manage their activities (reduce risks / eliminate hazards and identify opportunities) The sub contractual provisions are included in **Appendix I** of this document. However, the provisions may change / be revised. The SAFER System provides the latest, controlled version of the contractual requirements.

All risks associated with subcontractor activities are assessed, generally via the approved method statement for their activities. Several different tools are utilised to manage supply chain on projects including;

- Joint audits
- Joint investigation of incident reports
- Internal Training
- Availability of Competent Staff
- Legal Compliance – mainly insurances / work permits
- Auditing of Camp / Welfare Facilities
- Development of Subcontractor Management / Safety Staff
- Etc.

On a quarterly basis an assessment takes place on the subcontractors Safety Performance. The results are collated at a corporate level and are recorded on the **SAFER** System. Where a subcontractor scores less than **60%** an emergency meeting is held. The best performing subcontractor receives recognition from BAM on an annual basis.

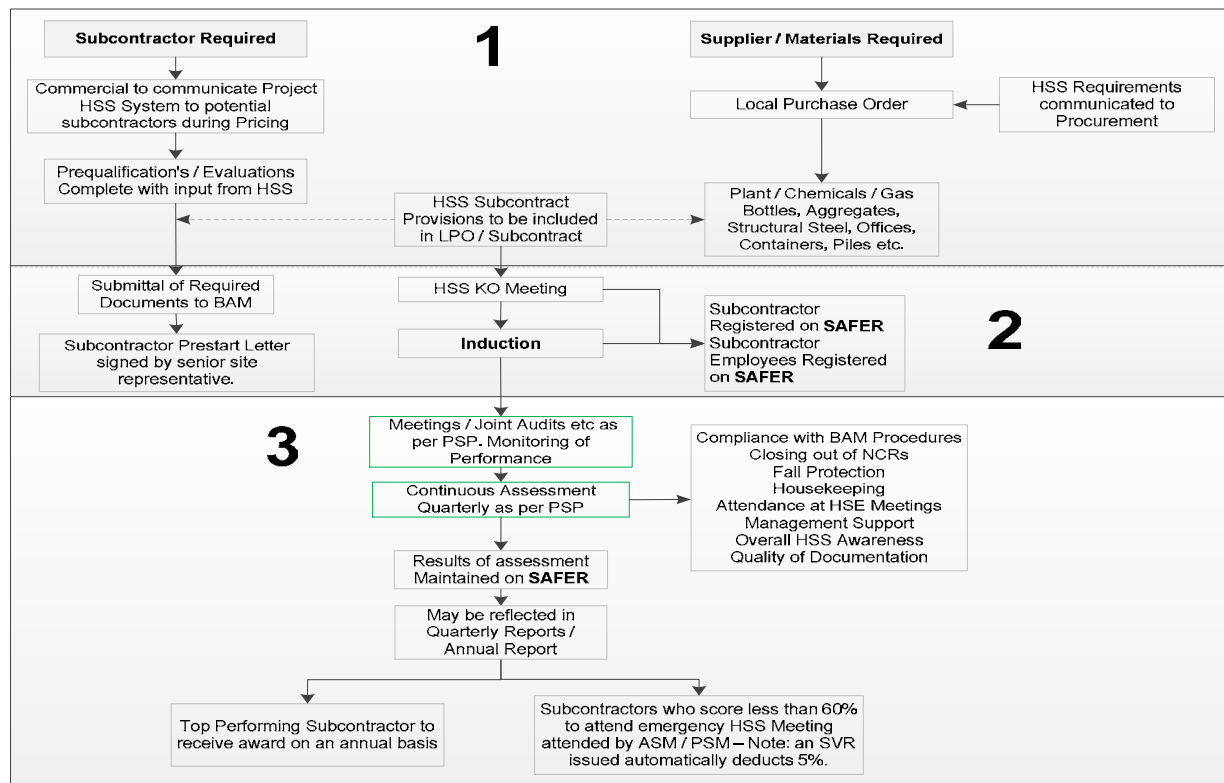
#### 3.13.1 Outsourcing – Suppliers

BAM ensures that all materials, equipment, service companies procured for Freetown Water Rehabilitation Project is done so in a structured manner. Generally, suppliers are procured via an LPO (Local Purchase Order). BAM has developed LPO safety provisions that are attached to ALL LPOs to ensure that the required level of controls is implemented.

The LPO HSS Provisions are included in the **Appendix I** of the Management of Subcontractors and Suppliers Corporate Procedure.

Where goods / services are procured such as PPE / Plant & Equipment – the procurement department issue the applicable Operational Control(s) to the supplier to ensure the material / equipment is fit for purpose as per the BAM specific requirements (considering legal / other / client stipulations).

#### 3.13.2 Management of Subcontractors Process



### 3.13.3 Summary of Process

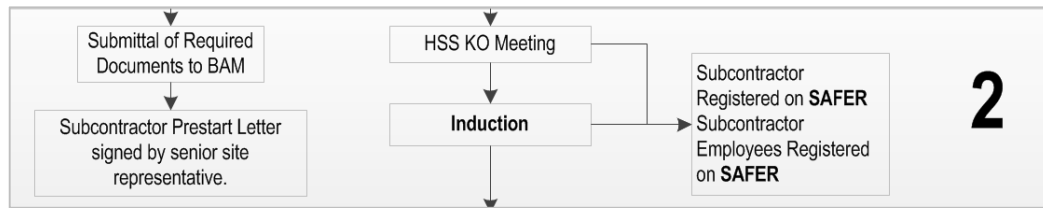
**1** The Commercial / Contracts department issues all applicable requirements to the subcontractor / supplier to ensure that there is no confusion and the vendor (subcontractor / supplier) is fully aware of the BAM Requirements prior to pricing their scope. Wherever possible, project specific information is communicated.



A prequalification document is completed by QA/QC with inputs from HSS. Where a supplier will be approached, the HSS department assesses if the supplier is to be treated as a subcontractor. Mainly dependent on the scope and exposure levels of the organization.

**2** Upon contract award, the vendor is required to attend a HSS KO meeting (BMS-HSS-F-017 HSS Subcontractor KO Meeting Guidance). A senior representative from the subcontractor is required to attend. Guidance notes for the meeting include such points as PPE requirements, communication protocols, incident reporting, training requirements etc. A subcontractor prestart letter **MUST** be signed by an authorized person representing the subcontractor. This letter also details the required HSS related documents the subcontractor must submit prior to mobilizing on the Project.

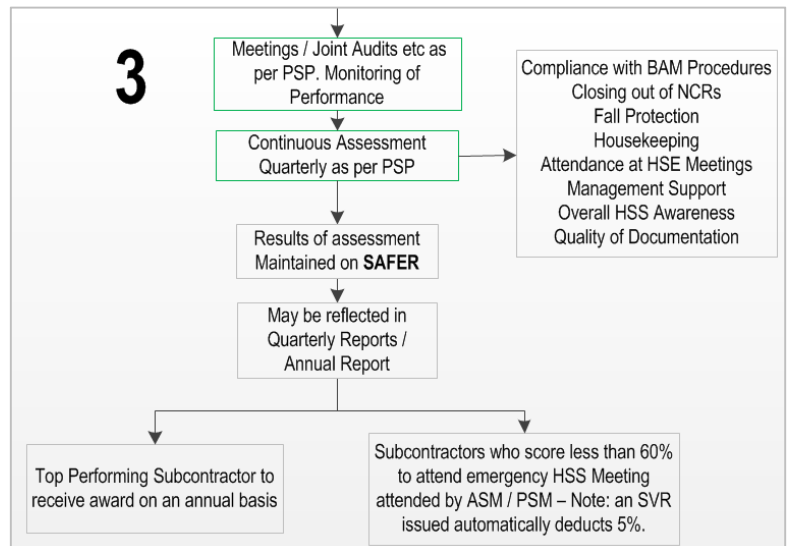
A key element is the supervisory resources appointed by the subcontractor, this includes Project HSS Managers, Advisors, First Aiders etc. Competency requirements are included within the sub contractual provisions. At the discretion of the Project HSS Manager, interviews may take place with proposed subcontractor HSS Staff.



**3** Management of the subcontractor takes the form of meetings, audits, joint trainings etc. On a quarterly basis, an assessment is completed of the subcontractor performance and focuses on HSS Aspects throughout that period (**BMS-HSS-F-016**, HSS Subcontractor Evaluation). Where a vendor scores below 60% an emergency HSS Meeting is held with top management from the subcontractor plus senior management from BAM.

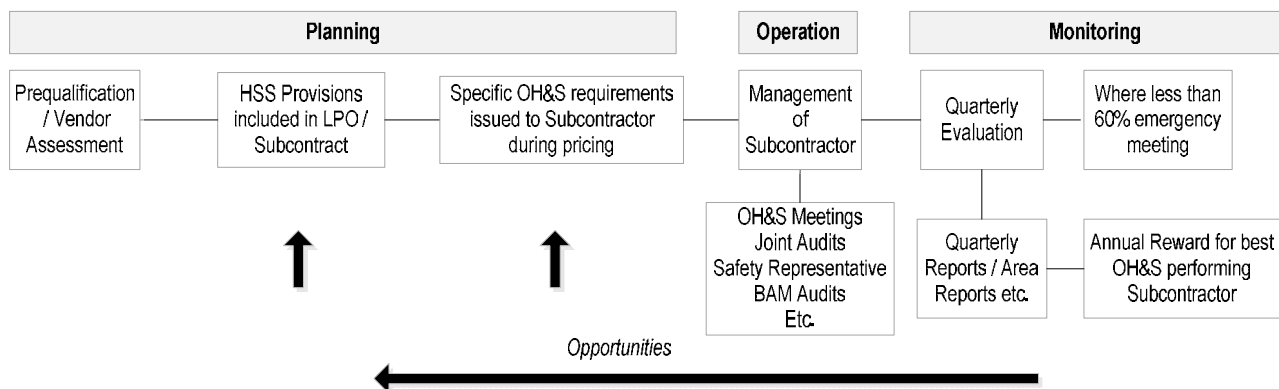
It should be noted that if a subcontractor is issued an SVR (**BMS-HSS-F-040** HSS Violation Report) by BAM, **5%** is deducted from the final score. All information pertaining to HSS evaluations of subcontractor performance is maintained on the SAFER System and may be reflected within the Quarterly / Annual Report.

On an annual basis, BAM issues an award to the best performing subcontractor within the Organisation.



Wherever **Opportunities** are identified, these will be recorded on the Opportunities Register on the **SAFER** System.

The Chart below provides an overall summary of the process.



### 3.13.4 Subcontractor Documentation Requirements

Prior to mobilizing, the HSS department verifies that the following documents are in place. On occasion, depending on the Legal / Client requirements additional documents may be required (**BMS-HSS-F-005**, HSS Identification and Evaluation of Legal and Other Requirements).

- Company Insurance
- CVs of potential HSS Staff – **Note:** as per terms / conditions of the subcontract, PSMs reserve the right to reject HSS staff.
- Applicable third-party certificates including Plant, Operators, Welders, Divers, Scaffolders. – **Note:** non-exhaustive list.
- MSDS for all applicable substances
- Method Statement / Risk Assessment for their scope of work. : **Note:** in some cases, the subcontractor will work under the BAM Method Statement. All method statements to be reviewed by Operations, Engineering, QA/QC and HSS departments prior to approval by the PM. Workshop to be completed by the Method Statement Owner.



- Project HSS Plan and associated documents – **Note: this is at the discretion of the PSM and depends on the size / scope of the subcontractor activity.**
- Organogram of the subcontractor which includes HSS resources.
- CVs of the senior representatives on the project.
- Subcontractor prestart letter – **BMS-HSS-F-018**, HSS Sub-Contractor Prestart Letter.
- Third Party Certificates
- Any other requirements identified.

**Note:** At induction stage, all workers / staff are required to have a valid work permit for that country. Additionally, a brief medical will take place with the worker. Attendance of the medical is at the discretion of the worker. All medical records are maintained securely in the site clinic and are only available to the worker / clinical nurse and / or doctor.

### 3.13.5 Documentation to be submitted to the Subcontractor

#### Tender Stage

- HSS Plan
- Operational Controls
- HSS subcontract provisions.

#### Upon Contract Award

- Project HSS Management System
- Project Operational Controls
- Forms
- Associated Procedures including Emergency Plans, First Aid Management Plan etc.

### 3.14 Emergency Response and Preparedness

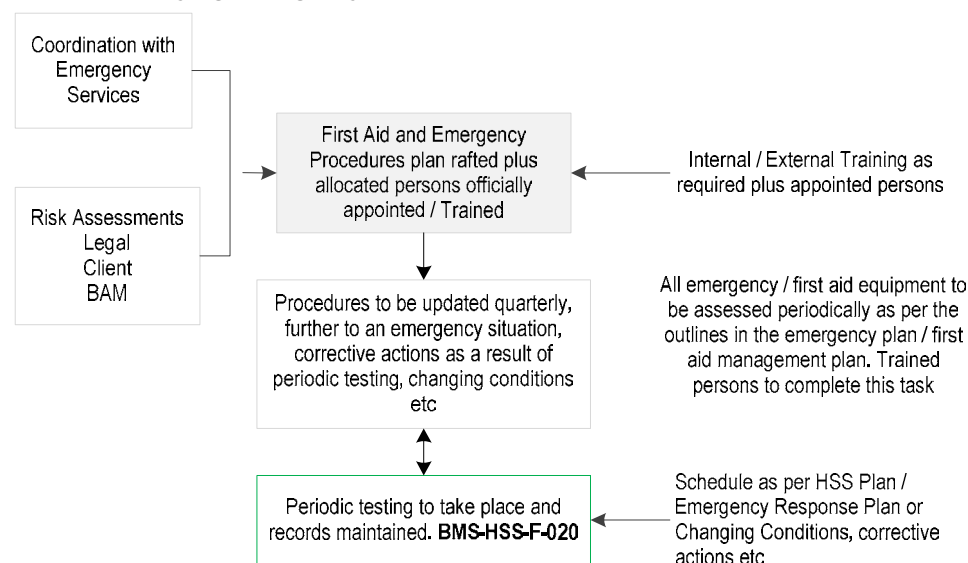
Specific Emergency Procedures are required to be developed for all potential emergency scenarios on the Freetown Water Rehabilitation Project. The potential scenarios consider the needs / expectations of workers and interested parties) in addition to the review of risk assessments and legal / client requirements.

Personnel are appointed into the various roles and training take place as required, either internally or externally. Letters of appointment are issued to the emergency team members / leaders and any other identified critical positions.

As a minimum, periodic testing is required on a monthly basis and all drill reports must maintained in the Project files. In addition, emergency response procedures are required to be reviewed further to the following;

- Following a Category 1-3 or 5 Incident
- As a result of a corrective action identified during the periodic testing.
- Where there are changes to the legal requirements, Client and other requirements
- Where additional needs / expectations of interested parties are identified
- Where opportunities are identified.
- Where there are changes in the scope of work (Changing Conditions)
- Where there are changes to personnel / appointed persons.

#### 3.14.1 Identifying Emergency Scenarios



#### 3.14.2 Potential Project Scenarios

- Fire
- Trench Collapse
- Crushing Plant / Equipment
- Structural Collapse
- Vehicle Overturning
- Fall from Height
- Man Down
- Confined Space
- Environmental Spill



All areas of the project will be assessed including offices, laydown areas, stores etc.

### 3.14.3 Management of First Aid

First aid management requirements are detailed in **Appendix 3** of the project specific emergency response plan **FW-IMC-BAM-HSS-ERP-001**

- Training Requirements including list of approved third-party agencies.
- Requirements for the Site Clinic(s), First Aid Kits etc.
- Detail on various control programs including biological, heat stress, dust / noise management etc.
- Transportation in the event of a first aid. Designated drivers etc.
- Location maps for the clinic, assembly points etc.
- Emergency Response Team information including day / night shift.
- First Aiders Contact Details.

The contents of the first aid management plan are generally documented in **Appendix 3** of the Project Specific Emergency Plan.

## 4. Performance Measuring / Monitoring

## 4.1 References

### 4.1.1 General References

Heading	BS ISO 45001-2018	Overview
Monitoring, Measurement, analysis and performance evaluation	9.1	Assessing if the processes which are in place are appropriate for what is being evaluated and proportionate to the level of risk.
Evaluation of Compliance	9.1.2	How BAM are evaluated based on the context and scope – involving legal / other requirements.
Internal Audit	9.2	Auditing process relevant to what affects the organizations OH&S Performance.
Management Review	9.3	The various meeting platforms, attended by Top Management where the performance and requirements to continually improve are discussed.
Incident, nonconformity and corrective action	10.2	Overview of the criteria involved for incident investigation and corrective actions.

### 4.1.2 Referenced Forms

Form / Template Reference	Title	Completed By	Support By (if applicable)	Filed / Recorded
BMS-HSS-F-021	HSS Manager Weekly Inspection	HSS	All	F7 / SAFER
BMS-HSS-F-022	Management Inspection	Management	All	F7 / SAFER
BMS-HSS-F-023	Daily observations	HSS Advisors	All	F7 / SAFER
BMS-HSS-F-024	Internal Audit Report	Internal Auditor	Auditee	F7 / SAFER
BMS-HSS-F-024A	Internal Audit NCR	Internal Auditor	Auditee	F7 / SAFER
BMS-HSS-F-024B	Internal Audit Check sheet	Internal Auditor	n/a	F7 / SAFER
BMS-HSS-F-025	Injury Report (Cat 1-4)	Lead Investigator	Investigation Team / Interested Parties if applicable	F8 / SAFER
BMS-HSS-F-025A	Near Miss Report (Cat 5-7)	Lead Investigator	Investigation Team / Interested Parties if applicable	F8 / SAFER
BMS-HSS-F-026	Clinical Register	First Aider / Paramedic / Clinical Nurse	HSS / All	F8 / SAFER
BMS-HSS-F-027	Safety Violation Report	BAM	All / Commercial	F9 / SAFER
BMS-HSS-F-028	Disciplinary Action	BAM	HR	F9 / SAFER

### 4.1.3 Legal / Client Reference

Heading / Decree / Law / Act etc.	Clause	Brief outline
CDM Regulations 2015	Part- 3	Health and safety duties and roles – Reporting dangerous conditions
CDM Regulations 2015	Regulation 15 - 158	Duties of contractor - Planning, managing and monitoring construction work -Monitoring
CDM Regulations 2007	Part -4 Regulation 24	Report of Inspections

## 4.2 Introduction

The objective of this section is to define the methods employed by BAM to monitor and measure and report the performance of Safety on the Freetown Water Rehabilitation Project. Routine monitoring of planned arrangements are carried out and key performance indicators and objectives are generated to monitor performance.

Identified issues (areas requiring improvement/with potential for improvement) are brought to the attention of the BAM PM who ensures that corrective actions are taken in line with the requirements. This can include corrective actions in the form of HSS Violation reports, disciplinary actions, auditing / inspections and incidents. Corrective actions further to audits / incidents are completed via the **SAFER** online system.

## 4.3 HSS Audits / Inspections

Performance monitoring of the HSS Management System on the Freetown Water Rehabilitation Project will be achieved through systematic inspection and audit of work in progress and administrative processes related to the HSS Management System

Safety Audits and inspections are completed according to the Safety Audit and Inspection schedule as detailed below;

### 4.3.1 Internal – Arranged / Planned by BAM



Audit / Inspection Type	Description	Frequency
Daily Observation Report s	Daily Observation Report completed by Project HSS Advisors. Information to be inputted into Trend Analysis. Wherever possible, subcontractors to be involved in the daily walk. Completed on SAFER.	Daily
HSS Manager Inspection	An inspection report where the scope is both Bam and Subcontractor activities on the Project. Corrective/Preventative actions are highlighted. Ownership of the audit is with the auditor. Audits will be scheduled as work locations. Construction Manager to attend plus subcontractors	Weekly
Management Inspection – PM/CM/ Supervisors etc.	Inspection by Management on the Project which highlights areas for improvement and good practice. See <b>Appendix J</b> for the required schedule.	
Internal Audit	A determination if the BMS is implemented and maintained. The internal audit can be utilized as a tool to evaluate the Management Systems of Suppliers / Subcontractors when required.	As per the Schedule

#### 4.3.2 External - Client Inspections / Audits

Audit / Inspection Type	Description	Ref. no	Frequency
	TBA		

Additional Audits may take place regarding;

- Identified Trends via SAFER
- Key Performance Indicators
- Evaluation of Legal and other requirements
- HSS Violations
- Changing Project Conditions
- Changes to the Project IMS
- Customer / Client Satisfaction
- Etc.

The SAFER online tool is utilised for management inspections, observations etc. All persons using the system to be trained. Project HSS Manager / Project Manager to ensure corrective actions are implemented as identified.

#### 4.4 Incident Investigation / Reporting

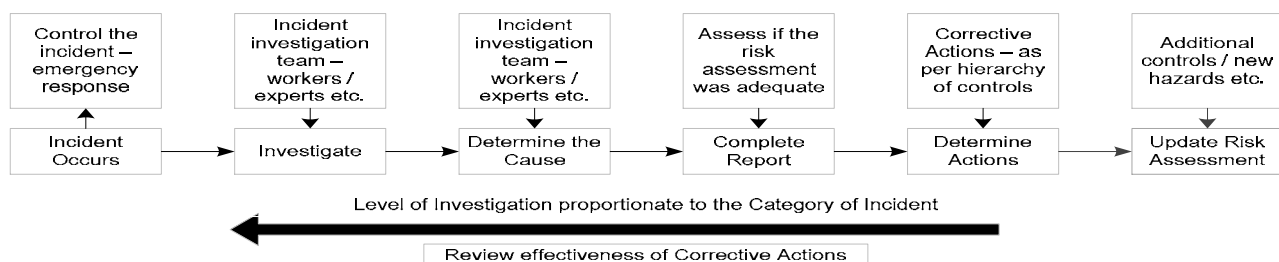
The following are the Categories for all types of incidents. It should be noted that where required, BAM will submit to the IMC / DIFD all required incident reports. The classification of incidents may differ, but this is for reporting purposes only to the Client and Regulatory authorities.

Notification of an incident to the Project HSS Advisor / Project HSS Manager / Supervisor is the responsibility of the individual who has witnessed or has been affected by the incident or his/her immediate supervisor. This is also a topic within the Project HSS Inductions.

The table below provides an overview on the BAM and Regulatory Requirements.

##### 4.4.1 Incident Reporting Process

All persons investigating incidents must have received internal incident investigation training.




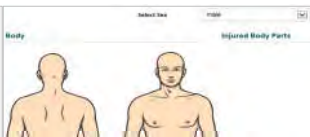









##### 4.4.2 Incident Categories – BAM

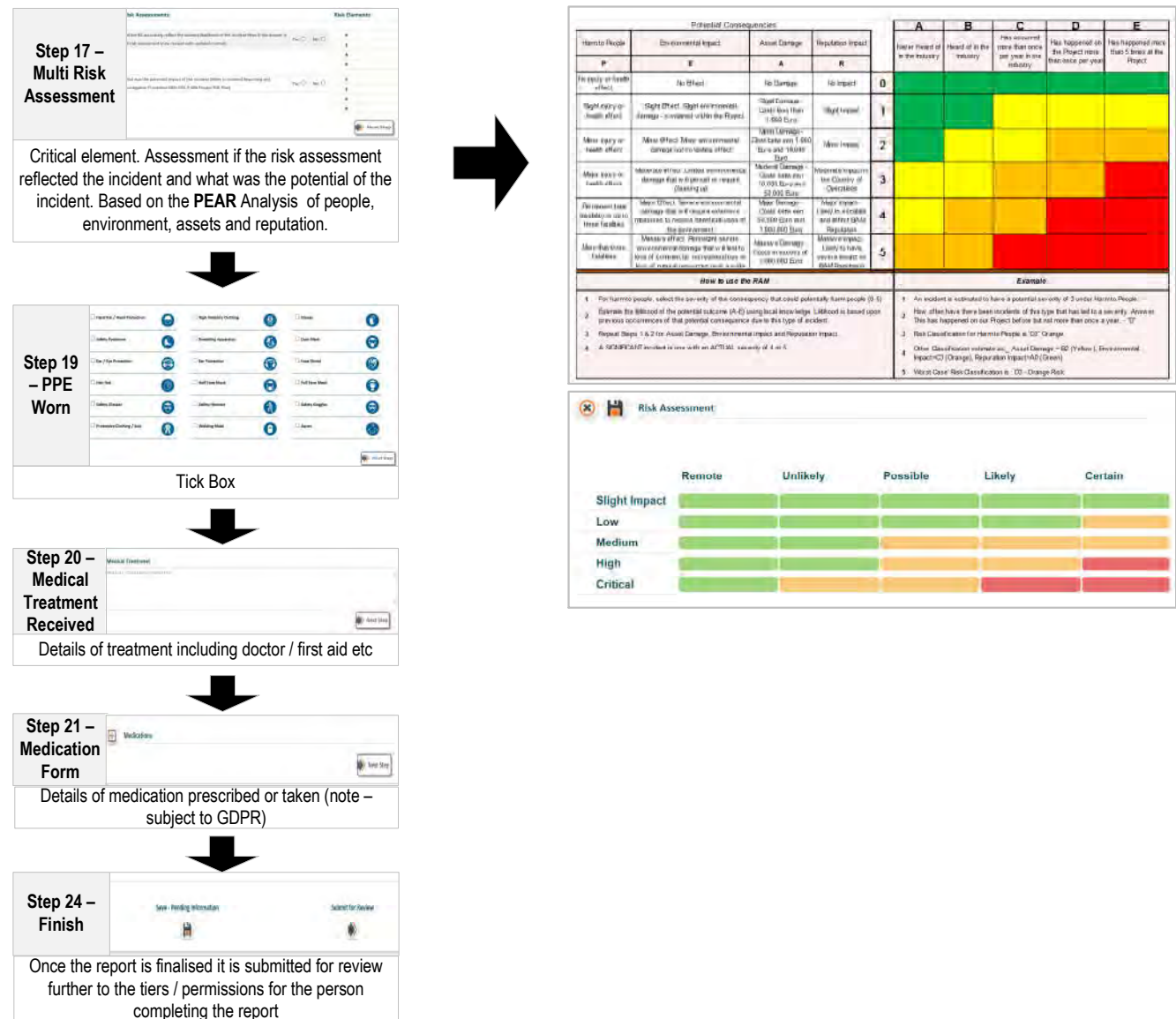
Category		Description	Example
1*	Fatality [Critical Incident]	A <b>reportable</b> and <b>recordable</b> work-related accident or illness where the project employee passes away directly after the incident or up to 180 days after the accident, due to the accident. Also defined as a <b>critical</b> incident.	Self-Explanatory
2*	Lost Time Injury	A <b>reportable</b> and <b>recordable</b> work-related accident or illness where the IP suffers a loss of more than 1 full day / shift off work, excluding the day of the accident. This includes rest days, weekend days, scheduled holidays, public holidays or subsequent days after ceasing employment.  Lost time is only applicable where time off work, following an occupational illness / injury, has been approved by a registered medical practitioner (Doctor) and records are verified.	The IP suffered a fracture to his hand when using a hammer. His left index finger received a fracture. The Incident occurred on a Wednesday and the IP returned to work on the Friday. This is reportable as an LTI due to the loss of 1 full shift.
2A	Restricted Work Case	A <b>recordable</b> work-related injury or illness that results in a limited ability to perform their duties, of their normal work, on any day after the day on which the injury occurred. A limited ability to work implies carrying out different duties as a result of the injury or where the injured person has less wage value than he / she had before the incident.	The IP works as a rigger. During rigging activities, he suffered a hairline fracture to his finger. Upon return from the hospital he was able to resume his duties in a limited fashion.
3	Medical Treatment Case	A <b>recordable</b> work-related accident or illness that has required management and care of the patient above and beyond first aid and includes treatment by a registered medical practitioner and where the IP returns to work in the same capacity on the same or following day. Examples will include; <ul style="list-style-type: none"> <li>• Hearing Loss</li> <li>• Eczema</li> <li>• Mild case of the bends</li> <li>• Stich injury</li> <li>• Arc Eye</li> </ul> <b>Note</b> – where an IP attends a registered medical practitioner and no symptoms / treatment is recommended, the incident will be classified as a Category 4 / First Aid Case.	The IP works as a rigger. During Rigging activities, he received a laceration injury to his finger. Upon advice from the clinic, he attended the hospital for further evaluation. The doctor inserted one stitch and the IP returned to work the same day.
4	First Aid Case	A <b>recordable</b> work-related accident or illness where the IP receives first aid on the Project and immediately returns to work. An injury arising of, or in connection with work which does not fit in any of the above categories. Examples will include; <ul style="list-style-type: none"> <li>• Removing foreign bodies from the eye using irrigation or cotton swab</li> <li>• Drinking fluid for the relief of heat stress</li> <li>• Cleaning, flushing or soaking wounds on the surface of the skin</li> <li>• Using wound coverings such as bandages, or gauze pads.</li> <li>• Using hot or cold therapy</li> <li>• etc</li> </ul>	The IP works as a rigger. During the rigging activities the rigger received a minor puncture wound to his finger. He attended the site clinic where the wound was cleaned and dressed. The IP then returned to work. The clinic requested he return the following day for a fresh bandage.
4A	Minor First Aid Case	A <b>recordable</b> Minor first aid case recorded by the project nurse / first Aider / paramedic using the clinical register for treatment of a minor scratch, cut, bruise etc, which does not result in subsequent medical attention by a registered hospital / doctor or follow up by the first aider / project nurse / paramedic at a project level. Corrective actions to be detailed in the register.	The IP works as a rigger. During rigging activities, he received a minor puncture wound to his finger. He attended the site clinic where the wound was cleaned / dressed, and a plaster applied. The IP then returned to work.
5	Dangerous Occurrence	A <b>reportable</b> and <b>recordable</b> incident where an unplanned, unwanted event occurred, that had a potential to cause a category 1 incident or where damage to property / costs of more than 50,000 Euros occurred or where the multi risk assessment is within the <b>yellow / red</b> category when assessing the potential impact. Examples will include; <ul style="list-style-type: none"> <li>• Explosion or Fire</li> <li>• Failure and / or Collapse of Equipment</li> <li>• Machinery Damage</li> <li>• Collapse of Building/ Structure or Excavation</li> <li>• Electric lines, Cables and Pipelines</li> <li>• Malfunction of Radiation Generating Equipment</li> <li>• Failure of Diving Equipment</li> </ul>	A tower crane was lifting a chiller unit onto a 3 <sup>rd</sup> floor slab. When the unit was 50cm from the slab, the lifting gear failed, and the unit landed on the deck. No persons were hurt and minimal damage to the unit. Further to the investigation it was ascertained that the potential of the incident was in the red category as the crane slewed over work areas plus the chiller was valued at 250,000 Euro
6	Near Miss	A <b>recordable</b> near miss incident where an unplanned, unwanted event occurs, which does not fit in any of the above categories or where damage to property / cost of less than 50,000 Euros occurred or where the multi risk assessment is within the <b>green</b> category when assessing the potential impact.	A telehandler reversed into the site hoarding whilst manoeuvring into position. Superficial damage was caused. A maintained exclusion zone was in place during the activity.

#### 4.4.3 Incident Investigation Steps

Further to an incident occurring on Freetown Water Rehabilitation Project the incident escalation chart contained in **Appendix O** and the First Aid & Emergency Response Plan must be followed.

General Information			Injured Party / Categories / Type of Injury		
<b>Step 1 – General Information</b>		Input all Applicable Information including weather conditions and an additional information re: location if required.	<b>Step 6 – Injured Party</b>		Details of the injured party – automated
<b>Step 2 – Investigation Team</b>		Insert details of those involved in the investigation process prior to moving to next step	<b>Step 7 – Body Part</b>		Male / Female plus tick the body part that has been injured in the event of a Cat 1-4
<b>Step 3 – Project Details</b>		Insert details of the type of Project	<b>Step 8 – Injury Category</b>		Tick box with "other option" re: immediate cause / injury category
<b>Step 4 – Confirmation Checks</b>		Emergency Response required / legal notification	<b>Step 9 – Injury Type</b>		Tick box with "other option" re: type of injury
<b>Step 5 – Incident Details</b>		Person who reported incident plus MS Reference no.			
<b>Step 10 – Incident Analysis</b>	 <p>Critical Element of the Report, scene to be examined, timeline if applicable, interviews, photographic evidence, 5 whys etc.</p>				
<b>Step 11 – Details of Plant / Equipment Involved</b>	 <p>Insert details of plant / equipment involved in the incident if applicable. Where an injury occurs that also includes damage to property, the primary incident report will be a category 1-4</p>				





#### 4.4.4 Investigation Protocol

**Examine the Scene** – This involves the use of photographs / sketches where necessary to record details of dimensions. The record of the incident scene serves three purposes, firstly it gives the investigator a real idea of the circumstances of the incident, secondly, the information gathered can be used to enhance the investigation report and thirdly it can be a useful tool when carrying out interviews.

**Interviews** – Conducting interviews on site is preferable as interviewees can point to locations, machines and not have to describe them. Ideally, all interviews will be conducted on site wherever possible

In most incident investigations, the main source of information will be the people involved which may include any or all the following;

- Those who sustained injuries
- Those who caused damage to assets
- Witnesses to the incident
- Managers / Supervisors of personnel involved
- Lifting Coordinator / Services Coordinator or other appointed persons.

**Note:** All HSS Advisors who conduct interviews must receive formal internal training from the PSM.

#### Interview Technique

- Only one person to carry out the interview
- Only one person to be interviewed at a time
- There should be an introduction / explanation about the purpose of the interview

- Start the interview on the interviewee's home ground (start with things familiar to the interviewee and then move on to details of the incident once the rapport has been established.
- Use language which is appropriate to the interviewee. (vocabulary / sentence structure that matches the intellectual level and verbal competence of the person being interviewed)
- Avoid Leading Questions
- Keep a positive and uncritical manner throughout the interview
- Interviewer to being with a general type of enquiry "tell me what happened...?"
- The opening description by the interviewee may be disjointed, however it will usually contain those items of information the interviewee considers important. The interviewer to take detailed notes throughout the interview.
- Only when the interviewee has had the opportunity to describe the circumstances in his / her own words should the interviewer try to establish and collect additional information. This is best done by trying to get a chronologically ordered description, ideally from an established timeline prior to the incident occurring

The final report will be issued to the required bodies which will include Client, Client Representative, Regulatory Body etc. Associated documents may include third party certificates, clinical report, photographs, police report, sketches, training records, witness statements etc. In addition, the analysis of the actual / potential impact of the incident takes place utilising the project risk assessment in conjunction with the PEAR analysis.

In addition, counselling will be provided wherever it is available for all those who may have been affected by the incident.

#### 4.5 HSS Violation Report

HSS Violation Reports, **BMS-HSS-F-027** (SVR) are issued further to a serious breach in HSS or for a repetitive issue not being closed in a timely manner. The SVR is a documented notification to the company (internal / external) with detailed corrective actions included. The SVR is closed when the HSS department verifies that the corrective actions have been addressed.

When an SVR is issued to a subcontractor / supplier then the payment to the company is put on hold until the corrective actions have been closed and verified by the HSS Department. Refer to **Appendix I** for subcontractor / supplier contractual provisions.

#### 4.6 Disciplinary Actions

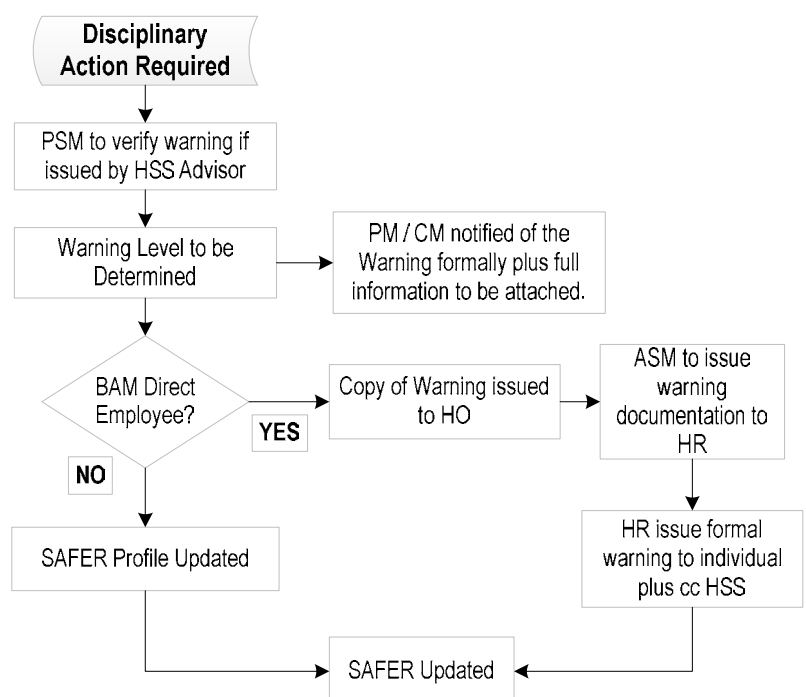
HSS related warnings can be issued by any member of BAM Staff / workers. When a warning is issued by a HSS Advisor, it is at the discretion of the PSM whether the warning is valid or not. All BAM Staff members will receive a brief training by the PSM on the warning process. Once a warning is issued by the PSM, either a documented verbal warning or written warning it is communicated to the PM / CM plus section engineer who was in charge when the non-conformance occurred. Where a BAM Employee is issued with a warning it is elevated to Area Head Office at Tanzania. where a formal written warning is issued by the Area HR Manager and kept on the employee file.

For personnel on a non-local contract (Singapore or equivalent), a copy of the warning is issued to the Head Office in the Hague for further action.

For all warnings issued, corrective and supportive actions **MUST** be implemented and documented, furthermore all corrective actions to be closed within the stipulated timeframe.

Disciplinary measures are a last resort on Freetown Water Rehabilitation Project and BAM prefers to retrain workers who non-conform during the execution of activities. However, when considered necessary by the PSM, disciplinary measures will be taken in account where non-compliance with HSS procedures and rules are persistent or of a serious nature. The purposes of disciplinary measures are to ensure non-compliance with HSS requirements and unsafe acts and conditions are eliminated. All disciplinary actions are maintained on the **SAFER** System.

A full list of the Project Rules is contained in **Appendix K** of this PSP.



**Note:** Other factors may result in disciplinary actions being taken. This is at the discretion of the PSM / PM of the Project.

### Warning Levels

Level 1	Verbal Documented Warning
Level 2	1 <sup>st</sup> formal written warning
Level 3	2 <sup>nd</sup> formal written warning and may result in suspension
Level 4	Dismissal from the Project Site

The person receiving the disciplinary action is entitled to have his safety representative present during the disciplinary hearing.

### 4.7 Rewards / Recognition

BAM recognises that rewarding persons who have performed or contributed to the HSS Standard should be implemented. For the Freetown Water Rehabilitation Project, various types of reward systems will be implemented including;

- Standard Awards- Workers who have been nominated by the HSS Team or Supervisors on the Project are issued an award plus monetary incentive / certificate.
- Discretionary Rewards - Giving BAM Supervisors (Including HSS Teams) the authority and resources to give rewards for any situation they choose for Workers & Supervisors for good safety practices. .
- Individual Awards – Awards may still take place at the discretion of the Project HSS Manager and will be handed over to employees at the weekly TBT

Awards issued are tracked on the SAFER System within the employee profile.

### 4.8 Non-Conformities

Non-conformity extends to the non-fulfilment of HSS requirements. These requirements can be from customer, statutory, internal or regulatory sources. The list below details what non-conformities must be tracked / recorded.

- NCR's as a result of legal audits
- NCR's raised by Clients / Client Representatives
- NCR's raised by external certification bodies
- NCR's raised as a result of internal audits
- SVRs (BMS-HSS-F-040 HSS Violation Report) issued internally or to a supplier / subcontractor. Corrective actions are required to be implemented for all identified non-conformities and subsequently tracked and closed within the non-conformity register.

### 4.9 Reporting Requirements

Statistical reports are collated on the Freetown Water Rehabilitation Project which give an accurate analysis of categories, body part, injury type, root causes etc. Further to the identification / evaluation of Client and Legal requirements the following submittals are required to be issued;

Report Required (Heading)	Frequency	Information on requirements within the report

BAM Internal Reports are completed via the online **SAFER** System under Planning – Weekly Stats.



## Appendix A – OH&S Policy

Policy



### Occupational Health & Safety

**BAM International regards safety as an extremely important priority for the company. It is our commitment to conduct our business in the best way to safeguard the health, safety and welfare of all the people who may be affected by the activities of the company including third parties. We firmly believe that all accidents are preventable. Current health and safety legislation and approved codes of practice will be complied with at all times wherever the company is active. To achieve these aims BAM International will:**

- Provide such information, instruction, training and supervision, as is necessary to enable the safe performance of our work activities.
- Ensure that all incidents are investigated by competent persons with a view to identifying clear corrective actions.
- Provide a platform for employees / sub-contractors / suppliers to raise issues relative to Health, Safety & Welfare. No punitive actions will be taken against any worker who raises a concern.
- Provide a safe working environment and safe system of work through design, construction, operation and maintenance of all plant, equipment and facilities.
- Provide adequate arrangements for the engagement of the workforce on our project and workplaces.
- Ensure all staff and workers are empowered not to carry out any activity they feel is unsafe with no punitive actions as a result plus reinforce the levels of responsibility / accountability in the organisation.
- Provide adequate welfare facilities for all employees and ensure sub-contractor conditions are at the same standard as BAM International and that our supply chain is effectively managed and assessed for performance periodically.
- Identify hazards, assess risks and, where reasonably practicable, eliminate or reduce risk to an acceptable level with the process being carried out by competent persons.
- Set objectives on an annual basis and measure performance against those previously established. Results will be published with the intent of achieving year-on-year development and improvement.
- Provide a maintained, effective Occupational Health & Safety Management System that meets or exceeds all identified applicable standards including regulatory requirements.
- Identify and mitigate occupational & non-occupational risks our people face when having to travel at the request of the company.

Every employee has an obligation to take reasonable care for their safety and for the safety of other people who may be affected by their actions or omissions. They are also obliged to co-operate with their employer in respect of matters concerning health and safety. The involvement and co-operation of employees at all levels is essential for the effective implementation of this policy. This policy will be reviewed periodically to ensure its continuing relevance, effectiveness and adequacy as per the scope of the organisation.

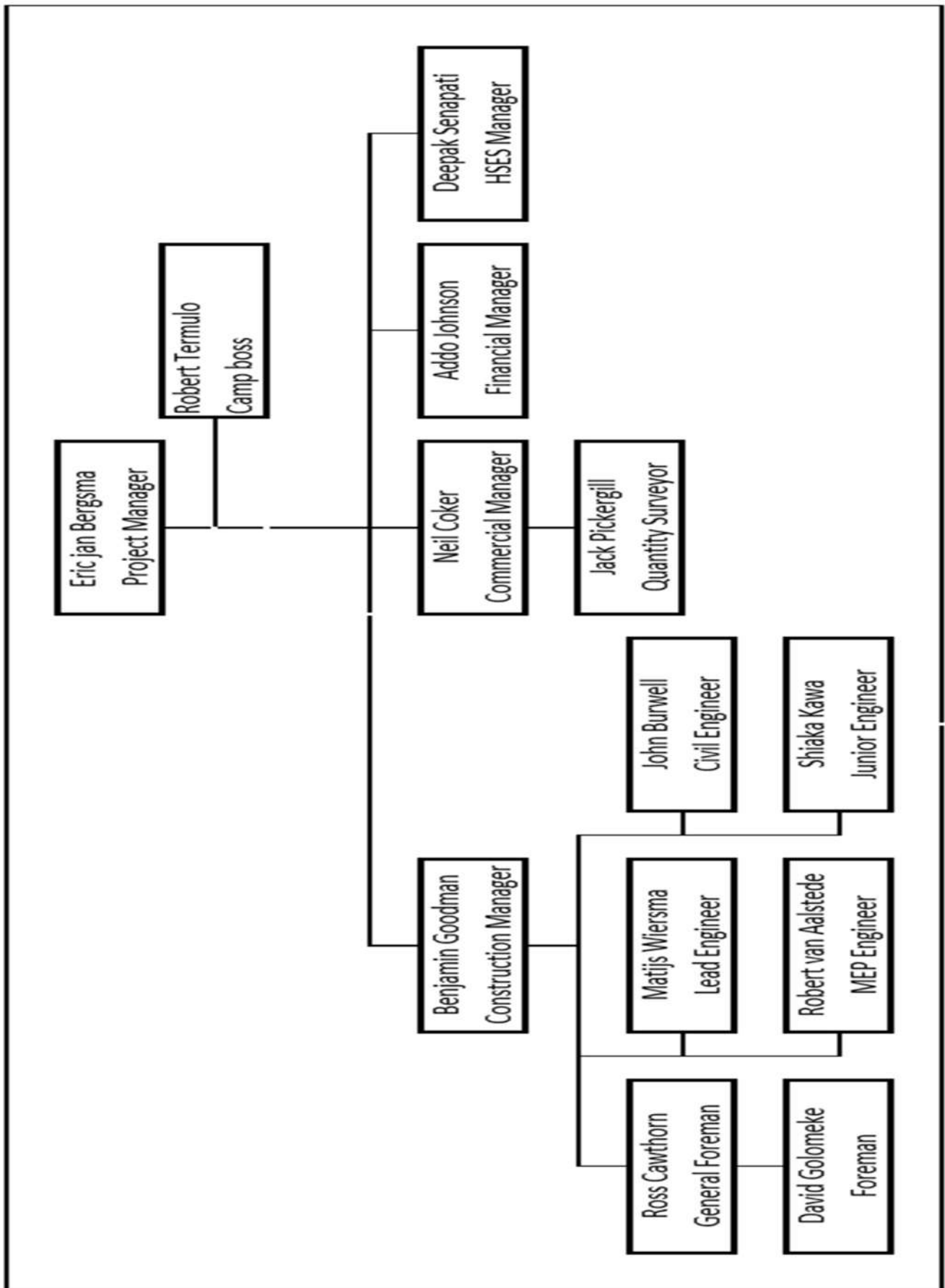
Board of directors BAM International by:

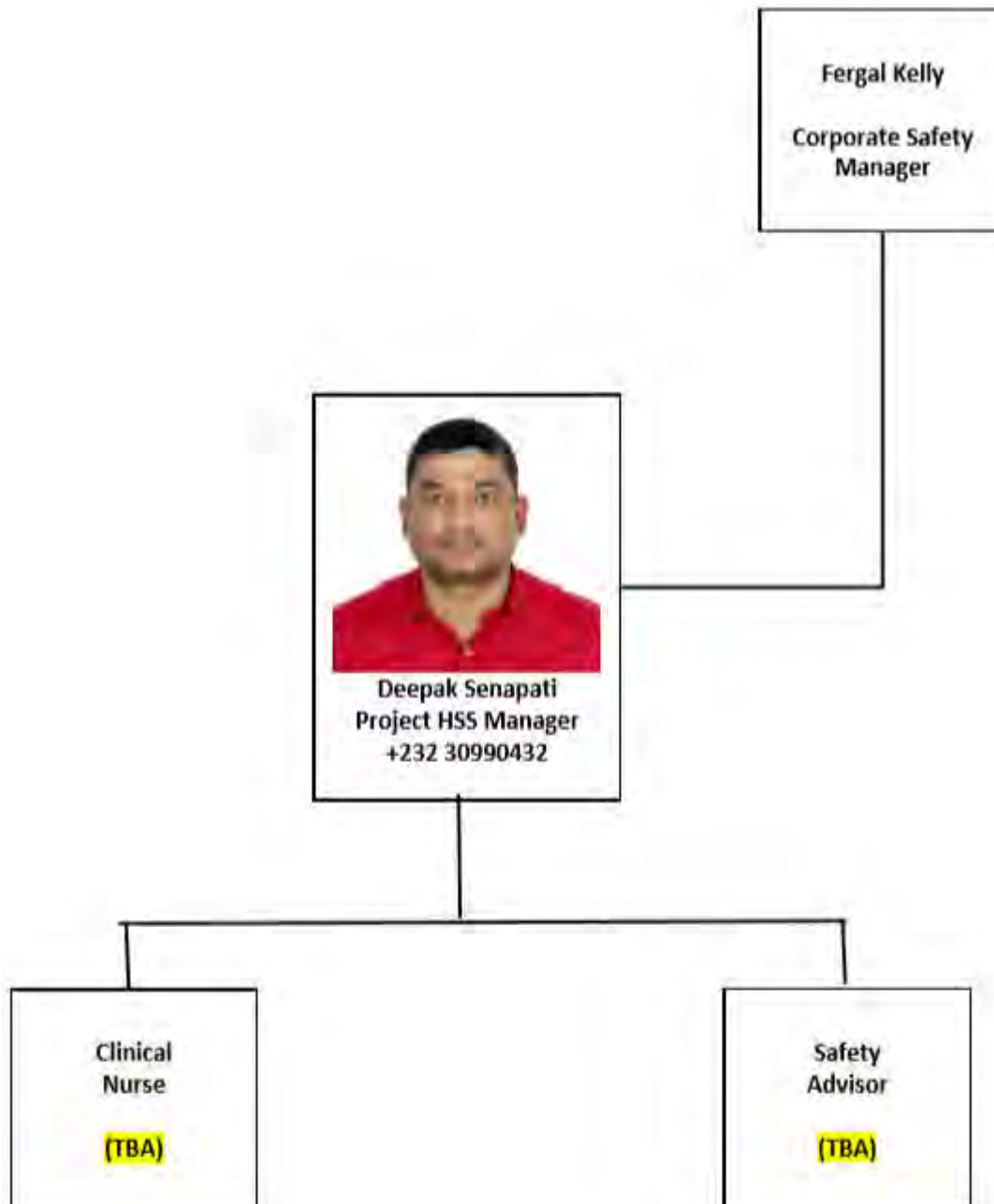
  
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March 2018

## Appendix B – Project Organisational Chart



**Appendix C – OH&S Organisational Chart**



## Appendix D – Roles, Responsibilities

### Project Manager shall;

- Report Directly to the Board..
- Ensure that the requirements of the BAM Project Health, Safety and Security Plan are understood / communicated, and the required resources are made available for the Project.
- Be the focal point in the event of a critical incident. Effectively lead the emergency response teams and ensure all are trained as required.
- Visibly demonstrate a commitment to the BAM Safety Policy and project safety arrangements and ensure that the policy is communicated and understood by suppliers, subcontractors, visitors to the project, consultant, client and any person or group who may be affected by the Project works.
- Review project inspection and audit reports and ensure that necessary corrective and preventive actions are effectively implemented.
- Maintain a high profile in terms of safety through active involvement in safety management tours and client inspections.
- Ensure he / she completes a management HSS inspection on a bi-weekly basis.
- Promote open communication on safety issues across line management.
- Ensure that the Project HSS Rules are followed.
- Organize and control the project, operations on the project and personnel so that works can proceed safely.
- Ensure that incidents and near misses are reported and investigations are carried out and corrective / remedial actions taken. Provide feedback / comments for all incidents.
- Attend all mandatory trainings and ensure his teams do the same.
- Be present for the BAM Safety Awareness audit and ensure that corrective actions are taken as required.
- Support the Project HSS Team where work is stopped due to significant Safety concerns and / or violations and maintain a dialogue with the Project HSS Manager and HSS members.
- Ensure that subcontractors / suppliers are aware of the Project HSS requirements and that kick off meetings take place with all subcontractors prior to mobilization.
- Ensure that periodic evaluation of subcontractors takes place.
- Ensure that Safety is the first item on the agenda in all internal meetings.
- Monitor KPIs and Trends and ensure corrective measures are implemented to reduce non-conformances.
- Ensure that legal / client requirements have been identified and reflected within the Project HSS Plan and associated documents

*Training Requirements – Risk Assessment, Staff Induction, Incident Investigation, Emergency Response, Project Management System*

### The Construction Manager Shall;

- Report Directly to the Project Manager
- Ensure all works are carried out as per approved method statements.
- Ensure that all approved method statements are communicated to the teams on site.
- Complete a weekly management inspection of his work area.
- Attend all HSS Meetings as detailed within the Project PSP.
- Encourage the reporting of all incidents and be actively involved in the incident investigation process as required.
- Be an integral part of the emergency response teams for the project.
- Ensure that all temporary works are planned, designed and approved.
- When requested, deliver HSS related trainings to his workforce.
- Effectively manage his subcontractors and ensure their works are carried out in a safe manner.
- Attend emergency meetings as required.
- Identify best performing workers and issue awards accordingly.
- Ensure pre-start briefings are completed for all activities.
- Ensure that he workers attend a minimum 1 TBT per week plus 15% of the workforce attends the internal module training.
- Ensure periodic drills take place in his work area and corrective actions are implemented as required.
- Ensure that all persons working for him have attended the Project Specific Induction
- Attend Subcontractor KO meetings where applicable.
- Visibly demonstrate a commitment to the BAM Safety Policy and project safety arrangements and ensure that the policy is communicated and understood by suppliers, subcontractors, visitors to the project, consultant, client and any person or group who may be affected by the Project works.
- Review project inspection and audit reports and ensure that necessary corrective and preventive actions are effectively implemented.
- Maintain a high profile in terms of safety through active involvement in safety management tours and client inspections.
- Promote open communication on safety issues across line management.
- Ensure that the Project HSS Rules are followed.
- Ensure that incidents and near misses are reported and investigations are carried out and corrective / remedial actions taken.

- Support the Project HSS Team where work is stopped due to significant Safety concerns and / or violations and maintain a dialogue with the Project HSS Manager and HSS members.
- Monitor KPIs and Trends and ensure corrective measures are implemented to reduce non-conformances.
- Ensure that all Plant / Equipment is fit for purpose and certified.
- Lead by example.

*Training Requirements – Staff Induction, Incident Investigation, Risk Assessment, Emergency Response, Project Management System*

**The Project HSS Manager Shall;**

- Report to the ASM and communicate / advise the Project Manager and his operating teams on all matters pertaining to HSS.
- Develop the Project HSS Plan and all associated documentation and ensure that reference documents identified in the risk assessment are in place. These may include logistics plan, emergency procedures, First Aid Management Plan etc.
- Ensure that risk assessments are in place for all activities and the controls are implemented and communicated to all those involved or those who may be affected by the work.
- Review Task specific method statements and risk assessments for approval.
- Ensure that all legal / Client requirements have been identified, incorporated into the Project HSS Plan and periodically evaluated and documented.
- Ensure that the requirements of the Project HSS Plan are implemented and reviewed as required or on a quarterly basis.
- Ensure that the scheduled project meetings take place and minutes are generated where HSS are leading the meeting.
- Ensure the weekly schedule of internal training modules are communicated to all.
- Attend all Client related meetings as required.
- Ensure that internal audits take place as per the communicated schedules.
- Monitor both the temporary and permanent works design process and liaise closely with the TWC.
- Understand and implement any specialist HSS related requirements of the client or the client's agent.
- Prepare and maintain relevant KPIs including Trend Analysis for the Project
- Analyse on-going training needs and prepare suitable briefings / training as required. Ensure a training programme is in place. Maintain a register for the same.
- Schedule and conduct HSS inspections. Identify and close out non-conformances / safety violations. Determine and implement corrective actions and preventive actions.
- Monitor and Manage the Project HSS Team (clinical staff) plus advise subcontractor / supplier Safety teams.
- Prepare the weekly / monthly reports and submit to the client (clients representative), Project Manager / Director.
- Assist in the investigation of all incidents and ensure that root cause(s) are identified, corrective and preventive actions are implemented, and the effectiveness of the corrective/preventive actions are monitored.
- Ensure that all persons carrying out incident investigations have been adequately trained.
- Maintain Project HSS administration.
- Review the Project HSS Plan for effectiveness on a quarterly basis or if there is a change in the scope of the works, legal requirements Corporate requirements, client requirements etc.
- Ensure that Project HSS Notice Boards are maintained and display applicable information.
- Maintain all registers including Induction, Good Practice, Incidents, and Disciplinary etc.
- Ensure the Plant department maintains all registers for lifting gear / equipment etc.
- Ensure that a minimum of 10% of workers are trained internally on a weekly basis.
- Issue formal and verbal warnings as required plus review warnings issued by the HSS Advisors.
- Ensure all Staff are trained to carry out their tasks in a safe manner.

*Training Requirements – Staff Induction, Risk Assessment, Incident Investigation*

**The HSS Advisor shall;** Report directly to the Project HSS Manager

- Behave in a proactive / positive manner when dealing with all persons on the project including subcontractors and BAM Direct Staff and workers.
- Complete daily, documented inspections of the Project and submit all information to the Project HSS Manager daily plus the Construction Teams / Subcontractors as required.
- Coordinate with line management and workers to ensure all non-conformances are closed out and documented
- Report all incidents to the Project HSS Manager and assists in the investigation process to identify the root cause and implement corrective actions.
- Complete and oversees toolbox talks performed in the workplace
- Completes internal module training when required plus project specific inductions, staff, worker and visitor.
- Ensure risk assessments are in place for all activities.
- Ensure notice boards are kept up to date / relevant on the Project.
- Assists in Emergency Response drills
- Monitors Plant and Equipment on the Project and ensures all documentation including certificates, check sheets are in place.
- Ensure lifting plans are in place for all lifting activities, completed by the appointed lifting coordinator.
- Monitors all store areas and COSHH.(Control of Substances Hazardous to Health)

- Completes / reviews / collates all applicable check sheets and reports as per the Project Specific Management System.
  - Ensures and periodically samples that all persons on the project are inducted and have a valid Bam id card.
  - Ensures all activities are carried out as per the approved Method Statement / Risk Assessment.
  - Attend HSS related meetings and ensures company HSS standards are maintained at all times.
  - Follows up on actions generated as a result of internal and external meetings.
  - Monitor the availability and status of fire extinguishers and other firefighting equipment on the Project including offices, stores, and vehicles.
  - Review permits / prestart talks in the workplace.
  - Ensure that signage, scaffolding tags etc. are in place for all temporary works on the project.
  - Ensure all information boards are kept up to date.
  - Chair the safety committee meetings as per 3.6 of the Project HSS Plan
  - Understand and implements all requirements contained within the Project HSS Plan and associated documentation.
  - May issue warnings pertaining to HSS are issued and subsequently elevate to the Project HSS Manager
- Training Requirements – Staff Induction, Various Internal Module Trainings (Must be completed prior to delivering the training), Incident Investigation, risk assessment, emergency response, Project HSS management system, Inspection / Auditing.*

#### **The (Senior / Package) Project Engineers shall;**

- Report directly to the Construction Manager.
- Lead by example in terms of HSS to promote a safe working culture on the project.
- Supervise the execution of the works to ensure that they are carried out in a safe manner.
- Engineers shall ensure, as far as reasonably practicable for him / her to do so, the health and safety of workers engaged in work under his / her supervision.
- Perform a weekly management inspection of his / her area
- Ensure that all non-conformities identified by inspections are closed out in a timely manner and corrective / preventive actions implemented.
- Report all incidents and assist / participate in the investigation if required.
- Ensure that 15% of his workforce attends the scheduled internal module training in addition to any other specific training required / identified by the HSS Department.
- Attend all required meetings related to HSS.
- Assist the charge hands / foremen to complete the 'prestart talk'
- Conduct TBTs on a regular basis or when required by the HSS Department. Ensure that all his workers complete at least 1 TBT per week.
- Ensure that all equipment and accessories are in good working order, fit for purpose and only authorized persons can operate the equipment.
- Provide feedback / comment for Method Statements plus elevate comments from his workers to the method statement owner as required.
- Be a part of the emergency response team.

*Training – All internal training modules, Prestart Briefing, Incident Investigation, Risk Assessment, Emergency Response, Auditing / Inspection, Staff Induction*

#### **Supervisors Shall;**

The General Foremen / Foremen and Supervisors shall;

- Carry out their duties in compliance with the Project HSS Plan and referenced procedures / Operational Controls.
- Lead by example in terms of HSS, correct and comment on the spot.
- Ensure that workers carrying out specialist trades are suitably competent.
- Report all incidents and assist with the investigations where required.
- Never permit works to take place where there may be a risk to persons or property.
- Ensure that work permits are in place where required.
- Conduct Tool Box Talks on a regular basis and ensure that prestart briefings are completed daily for any new task / activity that are being undertaken.
- Ensure that Personal Protection Equipment is available and used where required.
- All supervisors, as far as reasonably practicable shall ensure that health and safety of workers engaged in work under his supervision. Those workers not engaged in work under his supervision but present at the workplace.
- Understand, communicate and implement the approved method statement
- Complete prestart briefings with his / her workers daily or when required by the risk assessment.
- Respond to Safety issues reported to him by workers and to their Safety related requests.
- Ensure that housekeeping and physical conditions are maintained on the Project.

*Training – All Internal Training Modules, Prestart Briefing, Incident Investigation, Risk Assessment, Emergency Response, Auditing / Inspection, Staff Induction*



**General Workers (including subcontractors) shall;**

- Comply with the HSS related rules for the Project.
- Wear applicable Personal Protection Equipment for the works being carried out as per the prestart briefing and method statement.
- Comply with site signage and exclusion zones.
- Shall not operate any plant, tools or equipment without authorization.
- Shall not modify plant, tools or equipment.
- Shall attend all planned Tool Box Talks, prestart briefings, internal trainings etc. arranged on their behalf.
- Shall comply with all reasonable instructions issued by the Project Safety Team.
- Shall report all incidents to the line supervisor / Project Safety Team etc.
- Shall report all defects and unsafe conditions to the line supervisor / Project Safety Team.
- Ensure that the contents of the prestart briefing are implemented.
- Ensure that only welfare areas are used for eating / sleeping
- Not bring food in bags and only use approved containers.
- Pay attention during all inductions / training and ask questions where required.
- Be committed to only working safely.

*Training – Internal Training Modules as Required, Worker Induction*

**Subcontractors / Suppliers shall;**

- Implement and comply with the Project HSS Management System and the terms and conditions of the subcontract.
- Provide the required documentation to BAM prior to mobilization.
- Attend the premobilisation KO meeting.
- Senior Management to attend a kick off meeting prior to mobilization.
- Ensure that all employees, visitors, suppliers are provided with Personal Protection Equipment.
- Cooperate with the Project Safety team during inspections and ensure that all highlighted issues are closed out within the agreed timescale.
- Ensure that all employees / suppliers have applicable work permits
- Ensure that all Plant and Equipment complies with BAM and legal requirements.
- Ensure that his / her workforce attend internal training when required.
- Ensure that all employees have a valid work visa to work and are medically fit to carry out their task.
- Ensure that worker accommodation off site is legally compliant and facilitate all inspection requests from BAM
- Ensure that all persons attend the Project Induction prior to entering the Project.
- Ensure that all people keep their BAM ID on their persons at all times and shall produce the card upon verbal request from any member of the BAM Team on the site.
- Shall return the BAM ID upon demobilization from the Project to the Administrator or Project HSS Manager.

*Training Requirements – Induction (Staff / Visitor), various internal training modules,*

**Clinical Nurse Shall;**

- Ensure the project clinic is fully stocked always and complete an inventory monthly.
- Report to the Senior HSS Advisor / Manager
- Be an integral part of the emergency response team.
- Assess / Check all emergency response and clinical equipment and document the results of the same.
- Ensure the clinic is cleaned daily.
- Treat all workers / staff for injury / illness as required, both occupational and non-occupational. Maintain a record of all persons entering the clinic.
- Report all first aids / injuries / illness to the PSM or HSS advisor on the Project.
- Attend HSS meetings as required
- Deliver training (internal) on the Project as required.
- Complete the health assessment for all workers after the induction
- Where required, input induction / training information to the i-BAM software.
- Assist in the investigation of incidents where required.
- Decide if further treatment is required for persons – hospital / doctor etc.
- Regularly walk the project and ensure all first aid kits are adequately stocked and in date.
- Maintain an excellent relationship with all workers / staff on the Project.
- Lead by example.

*Training Requirements – Staff Induction, Incident Investigation, Emergency Response, First Aid equipment checking, Site Inspection, various internal training modules.*

**Visitors Shall;**

- Shall attend the Visitor Induction Training when accessing the Project for only one day.
- Ensure that they are accompanied at all times by a staff member from BAM.
- Carry out their activity as per the requirements of the quick induction
- Return the BAM Freetown Water Rehabilitation Project ID Card upon exiting the Project.
- Ensure that they only access the project for 24 hours and additional days require the full induction.
- Report unsafe acts / conditions / incidents to a member of BAM Staff.
- Where full PPE at all times as per the Project Requirements.

*Training Requirements - Visitor Induction*

## Appendix E – Method Statement List

Work Package	Work Item	WI Re	Title of MS to be written	Reference No.
WP 1 Guma Dam & WTP	Scour and Guard Valve refurbishment	1.1	1) Site Set Up 2) HVL Works to Stop Leaking 3) Replacement of control valve	TBA
	Intake Tower Concrete Sealing	1.2	1) Concrete Repair Works	TBA
	Intake Tower Ladders and Platforms	1.3	1) Site Set Up 2) Replacement of Floors 3) Replacement of lighting	TBA
	Repair Leaking Structures	1.4	1) Repair of water retaining structures 2) Building works repair	TBA
	Guma WTP Filter Bed Replacement	1.5	1) Site Set Up 2) Filter bed refurbishment 2) Blowers and associated piping	TBA
	Guma WTP Electrical and Control Refurbishment	1.6	1) Electrical control replacement 2) Lime dosing line replacement 3) Chemedose installation 4) Commissioning of the works	TBA
	Flowmeters	1.7	1) Excavation and construction of chamber 2) Installation and commissioning of meter	TBA
WP 3 Transmission Main	Replace 4.4 km of Pipeline	3.1	1) Site Set Up 2) Transportation and delivery of pipes 3) Setting out and site control 4) Trenching works 5) Pipe laying, jointing and pressure testing 6) Backfilling 7) Thrust block construction 8) Tie in to existing pipe line	TBA
	Construct Service Reservoirs	3.2	1) Site set up 2) Foundation prep works 3) Braithwaite install of tanks 4) Chamber construction and minor civils 5) Boundary wall construction 6) Trenching and laying of pipe 7) Commissioning of tanks	TBA
	DMA meters	3.4	Procurement only	TBA
WP 4 Rehabilitate Distribution Network	Improve Leak Control	4.1	1) Leak detection training	TBA
	Pressure Management	4.2	1) Construction of chambers 2) Install of DMA and PRV	TBA
	Reservoir Rehabilitation	4.3	1) Civils Repair Works 2) Water retaining structures repair works 2) No MS will be required for each of the reservoir sites.	TBA
	Road reinstallement	4.4	1) Typical repair in surfaced road 2) Typical repair in unsurfaced road.	TBA

WP 5 Distribution Replacement	Priority 2 : Mains Rehabilitation	5.2d	1) Site Establishment 2) Laying pipes in verges 3) Laying pipes in roads	TBA
		5.2e		TBA
		5.2f		TBA
		5.2g		TBA
	Design and install communal waterpoints/kiosks	5.5	1) Installation and commissioning of water points	TBA
	Commission the Bulk Transfer System	5.6	1) Support works associated with the commissioning of the BTS this is an Atkins led activity	TBA
	Bulk Flowmetering	5.7	1) Construction of chambers 2) Installation of Flow meter	TBA
	Rehabilitation of networks in the East of the city	5.9a	1) Site Set up 2) Relaying of pipes in road 3) Relaying of pipes in verge	TBA
		5.9b		TBA
		5.9c		TBA
		5.9d		TBA
WP 6 Charlotte to Allen Town	Rehabilitate transmission mains + weirs	6.5	1) Site Establishment 2) Materials delivery to the weir site 3) Construction of weir 4) construction of transmission main through forest 5) Construction of transmission main along road 6) Orugu river crossing construction 7) Connection into Allan Town Treatment works 8) Works to Allan Town Treatment works	TBA
	Rehabilitation of Allen Town distribution network	6.9	1) Site Set Up 2) Pipe laying in the Allan Town network	TBA
WP 9 Wilberforce Reservoir	Replace Spur Road Pumps and provide standby generator	9.1	1) Site Establishment 2) Access improvement works 3) Installation of spur road pumps 4) Installation and commission of MEP equipment 5) EDSA transformer installation and commission	TBA
	Rehabilitate Spur Road Reservoir	9.4	1) Spur Road Civils Works	TBA
	Rehabilitation of Africanus Road Pumps, Rising Main Hooke Str Reservoir and outlet pipework.	9.6		TBA



## Appendix F – Training Modules

Training Module	Reference	Revision
Induction	FW-IMC-BAM-HSS-ITM-001	02
Flagman	FW-IMC-BAM-HSS-ITM-002	00
Abrasive Wheel	FW-IMC-BAM-HSS-ITM-003	00
Manual Handling	FW-IMC-BAM-HSS-ITM-004	00
Use of Portable Electrical Tools & Hand Tools	FW-IMC-BAM-HSS-ITM-005	00
Harness & Lanyard	FW-IMC-BAM-HSS-ITM-006	00
Excavation Banksman	FW-IMC-BAM-HSS-ITM-007	00
Hazardous Substances - COSHH	FW-IMC-BAM-HSS-ITM-008	00
Plant & Equipment	FW-IMC-BAM-HSS-ITM-009	00
Site Inspection	FW-IMC-BAM-HSS-ITM-010	00
Safety Representative	FW-IMC-BAM-HSS-ITM-011	00
Use of Scaffold	FW-IMC-BAM-HSS-ITM-012	00
Lifting Operation	FW-IMC-BAM-HSS-ITM-013	00
Operational Control	FW-IMC-BAM-HSS-ITM-014	00
Prestart Talk	FW-IMC-BAM-HSS-ITM-015	00
Rigger	FW-IMC-BAM-HSS-ITM-016	00
Fire Fighting	FW-IMC-BAM-HSS-ITM-017	00
Confined Space	FW-IMC-BAM-HSS-ITM-018	00
Emergency Response Team (ERT)	FW-IMC-BAM-HSS-ITM-019	00
Cranes	FW-IMC-BAM-HSS-ITM-020	00
Eye Protection	FW-IMC-BAM-HSS-ITM-021	00
Supervisor Training	FW-IMC-BAM-HSS-ITM-022	00
Defensive Drive	FW-IMC-BAM-HSS-ITM-023	00
Accident Investigation	FW-IMC-BAM-HSS-ITM-024	00
Near Miss Briefing	FW-IMC-BAM-HSS-ITM-025	00
Job Performer	FW-IMC-BAM-HSS-ITM-026	00
Hot Works	FW-IMC-BAM-HSS-ITM-027	00

**Appendix G – Amendments**

Section	Amendment	Changed By	Date

## Appendix H – Operational Controls / Supporting Docs

Operational Control	Reference	Revision
Site Set Up	FW-IMC-BAM-HSS-OC-001	02
Personal Protective Equipment	FW-IMC-BAM-HSS-OC-002	02
Access & Egress	FW-IMC-BAM-HSS-OC-003	02
Material Storage Stacking and Movement	FW-IMC-BAM-HSS-OC-004	02
Excavation	FW-IMC-BAM-HSS-OC-005	02
COSHH	FW-IMC-BAM-HSS-OC-006	02
Hand Tool and Small Equipments	FW-IMC-BAM-HSS-OC-007	02
Electrical Requirement	FW-IMC-BAM-HSS-OC-008	02
Plant & Equipment	FW-IMC-BAM-HSS-OC-009	02
Lifting Operations	FW-IMC-BAM-HSS-OC-010	03
Static Plant & Equipment	FW-IMC-BAM-HSS-OC-011	02
Fall Protection and Prevention	FW-IMC-BAM-HSS-OC-012	02
Formwork / Falseworks	FW-IMC-BAM-HSS-OC-013	02
Confined Space	FW-IMC-BAM-HSS-OC-014	02
Scaffolding	FW-IMC-BAM-HSS-OC-016	02
Hot Works and Abrasive Wheels	FW-IMC-BAM-HSS-OC-017	02
Precast	FW-IMC-BAM-HSS-OC-018	01
Supporting Documents	Reference	Revision
Emergency Response and First Aid Management Plan	FW-IMC-BAM-HSS-ERP-001	01
Logistics / Traffic Management Plan	FW-IMC-BAM-HSS-LP-001	00
Project Environment Management Plan	FW-IMC-BAM-HSS-PEMP-001	00
Waste Management Plan	FW-IMC-BAM-HSS-WMP-001	00
Project quality plan	TBA	



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## Appendix I – Subcontractor / Supplier Provisions

To be attached to applicable LPOs issued to vendors (suppliers)

### General Provisions

#### Purpose

The purpose of this document is to set out the construction Health, Safety and Environmental (HSS) requirements for the **VENDOR** supplying or renting out goods, equipment or manpower to BAM .

The **VENDOR** is contractually required to comply with the requirements set out in this document and associated BAM HSS Procedures within the BAM Project HSS Management System.

The **VENDOR** is required to adhere to all legal requirements related to their activities both on the Project and those activities that may have an impact on BAM Operations.

The Enforcement / Requirements related to this Provision is subject to the scope / exposure levels of the **VENDOR** on the Project. This will be assessed by the Project HSS Manager in conjunction with the Operations / Supply Chain team.

#### Application

All activities shall be carried out in accordance with the requirements set out in this document and supporting Project HSS Documents / Legal Requirements.

#### Legal Requirements

It is mandatory that local legislative requirements are identified and adhered to by the **VENDOR**.

Where new legislation relating to HSS is passed or existing legislation revised, the requirements stated therein shall automatically apply immediately to the **VENDOR**.

**VENDOR** activities shall be suspended pending implementation of remedial measures where it is clearly demonstrated that the **VENDOR** is in breach of its legal and contractual HSS responsibilities.

### General Requirements

#### Induction of Employees, Consultants/Contractors and Visitors

All employees and representatives of the **VENDOR** must undergo the BAM Site Specific HSS Induction prior to accessing the Project Area. However, in some cases, further to the assessment of **VENDOR** activities, a full induction may not be required. This is at the discretion of BAM Management on the Project.

#### Competence & Training

The **VENDOR** shall provide a trained and competent workforce. Minimum competence criteria for safety critical positions are detailed in the BAM Project HSS Plan.

Where deemed a requirement, the **VENDOR** is obliged to provide competent HSS Staff for their activities. This is at the sole discretion of the BAM Project HSS Manager.

#### Equipment / Deliveries

The **VENDOR** shall ensure that all equipment comply with local standards and regulations and comply with the standards of the Contractor included being fitted with all safety devices, in good working order, e.g. flashing beacons, seat belts, audible reversing alarms for all reversing vehicles (or CCTV).

The **VENDOR** shall provide, upon request of Contractor, certificates, maintenance records and incident/accident records of equipment to be used on the work location.

The **VENDOR** shall submit Manufacturers Data Sheets (MSDS) for all hazardous materials supplied to the work location.

#### Inspection / Auditing

Joint HSS Inspections will take place as per the schedule outlined in the Project HSS Plan further to the evaluation of the scope of the **VENDOR**.

BAM HSS shall carry out continual daily inspections of work in progress. Where action by the **VENDOR** is required, formal notification of the requirements will be issued to the **VENDOR** via mail, verbal, daily inspection report or within a HSS audit.

The **VENDOR** shall co-operate with BAM HSS staff allocated to the project and ensure that remedial action is prompt and effective. If the action is not complete within the time stated within correspondence BAM reserves the right to stop the activities until the corrective actions have been put in place to the satisfaction of BAM .

#### Communication

A SUB-CONTRACTOR HSS meeting is held periodically on the Project as outlined in the HSS Plan. Where deemed a requirement by the BAM HSS Team, a representative from the **VENDOR** is required to attend.

Each **VENDOR** shall establish a communication process to convey HSS information to all employees. This will include but not be limited to:

- Weekly toolbox meetings
- Daily Prestart Talks
- Awareness, promotion and training programs
- Well maintained notice boards
- Safety alerts
- Safety signs and posters

A detailed meeting / communication schedule is included in the Project HSS Plan and associated documents.

### **BMS – BAM Management System**

The objective of the BMS is to provide guidance and instruction for **VENDOR** in best practice methodology **VENDOR** shall review and implement the requirements of the BMS as detailed in this document.

### **Housekeeping**

The **VENDOR** is responsible for removing all excess waste and materials to the designated waste removal area as indicated by the Contractor. When housekeeping is performed by BAM full reimbursement for the cost of the removal will be issued to the **VENDOR**. The **VENDOR** must also ensure that all waste is segregated as per the Project Waste Management Plan.

### **Pre-Start Meeting**

When deemed a requirement by the Project HSS Manager, a HSS Kick Off meeting will be held with the **VENDOR** prior to the start of activities.

### **HSS Violation**

The **VENDOR** is responsible for promptly correcting all violations of health and safety standards. In the event of an apparent violation being observed by BAM the **VENDOR** will be notified. BAM reserves the right to issue documented warnings/safety violation reports and/or remove the **VENDOR** or its employees from the Site. Guidance of the warning levels are detailed in the Project HSS Plan.

If BAM notifies the **VENDOR** of any non-compliance in relation to the provisions of the Project HSS Management System, the **VENDOR** shall take immediate remedial and corrective action. If the **VENDOR** refuses to correct unsafe or unhealthy conditions or acts BAM will initiate appropriate actions in accordance with the **VENDOR** provisions and may take one or more of the following steps.

- A- Cease the operation or a portion thereof
- B- Correct the situation and back charge the **VENDOR**
- C- Stop or delay payment for the work being performed until verification of corrective measures has been verified by the BAM Team.
- D- Remove **VENDOR** employees from the Site.

### **Reports and Submittals**

The **VENDOR** will report all incidents to BAM immediately. Within 24 hrs. the **VENDOR** will provide BAM with a written report clearly detailing the root cause of the incident and the corrective / preventive actions to prevent a recurrence. The **VENDOR**, at his own risk, may use the BAM first aid/clinic facilities. Such services are provided on a "Good Samaritan" basis and the **VENDOR** will execute a "Hold-Harmless" agreement prior to obtaining services from BAM.. BAM will not assume responsibility for the transportation of **VENDOR** employees for medical or other purposes.

### **Subcontractor - Safety Provisions**

#### **Purpose**

The purpose of this document is to set out the construction Health, Safety and Security (HSS) requirements for the **SUB-CONTRACTOR** working for BAM .

The **SUB-CONTRACTOR** is contractually required to comply with the requirements set out in this document and associated BAM HSS Procedures within the BAM Project HSS Management System. The **SUB-CONTRACTOR** required to comply with any requirements that are updated in the periodic reviews of the Project HSS Management System.

The **SUB-CONTRACTOR** is required to adhere to all legal requirements related to their activities on the Project.

The BAM Project HSS Management System aims to reinforce BAMs commitment to improving, health, safety and security standards for all activities. The **SUB-CONTRACTOR** will perform its work in a safe manner and comply with all health, safety, security requirements of the subcontract documents as issued by BAM and which form an integral part of the Sub-Contract.

The **SUB-CONTRACTOR** has the sole and complete obligation to provide a safe and healthy working environment for its employees and other persons at the project site who may be exposed to the **SUB-CONTRACTOR** work.

### Application

All activities shall be carried out in accordance with the requirements set out in this document and supporting Project HSS Documents / Legal Requirements.

### Legal Requirements

It is mandatory that local legislative requirements are identified and adhered to by the **SUB-CONTRACTOR**.

Where new legislation relating to construction safety is passed or existing legislation revised, the requirements stated therein shall automatically apply immediately to the **SUB-CONTRACTOR**.

Sub-Contract Works shall be suspended pending implementation of remedial measures where it is clearly demonstrated that the **SUB-CONTRACTOR** is in breach of its legal and contractual HSS responsibilities. If deemed a requirement BAM will complete the remedial actions at the sole cost to the **SUB-CONTRACTOR**.

### General Requirements

#### Induction of Employees, Consultants/Contractors and Visitors

All employees and representatives of the **SUB-CONTRACTOR** must undergo the BAM Site Specific HSS Induction prior to commencing the Sub-Contract Works on Site. This includes staff and labour that will be present on Site during the Works. BAM reserves the right to remove any person who has not completed the induction and issue a formal written warning to the Sub-Contractor. No persons will be inducted on the Project without having the correct PPE as per the Project Requirements defined within the Project HSS Plan / Supporting Documents. If deemed a requirement by BAM, a translator will be provided by the Subcontractor to ensure the content of the induction is understood by any employee or representative. A Questionnaire may be distributed to verify the induction content was understood by all attendees; however, it is also at the discretion of the Trainer / Project HSS Manager of the Contractor whether attendees display the knowledge and ability to pass the induction training. Evaluations may take the form of interactive questions during the induction. The HSS induction will include but is not limited to;

- Workplace Hazards
- Overview of Site Rules
- Overview of disciplinary policy
- Overview of employee HSS responsibilities
- Awareness level training on applicable safe systems of work / safe working practices
- Emergency arrangements
- Welfare Facilities

All **SUB-CONTRACTOR** employees will be issued with a project specific identification card with their name / picture / company and job-function. Upon demobilisation, the **SUB-CONTRACTOR** is required to return the cards to the Project HSS Manager or equivalent. In the event of cards not being returned or lost, the **SUB-CONTRACTOR** is subject to a fine of 40 USD per card.

It is a mandatory requirement each employee of the Sub-Contractor entering the Project have an adequate means of bringing / storing their food. Plastic bags are not permitted to be used to carry food.

### Hazard Identification & Risk Assessment

The **SUB-CONTRACTOR** shall identify hazards/aspects, assess the risks/impacts and implemented control measures. For each work operation identified involving a previously identified hazard, the **SUB-CONTRACTOR** shall conduct a Risk Assessment, which shall:

- Describe the operation to be performed in the sequence of the basic job steps. (Method Statement)
- Identify the hazard/aspect
- Identify those at risk
- Assess the risk and possible impact
- Describe how the hazard shall be managed (control measures).
- Be communicated to those responsible for carrying out such works.
- Identify monitoring and review procedures

A method statement shall be produced for each portion of the Sub-Contract works or operation and the relevant risk assessment shall be included therein. Method Statements shall be submitted to BAM by the Sub-Contractor for their approval prior to commencement of all Sub-Contract works.

### Competence & Training

The **SUB-CONTRACTOR** shall provide a trained and competent workforce. Minimum competence criteria for safety critical positions are detailed in the BAM Project HSS Plan. On a weekly basis, the subcontractor is obliged to ensure 15% of its workforce attend the BAM internal training schedule. In addition, Management of the subcontractor are required to deliver training when instructed by BAM.



Engineering staff with safety critical duties (e.g. deep excavation inspection / electrical engineering) shall hold a recognized Diploma / Degree in relevant disciplines (Construction / Civil Engineering / MEP) and shall have at least 3 years of on-site experience in a similar role.

Health & Safety staff of the Sub-Contractor shall be suitably trained and experienced.

- All **HSS Managers** shall hold a recognized qualification and shall have a minimum of 5 years on-site experience in a safety management position and 12 years total experience. As a minimum the qualification will be a **Nebosh Diploma or equivalent**
- **Senior HSS Advisors** shall also hold a recognized qualification and shall have a minimum of 2 years on-site experience in a safety Advisor senior role. As a minimum the qualification will be a Nebosh Diploma or equivalent.
- **HSS Advisors** shall also hold a recognized qualification and shall have a minimum of 5 years on-site experience in a safety officer's role. As a minimum the qualification will be a **Nebosh Certificate or equivalent**.
- **CVs** of all safety staff must first be approved by the BAM Project HSS Department prior to mobilization.

The restrictions and requirements regarding the deployment of safety staff are detailed in the section below.

### Management Resources

The **SUB-CONTRACTOR** shall allocate adequate resources for HSS management and implementation. All professional, qualified safety staff on Site shall be in accordance with the following table. CV's for all safety managers / advisors shall be submitted to the BAM HSS Department for verification prior to appointment by the Sub-Contractor for the Site.

Project HSS Manager	Senior HSS Advisor	HSS Advisor	First Aider
Resident at manpower of 150+	Resident when manpower exceeds 250 to support HSS Manager	Resident at manpower of 30 then + 1 for each additional 50	Resident at manpower of 50 then + 1 for each additional 75

HSS staff shall be deployed to meet the requirements of shift patterns and location of the Sub-Contract Works on Site. Site specific requirements may require variance with the deployment table. This is at the discretion of the BAM Area HSS Manager in conjunction with the Project HSS Manager and Project Manager / Director. BAM reserves the right to instruct the **SUB-CONTRACTOR** to provide Project HSS Staff, Health & Safety Manager, Senior HSS Advisor and HSS Advisor when deemed a requirement by BAM irrespective of the manpower on the Project.

### Inspection / Auditing

As a minimum, there shall be a joint management HSS inspection between BAM and the **SUB-CONTRACTOR** on a weekly basis. The **SUB-CONTRACTOR** shall ensure that their Construction Manager or equivalent attends the joint management HSS inspection.

BAM HSS shall carry out continual daily inspections of work in progress. Where action by the **SUB-CONTRACTOR** is required, formal notification of the requirements will be issued to the **SUB-CONTRACTOR** via mail, verbal, daily inspection report, via the BAM SAFER system or via a standard inspection report.

The **SUB-CONTRACTOR** shall co-operate with BAM HSS staff allocated to the project and ensure that remedial action is prompt and effective. If the action is not complete within the time stated within correspondence BAM reserves the right to stop the Sub-Contract Works until the corrective actions have been put in place to the satisfaction of BAM.

BAM reserves the right to inspect all accommodation facilities of the **SUB-CONTRACTOR** to ensure it complies with all statutory laws and to instruct the **SUB-CONTRACTOR** to complete remedial actions within a timeframe decided by the Project HSS Manager.

### Communication

A **SUB-CONTRACTOR** HSS meeting will be held with representatives of all **SUB-CONTRACTORS** on Site. This will be chaired by the BAM Project HSS Manager. Attendance is mandatory for all **SUB-CONTRACTORS**. The frequency of the meetings shall be detailed within the Project HSS Plan

Each **SUB-CONTRACTOR** shall establish a communication process to convey HSS information to all employees. This will include but not be limited to:

- Weekly toolbox meetings
- Daily Prestart Talks
- Awareness, promotion and training programs
- Well maintained notice boards
- Safety alerts
- Safety signs and posters

A detailed meeting / communication schedule is included in the Project HSS Plan and associated documents.

### BMS – BAM Management System

The objective of the BMS is to provide guidance and instruction for **SUB-CONTRACTORS** in best practice methodology. **SUB-CONTRACTORS** shall review and implement the requirements of the BMS as detailed in this document. It should be noted that Project Specific plans will be in place for all projects. In some cases, there will be slight deviations from the BMS as per the client, legislative and other requirements.

#### Housekeeping

The **SUB-CONTRACTOR** is responsible for removing all excess waste and materials to the designated waste removal area as indicated by the Contractor. When housekeeping is performed by BAM full reimbursement for the cost of the removal will be due upon receipt of Contractor's invoice by the Sub-Contractor. The **SUB-CONTRACTOR** must also ensure that all waste is segregated as per the Project Waste Management Plan.

#### Pre-Start Meeting

Upon signing of the Sub-Contract agreement, a senior representative from the **SUB-CONTRACTOR** will attend a pre-mobilization meeting with BAM where Project HSS requirements will be discussed. BAM will hand over a copy of the complete BAM Site Specific HSS Management System which details the standards and requirements that must be implemented and adhered to by the **SUB-CONTRACTOR**.

#### HSS Violation

The **SUB-CONTRACTOR** is responsible for promptly correcting all violations of health and safety standards. In the event of an apparent violation being observed by BAM the **SUB-CONTRACTOR** will be notified. BAM reserves the right to issue documented warnings/safety violation reports and/or remove the **SUB-CONTRACTOR** or its employees from the Site. Guidance of the warning levels is detailed in the Project HSS Plan.

If BAM notifies the **SUB-CONTRACTOR** of any non-compliance in relation to the provisions of the Project HSS Management System, the **SUB-CONTRACTOR** shall take immediate remedial and corrective actions. If the **SUB-CONTRACTOR** refuses to correct unsafe or unhealthy conditions or acts BAM will initiate appropriate actions in accordance with the Sub-Contract provisions and may take one or more of the following steps.

- A- Cease the operation or a portion thereof
- B- Correct the situation and back charge the **SUB-CONTRACTOR**
- C- Stop or delay payment for the work being performed until verification of corrective measures has been verified by the BAM Team.
- D- Remove Sub-Contractor employees from the Site.
- E- Terminate the Sub-Contract

#### Reports and Submittals

The **SUB-CONTRACTOR** will report all incidents to BAM immediately. Within 24 hrs the **SUB-CONTRACTOR** will provide BAM with a written report clearly detailing the root cause of the incident and the corrective / preventive actions to prevent a recurrence. The **SUB-CONTRACTOR**, at his own risk, may use the BAM first aid/clinic facilities. Such services are provided on a "Good Samaritan" basis and **SUB-CONTRACTOR** will execute a "Hold-Harmless" agreement prior to obtaining services from BAM. BAM will not assume responsibility for the transportation of **SUB-CONTRACTOR** employees for medical or other purposes.

#### Alcohol / Drugs

BAM reserves the right to test **SUB-CONTRACTOR** employees for drugs or alcohol. The tests will be carried out by a qualified medical practitioner.

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**Appendix J – Inspection Schedules**

<b>Project Manager / Director</b>	<b>Bi – Weekly</b>
Project Manager	Weekly
Project Engineer (Package Engineer)	Weekly
Foreman / Superintendents / Supervisors	Weekly
Commercial Manager	Monthly
MEP Manager	Bi-Weekly
Planning Engineer	Monthly

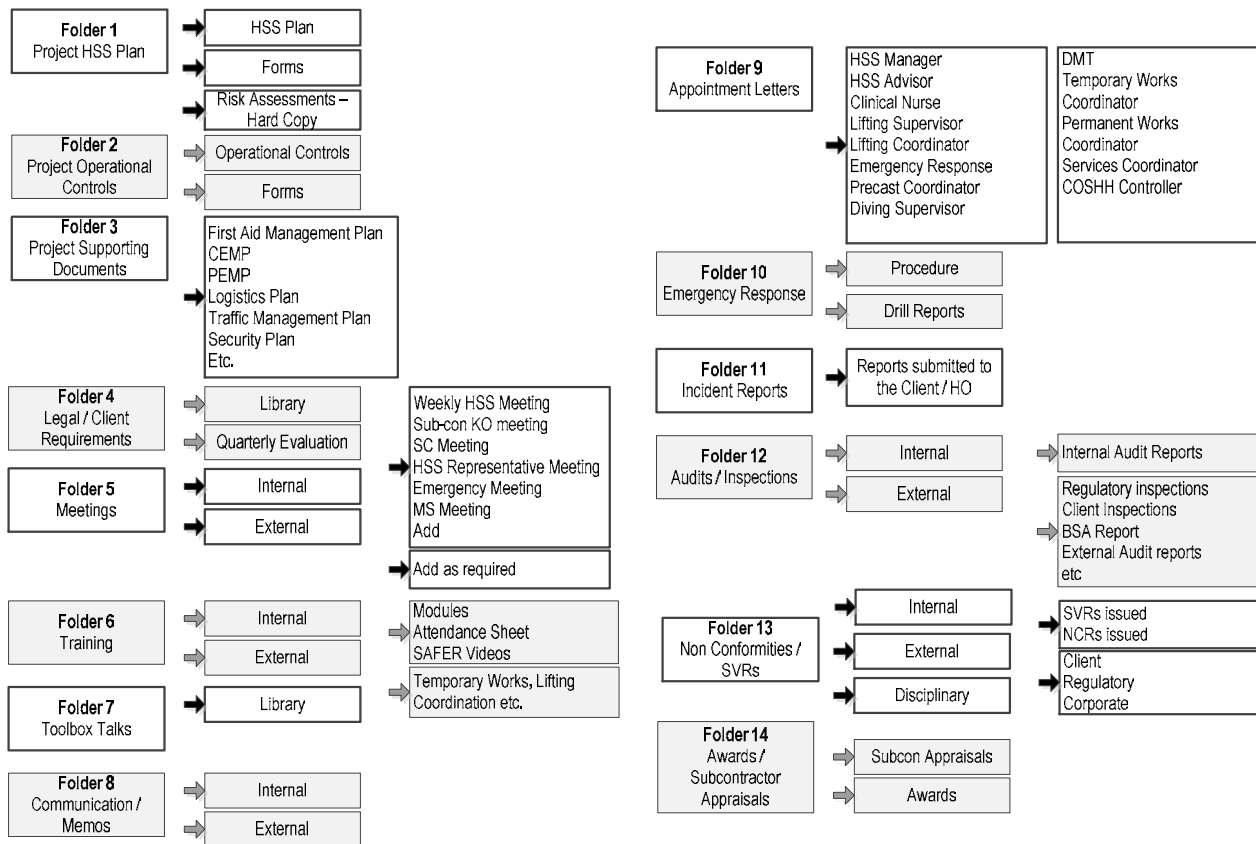


## Appendix K – Project Rules

- Being under the influence of Alcohol or Drugs
- Smoking on site or offices
- Not using proper toilet facilities
- Damaging Company Property or equipment
- Assault against a co-worker / staff member
- Failure to follow the required instructions of a supervisor / HSS Team Member when not following may result in an incident.
- Stealing from the Project
- Working under the sun during restricted hours\*
- Interfering with Safety Items (fire extinguishers etc.)
- Not protecting the area below coring works
- Working on an incomplete scaffold
- Operating Plant / Equipment without permission / applicable training
- Working above others without adequate provisions for those working below.
- Not cordoning off an area below works at height
- Working at height without adequate fall protection
- Unauthorized interference with scaffold (including handrails and toe-boards)
- Working in an excavation without shoring / stepping as per the risk assessment
- Working on the Project without completing the site induction
- Carrying out hot works without required HSS Provisions in place
- Completing a lift without a documented, approved lift plan in place
- Standing on the handrails of an MEWP.
- Working in a confined space without controls / HSS Provisions in Place
- Using damaged / uncertified lifting gear
- Directing lifting activities without having the required third-party training
- Completing hot works without the required PPE (Gloves / Shield / Apron / Permit etc.)
- Pushing a mobile scaffold with persons on the deck.
- Working without the required permits in place.
- Not using the correct access for a scaffold
- Working on a scaffold without an inspection tag.
- Standing on the handrails of a scaffold
- Working without an approved method statement / risk assessment.
- Not completing Prestart Talks (Supervisor)
- Leaving excavations open without providing a barrier
- Carrying passengers on plant that is only designed for driver only.
- Storage of materials on roofs / huts unless approved in a risk assessment
- Use of acetylene without flash back arrestors
- Use of a ladder that does not conform to the Project Standards
- Dangerous Driving or exceeding the speed limit of 15 kmph.
- Using damaged leads / transformers or power tools
- Incorrect use of an A-Frame Ladder or using a ladder without the required permits in place.
- Use of Plant / Equipment without the correct, up to date certificate.
- Use of internal combustion engines in an enclosed space (with 50% or more walls)
- Harness not clipped to MEWP
- Poor Housekeeping of work area
- Using mobile phone whilst operating Plant
- Working with hazardous materials without the MSDS/COSHH assessment
- Working without a permit or ignoring permit requirements
- Working on a mobile scaffold (Less than 3m) with an inadequate handrail
- Working on a mobile scaffold with the castor wheels unlocked
- Incorrect access to a mobile tower.(Climbing on the outside)
- Not wearing safety seat belt whilst driving or operating plant
- Standing on the handrails of a mobile scaffold
- Using non-designated access points when egressing / accessing floating equipment\*
- Not wearing standard PPE (Helmet / Vest / Boots with steel midsole / Glasses and coveralls.)
- Not wearing PPE as required by the risk assessment

## Appendix L – Filing Requirements

As per the A0 overview Chart for the Overall Management System



1		Project HSS Plan
2		Project Operational Controls
3		Project Supporting Documents
4		Legal Client Requirements
5		Meeting
6		Training
7		Toolbox Topics
8		Communication Memos

9		Appointment Letters
10		Emergency Response
11		Incident Reports
12		Audits Inspections
13		Non Conformities SVRs
14		Awards Subcontractor Appraisals

## Appendix M – Responsibility Matrix

Where training is highlighted in GREEN, it denotes external training. Where training is highlighted in ORANGE, it denotes may be either internal or external depending on the legal / client requirements.

Training	Abbreviation	Training	Abbreviation	Training	Abbreviation
Staff Induction	01	Project Induction	01A	Visitor Induction	01B
Risk Assessment	02	Management Inspection	02A	Risk Assessment	02B
Rigger	03	Lifting Supervisor	03A	Lifting Coordinator	03B
Confined Space Entry	04	Confined Space Supervisor	04A	Tag Line Operatives	04B
Prestart Briefing	05	Site Inspection	05A	Incident Investigation	05B
Hot Works Coordination	06	Confined Space Coordinator	06A	Services Coordinator	06B
Scaffolder	07	Scaffold Supervisor	07A	Scaffold Coordinator	07B
Flagman	08	Fire Marshal	08A	Cable Detector Use	08B
Emergency Response Team	09	Excavations	09A	Working at Height	09B
Hot Works	10	Abrasive Wheels	10A	Personal Flotation Device	10B
Temporary Works Supervisor	11	Temporary Works Coordinator	11A	Permanent Works Coordinator	11B
SAFER System	12	Management System	12A		

Position	Training Requirements	Position	Training Requirements
Project Manager	01,02, 02A, 05B, 09, 12A, 12	Construction Manager	01,02, 02A, 05B, 09, 12A, 12
Lifting Coordinator	01, 02, 03B, 05A, 05B, 12A, 12	HSS Advisor	01, 02, 02B, 05A, 05B, 12A, 12
Temporary Work Coordinator	01, 02, 05A, 05B, 11A, 12, 12A	Commercial Manager	01, 02A, 12A, 12
Package engineers	01, 02, 02A, 05, 05A, 06B, 09, 12A, 12	Supervisors / Foremen	01, 02A, 05
HSS Manager	01, 02, 02A, 05, 05A, 06B, 09, 12A, 12	MEP Manager	01, 02A, 12A, 12
Clinical Nurse	01, 02, 02B, 05A, 05B, 12A, 12	Operatives	01A, 05, 09B, 10, 10A, 10B

Note that this is a non-exhaustive list. The Project Specific Operational Controls must also be assessed and the training / competency requirements implemented.



## Appendix N – Objectives

Objective 1 - Category	Objective	Plan for Achieving Objective		Resources / Accountability
Training	Develop site specific training modules	Training modules to be developed and made site specific. Practical element		HSS / Operations
Indicator	Progress Update			
	Q1	Q2	Q3	Q4
100% training to be identified and completed		100% achieved	100% achieved	

Objective 2 - Category	Objective	Plan for Achieving Objective	Resources / Accountability	
Competence & Training	Improve competency on safety	<ul style="list-style-type: none"><li>New comer to be assesd, Mandatory training shall be provided along with site Induction. Examples: Welder – Induction, abrasive wheel, manual handling, hot works, tools etc Mason – Induction, COSHH, Manual Handling etc</li><li>Identify who has to be trained</li><li>Internal training schedule to be issued weekly to operations. Weekly one training to be given by supervisor/ operation team</li></ul>	Project Manager HSE Manager Project operation team	
Indicator	Progress Update			
	Q1	Q2	Q3	Q4
15% of workforce to be trained weekly basis		Achieved as required	Achieved as required	
100% target to be achieved		100%	Overall 28% of workforce have been trained weekly basis within this quarter	
		Weekly training by foreman / Supervisor shall be improved		

Objective 2 - Category	Objective	Plan for Achieving Objective	Resources / Accountability
Performance measuring & monitoring	Effectiveness of Management HSS Inspections	<ul style="list-style-type: none"> <li>Monthly inspection schedule to be issued as per the requirement of HSS Plan</li> <li>Inspection report to be issued promptly to all parties with the auditor taking ownership of the corrective actions. .</li> <li>1 method statement to be an assessed of a live method statement</li> </ul>	Project Management/ PM / PSM/ Engineering Manager

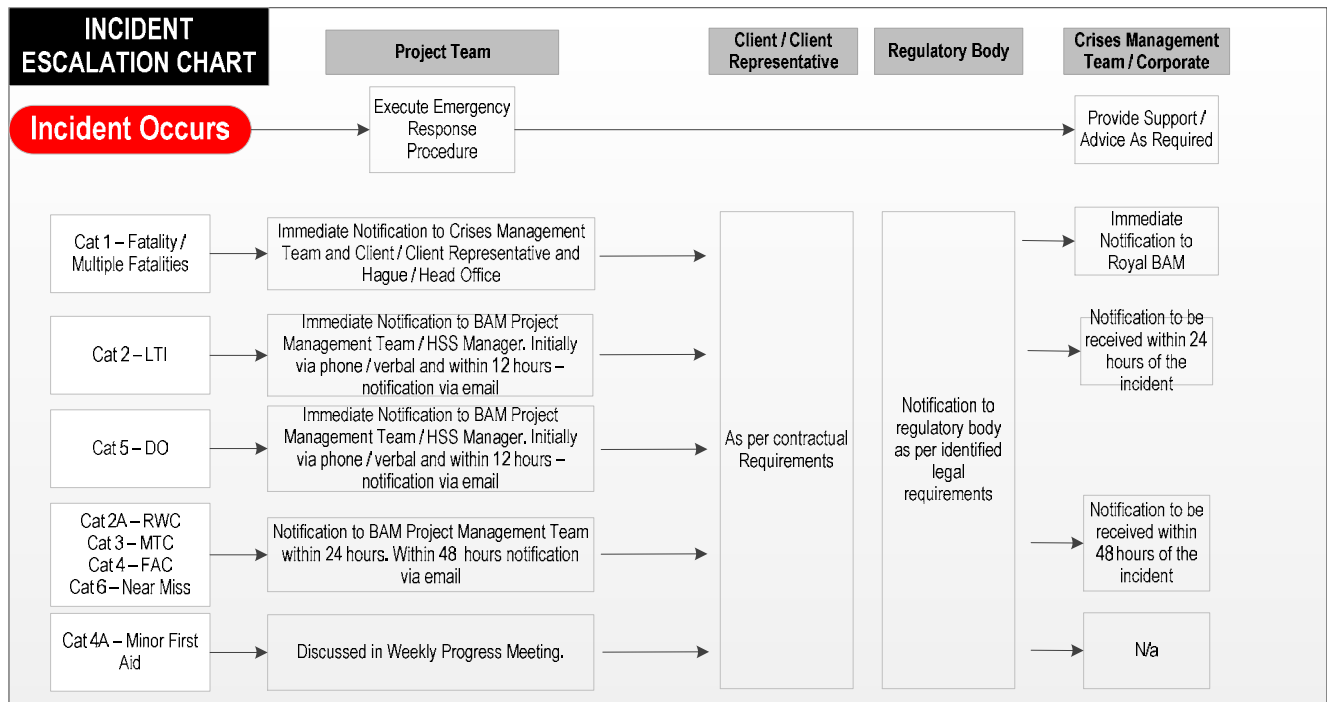
Indicator	Progress Update			
	Q1	Q2	Q3	Q4
Management HSE Inspection to be completed 100% as per schedule		Project only received an approval for storage area facility at Affricanus Road in May 2018. This is the only construction site at moment. During preparing of storage area there are 3 management inspection have been carried out. 100% Achieved	Within the 8 weeks in total 11 management inspection has been carried out.  As scope of work and inspection schedule, project has achieved his target	

Objective 2 - Category	Objective	Plan for Achieving Objective		Resources / Accountability
Internal Audit	Implementation of project management system	Identify of internal auditors and Internal audit schedule to be issued quarterly		HSS / Operations / All / internal auditors
Indicator	Progress Update			
	Q1	Q2	Q3	Q4
Quarterly minimun 3 internal audits shall be carried out		Not done, due to project delay and lack of staff	One internal audit has been completed on Project SAFER online system	

Category	Objective	Plan for achieving Objective	Resources / Accountability	Indicator	Progress Update			
					Q1	Q2	Q3	Q4
Planning / Leadership etc.	What is the objective – ie increase supervisor OH&S Awareness	Detailed plan to achieve the objective – what will be done – must be tangible	Resources and persons allocated to achieve the objective	KPI - % of persons trained, number of workshops etc.	Update the KPI in this section plus add additional resources or update the plan if objective not being achieved.			

## Appendix N – Incident Escalation Chart

Make escalation chart specific to the project plus post / communicate. Print in A3 as a minimum.



## Appendix O – Terms / Definitions

Term	Definition
Acceptable Risk	Risk that has been reduced to a level that can be tolerated by the organization having regard to its legal obligations and its own OH&S Policy
Appointed Person	A person who has been appointed in an additional function to his normal role such as lifting coordinator, temporary works coordinator etc.
AQM	Area Quality Manager
ASM	Area Safety Manager
Audit	A systematic, independent and documented process for obtaining 'audit evidence' and evaluating it objectively to determine the extent to which 'audit criteria' are fulfilled.
Auditor	A person with the competence to conduct an audit
BMS	BAM Management System that incorporates all elements of Health, and Safety
CM	Construction Manager
Competent Person	A person that has been deemed to meet the combination of licences, qualifications, training and instruction as defined by the company or by legal requirements for an activity or works.
Continual Improvement	Recurring process of enhancing the IMS in order to achieve improvements in overall IMS performance consistent with BAM Policies.
Corrective Action	Action taken to eliminate the cause of a detected nonconformity or other desirable situation
COSHH	Control of Substances Hazardous to Health
Customer Satisfaction	Customer's perception of the degree to which the customers' requirements have been fulfilled.
Document	Information and its supporting medium
Hazard	Any source, situation or act with a potential for harm in terms of human injury or ill health or a combination of these.
Hazard Identification	Process of recognising that a hazard exists and defining its characteristics
HR	Human Resources
HSS	Health, Safety & Security
Ill Health	Identifiable, adverse physical or mental condition arising from and / or made worse by a work activity and / or work related situation



IMS	Integrated Management System that incorporates all elements of Health, Safety and Security.
IMS Performance	Measurable results of an Organizations management of its OH&S risks
Incident	Work related event(s) in which an injury or ill health (regardless of severity) or fatality occurred or could have occurred.
Inducted	Company specific instruction provided to workers / supervisors related to a task, activity or process, with evidence of worker acknowledgement of instruction provided.
Interested Party	Person or group, inside or outside the workplace, concerned with or affected by IMS performance of BAM
Internal Audit	Systematic independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which the HSS management system audit criteria set by BAM are fulfilled.
ITP	Inspection and Test Plan
KPIs	Key Performance Indicators define a set of values to be measured against.
Licenced	A persons that has met the defined regulatory requirements for an activity or work
LP	Logistics Plan
Method Statement	A statement that outlines the activities to be performed and the methods to be implemented for minimizing HSS risks and ensuring compliance with requirements and regulations.
MS	Method Statement
MSDS	Material Safety Data Sheet
Non-Conformity	Non-fulfilment of a requirement
Objective	IMS goal in terms of OH&S Performance that BAM wishes to achieve
Operational Control	A documented, implemented and maintained measure to reduce the risk.
PM	Project Manager
Policy	Overall Intentions and direction of an organization related to IMS performance as formally expressed by top management.
PPE	Personal Protective Equipment
PQP	Project Quality Plan
PSP	Project HSS Plan
Preventive Action	Action to eliminate the cause of a potential nonconformity or any other undesirable potential situation.
Procedure	Specific way to carry out a process or activity
PSB	Pre Start Briefing
PSM	Project HSS Manager
RA	Risk Assessment
Record	Document stating results achieved or providing evidence of activities performed.
Recordable	An incident that occurs that is recorded internally within BAM
Reportable	An incident that occurs that is reportable to Bunnik (Royal BAM) plus recordable internally
Requirement	Need or expectation that is stated, generally implied or obligatory.
PRA	Project Risk Assessment
Risk	Combination of the likelihood of an occurrence of a hazardous event or exposure(s) and the severity of injury or ill health that can be caused by the event of exposure.
Risk Assessment	Process of evaluating risk(s) arising from a hazard(s), taking into account the adequacy of any existing controls, and deciding whether the risk(s) is acceptable
SVR	Safety Violation Report
TBT	Tool Box Talk
Trained	A person who has been trained internally, consistent with the company defined requirements. Evidence of specific content delivered or communicated is required.
TWC	Temporary Works Coordinator
Workplace	Any physical location in which the work related activities are performed under the control of the organization
WRULD	Work Related Upper Limb Disorders
TBC	To be Confirmed
SI	Serious Industrial
LTI	Lost Time Incident





## Appendix 13: First Aid and Emergency Response Plan





# First Aid & Emergency Response Plan for Freetown Water Rehabilitation Proejct

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First Aid & Emergency Response Plan to be updated on a  
quarterly basis

FW-IMC-BAM-HSS-ERP-  
001 Rev02

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## 1 Purpose

This plan is for the safety and wellbeing for all employees and visitors working on the Freetown Water Rehabilitation Project. It identifies necessary management and employee action during fires and other emergencies throughout the site and office area. Education and training will be provided based on the Emergency Procedure so that all employees know and understand the contents and their duties in the event of an emergency.

## 2 Scope

This is a BAM Emergency Action Plan and describes the emergency procedures for offices and project; this document is applicable to BAM Staff, Workers, Subcontractors, Suppliers and Visitors. BAM Project Management will ensure that the contents of this document are understood by all and monitored on the Project.

## 3 Definitions / Abbreviations

Definition	Heading	Definition	Heading
ER	Emergency Response	IP	Injured Party
ERC	Emergency Response Coordinator	PM	Project Manager
ERTL	Emergency Response Team Leader	PSA	Project HSS Advisor
ERTM	Emergency Response Team Member	SPSA	Senior Project HSS Advisor
APC	Assembly Point Coordinator	PIC	Project Incident Controller
HSS	Health, Safety and Security	ASM	Area Safety Manager (Remove if n/a)
IRTL	Immediate Risk to Life	SIC	Site Incident Controller
CMT	Crises Management Team (Office ERT)	CMT	Crises Management Team (Office ERT)
MC / CC	Mobile Crane / Crawler Crane	FE	Floating Equipment

## 4 Associated Documents

Title	Reference No.	Additional Information
Project Risk Assessment	BMS-HSS-F-01	Updated quarterly
Project HSS Plan	FW-IMC-BAM-HSS-ERP-001	Updated as a minimum quarterly
Operational Controls	FW-IMC-BAM-HSS-OC-001 to 018	Updated quarterly
Evaluation of legal, client and other requirements	BMS-HSS-F-05	Updated quarterly

## 5 Legal and Other Requirements

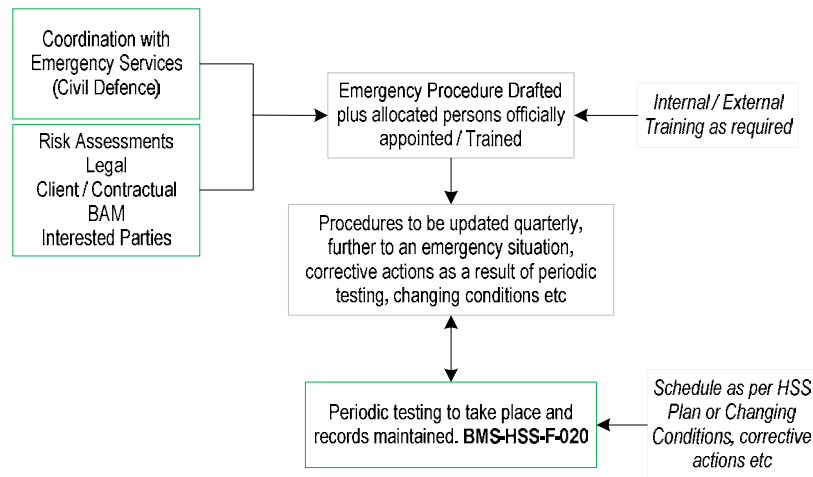
Document	Year / Section	BAM Reference	Info
CDM Regulation 2015 - Part 4 General requirements for all construction site - Regulation 29	06-04-2015 - Prevention of risk from fire, flooding or asphyxiation	BMS-HSS-F-05	(1) Suitable and sufficient steps must be taken to prevent, so far as is reasonably practicable, the risk of injury to a person during the carrying out of construction work arising from— (a) fire or explosion; (b) flooding; or (c) any substance liable to cause asphyxiation
CDM Regulation 2015 - Part 4 General requirements for all construction site - Regulation 30	06-04-2015 - Emergency Procedure	BMS-HSS-F-05	(1) Where necessary in the interests of the health or safety of a person on a construction site, suitable and sufficient arrangements for dealing with any foreseeable emergency must be made and, where necessary, implemented, and those arrangements must include procedures for any necessary evacuation of the site or any part of it. (2) In making arrangements under paragraph (1), account must be taken of— (a) the type of work for which the construction site is being used; (b) the characteristics and size of the construction site and the number and location of places of work on that site; (c) the work equipment being used; (d) the number of persons likely to be present on the site at any one time; and (e) the physical and chemical properties of any substances or materials on, or likely to be on, the site. (3) Where arrangements are made under paragraph (1), suitable and sufficient steps must be taken to ensure that— (a) each person to whom the arrangements extend is familiar with those arrangements; and (b) the arrangements are tested by being put into effect at suitable intervals



CDM Regulation 2015 - Part 4 General requirements for all construction site - Regulation 31	06-04-2015- Emergency routes and exits	BMS-HSS-F-05	<p>(1) Where necessary in the interests of the health or safety of a person on a construction site, a sufficient number of suitable emergency routes and exits must be provided to enable any person to reach a place of safety quickly in the event of danger.</p> <p>(2) The matters in regulation 30(2) must be taken into account when making provision under paragraph (1).</p> <p>(3) An emergency route or exit must lead as directly as possible to an identified safe area.</p> <p>(4) An emergency route or exit and any traffic route giving access to it must be kept clear and free from obstruction and, where necessary, provided with emergency lighting so that it may be used at any time.</p> <p>(5) Each emergency route or exit must be indicated by suitable signs.</p>
CDM Regulation 2015 - Part 4 General requirements for all construction site - Regulation 32	06-04-2015- Fire detection and fire fighting	BMS-HSS-F-05	<p>(1) Where necessary in the interests of the health or safety of a person on a construction site, suitable and sufficient fire-fighting equipment and fire detection and alarm systems must be provided and located in suitable places.</p> <p>(2) The matters in regulation 30(2) must be taken into account when making provision under paragraph (1).</p> <p>(3) Fire-fighting equipment or fire detection and alarm systems must be examined and tested at suitable intervals and properly maintained.</p> <p>(4) Fire-fighting equipment which is not designed to come into use automatically must be easily accessible.</p> <p>(5) Each person at work on a construction site must, so far as is reasonably practicable, be instructed in the correct use of fire-fighting equipment which it may be necessary for the person to use.</p> <p>(6) Where a work activity may give rise to a particular risk of fire, a person must not carry out work unless suitably instructed.</p> <p>(7) Fire-fighting equipment must be indicated by suitable signs</p>

## 6 Responsibilities

The Project Manager of Freetown Water Rehabilitation Project in conjunction with the Project HSS Manager on the project are responsible for updating, distributing and control of this document. This document will be reviewed quarterly and updated as required with the inputs as per the process below.



The Project Manager is responsible to ensure that a sufficient number of senior BAM staff are present on site to supervise the works. HSS supervision / clinical nurse and fire marshals will be present on site during working hours. This requirement extends into out-of-hours and night time working, if this is required for the project to progress.

## 7 Duties of Emergency Response Team

The Emergency Response Team will be appointed officially by Project Manager using the BAM Letters of Appointment. All personnel, including subcontractors and supply chain will be competent to carry out their duties as outlined in this emergency plan.

### Project Incident Controller (PIC)

The PIC shall be responsible for taking strategic decisions where required and providing the necessary direction when a serious or major incident on site is reported.

The PIC will be responsible for the worksite and the implementation of this Emergency Response Procedure.

He is responsible for implementing this procedure and for the provision of the resources required to implement this plan for any emergency scenario.

The PIC will also provide support and information to the CMT and Client

### Emergency Response Coordinator (ERC)

The Emergency Response Coordinator assists the emergency leader carry out his duties.

- In the event of the PIC not been present on site the emergency response coordinator will assume the role of the Incident Controller.
- He will assist with the coordination of HSS training and emergency action plans; and performs related duties as assigned by the Emergency Team Leader.

### Emergency Response Team Leader (ERTL)

The ERTL will oversee the ERT and ensure training and awareness is updated. The ERTL will have the dual responsibility of sounding the alarm if required.

- The ERTL shall alert the ERT of the emergency.
- The ERTL shall coordinate the ERT in dealing with the emergency.
- The ERTL liaises with the PIC/ERC on the level of response and assistance required in the event of an emergency.
- He will ensure the emergency is made safe and there is no danger to the ERT team.
- The ERTL will coordinate the specialist groups i.e. Mobile Crane, Tower Crane, Other contractors, etc. that is required to deal with the emergency rescue.
- The ERTL will assist the PIC/ERC in completing the emergency investigation.

### Emergency Response Team Member (ERTM)

The ERT will include fire wardens and first aiders. The ERTM(s) will react immediately under the direction of the ERTL in the event of an emergency. This will include but is not limited to fighting small fires and administering first aid in the event of an injury.

- The Emergency Response Team provides initial response in dealing directly with the incident and bringing the situation under control. The on-site nurse will administer first aid when required.
- The Emergency Response Team will be suitably trained, competent, and regularly drilled in all aspects of responding to site emergencies.
- The ERT will respond to any emergency as 'first responder' (i.e. until the arrival of nurse / professional agencies. It should be noted that all ERT will only intervene in cases where the teams are not subject to IRTL (Immediate Risk to Life), these situations are left to the Fire Brigade, Ambulance Service or other agencies.

**ER Specialist Team Members**

The ER Specialist Team members will assist in the emergency by cordoning off the area and making it safe. All personnel will be evacuated away from the emergency to a safe location.

Upon arrival of the emergency services, the ER Specialist team members shall provide the required help and support to assist the Emergency Services as necessary.

Members of the Emergency Response Specialist Team shall include;

- Security
- Tower / Mobile Crane Drivers
- Subcontractors
- Logistics Manager
- Electricians

**Assembly Point Coordinators (APC)**

APCs will ensure that all staff/visitors are accounted in the event of an emergency or an emergency drill.

For further details regarding assembly points Refer to **Section 14: Appendix 1** of this document.

**Traffic Coordinators (flagmen)**

Traffic Coordinators (flagmen) will be positioned at the main gate and along the route to ensure emergency services are given clear access to the Incident. The Traffic Coordinators will ensure clear egress route is maintained for the emergency services.

Traffic coordinators will ensure no unauthorized entry will be permitted on site. (Media etc.)

**Fire Marshal/ Flagmen/Security**

In the event of an emergency, the fire wardens will alert the people via megaphone siren and will sweep the site as to ensure no persons are left behind.

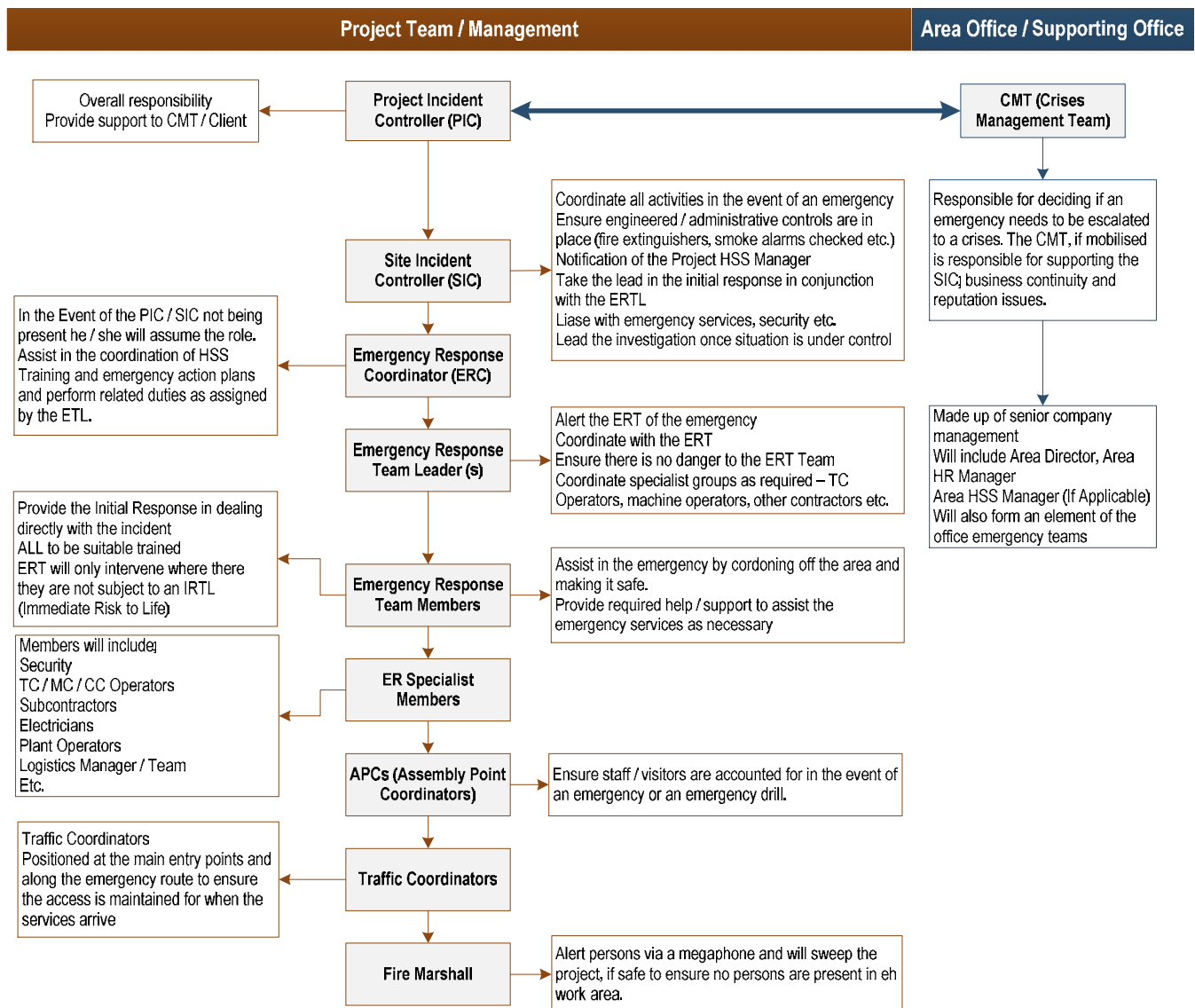
Flagmen will be positioned at the main gate and along the route to ensure emergency services are given clear access to the Incident.

The security will assist in the emergency by cordoning off the area and making it safe. All personnel will be evacuated away from the emergency to a safe location.

Upon arrival of the emergency services, the security/ driver shall provide the required help and support to assist the Emergency Services as necessary.

The Chart below provides a summary of the various roles / responsibilities involved in the event of an emergency.





## 8 Emergency Response Training

### External Trainings;

Firefighting and first aid training will be completed for emergency response team members.

### Internal Trainings;

Emergency Response team training will be completed with team members and refresher training to be completed 3-monthly where required.

Title	Training Requirement
Project Incident Controller - PIC	Emergency Action Plan – Office / Project Duties Incident Investigation / Reporting
ERT Team Leader	Emergency Action Plan – Office / Project Duties Escalation Plan / Communication Incident Investigation / Reporting
ERT Team Members	ERT Roles / responsibilities First Aid Basic Firefighting Spill response Confined space rescue
Fire Marshals	Fire Marshal Training
Assembly Point Coordinators	Internal Emergency Response Training
Flagman	Internal Flagman Training
Security	Security will be issued with the emergency action plan for office / project.

Specialist team members

Will partake in the required drills / testing of emergency scenarios.

Training is progressive and contains the following:

- Presentations: defining systems and teaching processes.
- Table top exercises: practicing ERT procedures without mobilisation of resources and in slow time, evaluating performance, identifying areas for development and establishing further training needs.
- Simulated / Major Exercises: practicing the combined response, mobilising resources in real time, evaluating performance, identifying areas for development and establishing further planning needs.
- Lessons learnt from previous actual mobilisations.
- Post-exercise learning sessions

### Medical Support

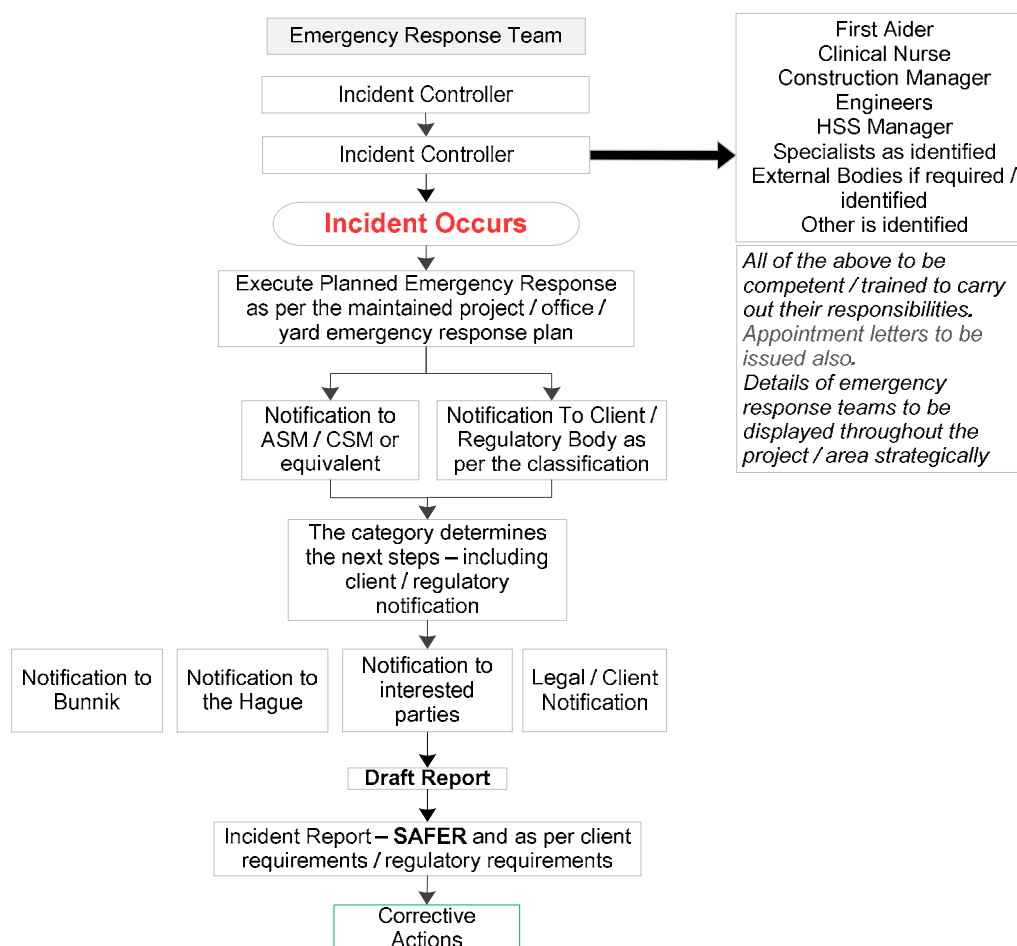
The medical support for immediate response to an emergency is the onsite nurses. They will provide 24/7 cover for the duration of the project. For additional information on first aid management, refer to **Appendix 3** of this document.

### Assembly / Emergency Siren<sup>1</sup>

Add information here re: methods for setting off the alarm.

<sup>1</sup>Please refer to **Appendix 1** for site layout drawing with marked up assembly points

## 9 Process for Emergency Response



## 10 Identified Emergency Scenarios

Further to the scope of Freetown Water Rehabilitation Project, the following have been identified as potential emergency scenarios;

Fire	Excavation Collapse
Trapped in a Room	Environmental Spill
Fall From Height	Adverse Weather ( Wind / Dust)
Overtaking Vehicle	
Structural Collapse	
Crushing Plant / Entanglement	
Rebar impalement	
Confined Space	

## 11 Escalation Chart

Note – Escalation Chart can be adjusted further to client / legal requirements.

INCIDENT ESCALATION CHART					
	INCIDENT CATEGORY	PROJECT TEAM Eric Jan Bergama +232 78336666 Ben Goodman +232 36721932	DFID / IVO Worldwide Jarret Boltman +232 99505359	REGULATORY BODY N/A	CRISIS MANAGEMENT TEAM / CORPORATE Fergal Kelly +31 631798473 Ian Hubbard +44 7919693314 Eric Van Zuthem +31 887123547
INCIDENT OCCURS	INCIDENT OCCURS	Execute Emergency Response Procedure			Provide Support / Advice As Required
ESCALATION	FATALITY / MULTIPLE FATALITIES	Immediate Notification to Crises Management Team and Client / Client Representative and Hague / Head Office	Jarret Boltman +232 99505359	Notification to regulatory body as per identified legal requirements  Local Police - 999	Immediate Notification to Royal BAM  Fergal Kelly +31 631798473 Ian Hubbard +44 7919693314 Eric Van Zuthem +31 887123547
ESCALATION	LOST TIME	Immediate Notification to BAM Project Management Team / HSS Manager. Initially via phone / verbal and within 12 hours – notification via email	Jarret Boltman +232 99505359	Notification to regulatory body as per identified legal requirements	Notification to be received within 24 hours of the incident
ESCALATION	DANGEROUS OCCURRENCE	Immediate Notification to BAM Project Management Team / HSS Manager. Initially via phone / verbal and within 12 hours – notification via email	Jarret Boltman +232 99505359	Notification to regulatory body as per identified legal requirements	Notification to be received within 24 hours of the incident
ESCALATION	MEDICAL TREATMENT	Notification to BAM Project Management Team within 24 hours. Within 48 hours notification via email	Jarret Boltman +232 99505359	N/A	Notification to be received within 48 hours of the incident
COMMUNICATION	FIRST AID	Notification to BAM Project Management Team within 24 hours. Within 48 hours notification via email	Jarret Boltman +232 99505359	N/A	Notification to be received within 48 hours of the incident
MINI-CUTION	MINOR FIRST AID	Discussed in Weekly Progress Meeting.	N/A	N/A	N/a



## 12 Emergency Contact Numbers

Wherever possible, all external parties who may be involved in the event of an emergency will be requested to attend a mock drill.

### External

Detail	Contact Details	GPS if applicable	Address if applicable
Police			
Fire Department	Freetown Central Zone – 300 Freetown Eastern Zone – 301 Freetown Western Zone – 302	N/A	
Ambulance	Hotline – 999 Choithram Hospital – 078190155 Emergency Hospital – 077624737 Aspen Hospital - 099888000	8°27'17.42"N 13°14'50.15"W 12°06'33.68"N 68°56'25.27"W 8°47'21.92"N 13°24'63.04"W	Hill station, Freetown Pennisula Road, Freetown Bass Street, Freetown
Client	IMC Worldwide Jarrett Boltman (Programme Manager) – Sierra Leone - +232 (0)99505359 South Africa - +27 (0) 828049373	8°27'35.85"N 13°15'28.04"W	IMC Worlwide Jalloh Street Spur Loop Freetown

### Internal -Emergency Response Project

Name	Function	Contact Details
Eric Jan Begsma	Project Manager	00 232 78 338666
Benjamin Goodman	Construction Manager	00 232 30 721902
Roos Cawthorne	Supervisor	00 232 30 743662
Deepak Senapati	Project Safety Manager	00 232 30 990432
Robert Termulo	Adminstrater	00 232 30 719196

### Internal – Region / Corporate

Detail	Function	Contact Details
Fergal Kelly	Corporate Safety Manager	+31 6 31798473 +971 56 1136801
Ian Hubbard	Bam Nuttall Divisional Director	+44 7919693314
Eric van Zutham	Bam International Divisional Director	+31 88 7123547

### 13 Emergency Testing

Periodic emergency drills will take place for all potential emergency scenarios. A schedule for emergency drills will be displayed throughout the project. These drills will be discussed at the project meetings.

Drills will take place as a minimum on 3 monthly basis as per schedule below. The schedule will be issued to all members of the emergency response team members.

Drills will be performed as a minimum on a monthly basis, with a different scenario being tested. A key element of the periodic test report are the corrective actions identified.

For the Freetown Water Rehabilitation Project, the following scenarios have been identified.

### 14 General Guidelines

In the event of a **General Alarm** – Office / Project

- All staff / visitors to immediately exit the building and make their way to the nearest assembly point
- Always leave the building, do not find out if it is a false alarm
- When exiting – walk, do not run
- Tell other people to proceed to their assembly point also
- Do not attempt to take valuable or other materials from the building
- If safe to do so – shut down electrical equipment
- Assembly point coordinators to tally all personnel in the assembly area
- DO NOT re-enter the building until given an all clear from the SIC or ERTL.

In Case of **Fire** - Office / Project

- ERTM to coordinate and ensure everyone is guided to a safe area away from the fire
- Immediately report to the SIC / ERTL who will in turn coordinate the ERT regarding actions to take
- Small Fires – use extinguishers but only if safe to do so
- Large Fires – get out of the building and proceed to the nearest assembly point
- All fires – large or small to be reported to the SIC / ERTL
- Stay low to the ground if smoke evident
- If a door is hot or smoke is visible, do not open the door. Use another exit
- Close doors as you exit to help contain the fire / smoke.



If **trapped** in a room;

- Place cloth material under and around a door to prevent smoke from entering.
- Close as many doors as possible between you and the fire.
- Stay low to the ground to avoid inhaling smoke.
- Try to signal your location through a window.
- If you have a mobile phone, call the ERTL or the SIC
- If an individual needs immediate medical attention, contact a first aider.
- Notify the ERTL so that he can direct first responders to the right location.
- Do not move the individual unless essential to protect life.
- If necessary to prevent shock, keep the individual warm and elevate lower extremities if possible.
- Control any heavy bleeding using direct pressure on the wound.

## 15 Specific Actions for all Scenarios

For the Freetown Water Rehabilitation Project, the following scenarios have been identified.

### Excavation Collapse

Whoever discovers the emergency will raise the alarm and will contact a member of BAM staff who will contact the site office and the Emergency Response Team Leader and Incident Controller.

- Emergency Response Services will be called immediately by the IC or his designee.
- The ERTL will access the area to ensure it is safe. The ERTL will make the final decision.
- The ERT will cordon off the area and ensure that crowd control restrictions are in place.
- Traffic coordinators will be sent to strategic locations to ensure there is no confusion when the civil defense arrives at the project.
- It is imperative that the person is rescued in the shortest time possible; therefore, time is of the essence.
- Two pre-appointed team members of the ERT (Emergency Response Team) to dig for the Injured party.
- The first part of the body to be uncovered is the mouth and nose so the person can get air or CPR can be administered.
- If the casualty is breathing continue to dig until fully exposed
- If the casualty is not breathing, a first aider will carry out CPR on the casualty when the chest area has been exposed and will continue to do so until the emergency services arrival on site.
- The clinical nurse will attend to the casualty in the event the ambulance has not arrived on site.
- A member of the ERT team will ensure that the ambulance is directed off site by the quickest route without any obstructions including people.
- A senior member of BAM Management will accompany the IP to the hospital
- The ERT will cordon off the area of the Incident pending a detailed investigation.
- The Project Manager will be notified of the Incident.



### Crushing Plant Entrapment

Whoever discovers the emergency will raise the alarm and will contact a member of BAM staff who will contact the site office and the Emergency Response Team Leader and Incident Controller.

- Emergency Response Services will be called immediately by the PIC / IC.
- The ERTL will access the area to ensure it is safe. The Emergency Team Leader will make the final decision.
- The ERT will cordon off the area and ensure that crowd control restrictions are in place. Traffic coordinators will be sent to strategic locations to ensure there is no confusion when the civil defense arrives at the project.
- It is imperative that the person is rescued in the shortest time possible; therefore, time is of the essence.
- The clinical nurse will attend to the casualty in the event the ambulance has not arrived on site.
- A member of the ERT will ensure that the ambulance is directed off site by the quickest route without any obstructions including people.
- A senior member of BAM Management will accompany the IP to the hospital.
- The ERT will cordon off the area of the Incident pending a detailed investigation.
- The Project Manager will be notified of the Incident.



### Structural Collapse

Whoever discovers the emergency will raise the alarm and will contact a member of BAM staff who will contact the site office and the Emergency Response Team Leader and Incident Controller.

- Emergency Response Services will be called immediately by the PIC / SIC / ERTL.
- The ERTL will access the area to ensure it is safe. The ERTL will make the final decision.
- The ERT will cordon off the area and ensure that crowd control restrictions are in place. Traffic coordinators will be sent to strategic locations to ensure there is no confusion when the civil defense arrives at the project.
- The ERT will establish the number and location of casualties if possible.
- If persons trapped underneath the objects are not in any more danger, no attempt will be made to remove the victims until the emergency services arrive on site.



- If however, there is severe danger that the situation might become worse before the emergency services arrive on site, the ERTL will arrange for the object to be lifted by whatever means are required e.g. lifting gear and plant etc.
- Once the object has been removed and the area made safe, the clinical nurse will attend to the casualty in the event the ambulance has not arrived on site.
- A member of the ERT will ensure that the ambulance is directed off site by the quickest route without any obstructions including people.
- A senior member of BAM Management will accompany the IP to the hospital.
- The ERT will cordon off the area of the Incident pending a detailed investigation.
- The Project Manager will be notified of the Incident.

### Vehicle Overturning

Whoever discovers the emergency will raise the alarm and will contact a member of BAM staff who will contact the site office and the ERTL and IC

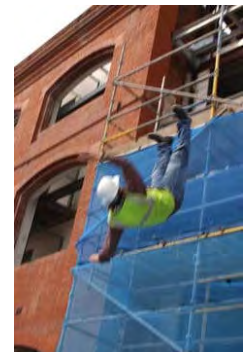
- Emergency Response Services will be called immediately by the Incident Controller or his designee if required.
- The ERTL will access the area to ensure it is safe. The ERTL will make the final decision.
- The ERT will cordon off the area and ensure that crowd control restrictions are in place. Traffic coordinators will be sent to strategic locations to ensure there is no confusion if the local authorities have to come to site.
- If there is no danger of the vehicle exploding the driver should be left in the vehicle until the emergency services arrive on site.
- If, however there is danger that the situation may escalate prior to the emergency services arrival on site, the overturned vehicle shall be secured by means of tying back with adequate ropes and chains attached to other nearby plant.
- No attempt should be made to turn the vehicle into its correct position until the driver has been removed.
- The clinical nurse will attend to the casualty in the event the ambulance has not arrived on site.
- A member of the ERT will ensure that the ambulance is directed off site by the quickest route without any obstructions including people.
- A senior member of BAM Management will accompany the IP to the hospital.
- The ERT will cordon off the area of the Incident pending a detailed investigation.
- The Project Manager will be notified of the Incident.
- A risk assessment / activity plan to be completed by the ERTL if attempting to "right" the vehicle.



### Fall from Height

Whoever discovers the emergency will raise the alarm and will contact a member of BAM staff who will contact the site office and the Emergency Response Team Leader and Incident Controller.

- Emergency Response Services will be called immediately by the PIC or his designee.
- The ERTL will access the area to ensure it is safe. The Emergency Team Leader will make the final decision.
- The ERT will cordon off the area and ensure that crowd control restrictions are in place.
- Traffic coordinators will be sent to strategic locations to ensure there is no confusion when the civil defense arrives at the project.
- If the injured person is in an inaccessible area where a crane stretcher is required, the ERT leader will organize for the stretcher to be brought to the required area.
- No attempt will be made to move the casualty until the emergency services arrive on site, unless the person's life is in immediate danger due to the circumstances of the location.
- The clinical nurse will attend to the casualty in the event the ambulance has not arrived on site.
- A member of the ERT will ensure that the ambulance is directed off site by the quickest route without any obstructions including people.
- A senior member of BAM Management will accompany the IP to the hospital.
- The ERT will cordon off the area of the Incident pending a detailed investigation.
- The Project Manager will be notified of the Incident.



### Fire in the Chemical/Hazardous Substances Stores

- Where a fire occurs in the chemical/hazardous stores the emergency services will be called immediately, and they must be told that the fire is related to chemicals/hazardous substances.
- The area should be evacuated immediately.
- The IC / ERTL must be contacted immediately.
- The IC / ERTL will obtain the full list of substances being stored in the area from the Storekeeper and give this list to the emergency services when they arrive.
- The emergency services will determine how to proceed.
- The IC / SIC or ERTL shall notify the relevant authority and neighbors, and complete an Environmental Incident Report, if required.

### Rebar Impalement

- If you come across someone impaled raise the alarm, either shout or phone a supervisor for help.
- Do not move a person who may have internal injuries or an injured spine unless you really have to.
- If the IP is lying down, keep the person in that position. Do not allow them to walk or try and stand up.
- Never give food or liquid to a person who may need an operation.
- If the IP is unconscious turn the head to one side to keep the person from choking, but watch out for spinal injuries.
- Never give water to a person who is unconscious.
- Make sure that the victim has an open airway. The nose, mouth and throat should be clear in order for them to breathe.
- Make the victim comfortable
- If necessary keep the IP in the shade by putting up screen around him protecting him from the sun.
- Remain calm, if unable to remain calm remove yourself from the area once other people come to help as you can stress out in IP
- Reassure the IP he is Ok no matter how bad it looks, and keep talking to him, check his ABC.
- Try and block the I.P form seeing the impalement by some kind of sheet if possible, as he may get stressed by seeing it and go into shock.
- Stop the bleeding or try and reduce the blood flow by any means available, use whatever is at hand t-shirt, viz vest, clean rags, your pants, anything that will help, never remove anything just keep adding until emergency services come.
- Never remove the rebar or bandages just keep bandaging around it.
- Remain calm and talk to the injured person. Explain what is being done and say that help is on its way
- Only move the IP if it is a life or death situation.

### High Winds and Dust

When high winds create a hazard to operatives or work being performed i.e. instability in elevated areas, limited visibility due to dust or particles in the air, unmanageable materials etc., supervisors will stop work activities, reassign work and area, properly store and secure materials which might blow away, injure someone or damage equipment, lower tie down crane booms and obtain further instruction from site management.



- Appropriate materials should be made available and stored on the project to facilitate the securing of project property, materials and equipment, i.e. rope, wire, boards/plywood.
- Although the storm has passed, hazards may still exist because of unstable structures or other hazardous conditions.
- Therefore, a safety and property damage loss assessment inspection shall be conducted on the project by site management and reported to the safety team.
- The construction team will have a site clear up if required prior to startup of normal construction activities.

### Man Down

Whoever discovers the emergency will raise the alarm and will contact a member of BAM staff who will contact the site office and the Emergency Response Team Leader and Incident Controller.



- Emergency Response Services will be called immediately by the Incident Controller or his designated person.
- Do not touch the person first if he/she is unconscious or can't speak, May be the reason of electrocution person down.
- The Emergency Response Team Leader will access the area to ensure it is safe.
- The Emergency Team Leader and clinical nurse will make the final decision upon nature of emergency.
- The Emergency Response Team will cordon off the area and ensure that crowd control restrictions are in place.
- Traffic coordinators will be sent to strategic locations to ensure there is no confusion when the civil defense arrives at the project.
- The clinical nurse will attend to the casualty in the event the ambulance has not arrived on site. A member of the ERT team will ensure that the ambulance is directed off site by the quickest route without any obstructions including people.
- A senior member of BAM Management will accompany the IP to the hospital.
- The ERT team will cordon off the area of the Incident pending a detailed investigation.
- The Project Manager will be notified of the Incident.

### Confined Space

Whoever discovers the emergency will raise the alarm and will contact a member of BAM staff who will contact the site office and the ERTL / SIC / PIC

Should the gas monitor alarm be activated, the persons within the confined space must self-rescue themselves by means of ladder, scaffold etc.

However, should a person within the confined space is unable to self-rescue themselves they must adhere to the following:

- Emergency Response Services will be called immediately by the PIC
- The ERTL will access the area to ensure it is safe.
- The ERTL will make the final decision.
- The ERTL will cordon off the area and ensure that crowd control restrictions are in place.
- Traffic coordinators will be sent to strategic locations to ensure there is no confusion when the civil defense arrives at the project.
- It is imperative that the injured person is rescued in as short as time as possible.
- The top man will immediately winch the injured party from the confined space using the tripod.
- First aid will be given by a trained first aider
- The site nurse will take control of the situation until the emergency services arrive on site.



### Environmental Spill Response

**Incident Controller** Eric Jan Bergsma – Contact No.: 078 33 8686

**Emergency Response Coordinator** Benjamin Goodman - 030 72 1902 / Ross Cawthorne – 030 74 3662

**Environmental advisor name / contact details- TBA**

**Contact the Emergency Response Coordinator or HSS Manager for advice & assistance**

### CONSIDER PERSONNEL SAFETY FIRST

- Immediately alert area occupants to evacuate area if necessary and report the spill to the Area Supervisor, HSS Manager or Incident Controller and Emergency Coordinator.
- The Emergency Response Team (ERT) will attend if there is a fire or if any people require medical attention or have been exposed to hazardous substances. Contaminated clothing must be removed immediately and the COSHH/MSDS consulted for first aid requirements.
- All chemical/hazardous storage areas are lined with polythene, then concrete and then a block bund to prevent seepage of substances into the soil.
- If a volatile, flammable material has been spilled, switch off or remove any sources of ignition close to the spill. Ventilate the area if indoors.
- Put on personnel protective equipment, as appropriate to the substance spilled. As a minimum glove must be worn (refer to the Material Safety Data Sheet if in doubt or consult the HSS Manager / Incident Controller/Emergency Coordinator). Gloves should be available in the spill kit.
- Consider the need for respiratory protection. Never enter a contaminated atmosphere without training or use a respirator without training. If respiratory protection is needed and no trained personnel are available do not approach spill and keep up wind.
- If the spill occurs in the sea do not enter the water. Take action from the shoreline or from a boat.

Contact **Emergency Control Center address / contact details** if the spill: cannot be contained; and/or Poses a serious public safety hazard; and/or threatens a protected habitat area or watercourse. Contact HSS Manager immediately if any spill, no matter how minor, occurs. Especially if it's near the sea/ water courses.

### Spill Control and Clean Up

- Try to identify the source of the pollutant and, if possible and safe to do so, stop the flow.
- Where an item of plant leaks (burst hose, etc.) place a drip tray underneath the leak immediately. Ensure the drip tray is large enough to hold the amount of fluid leaking from the plant until the leak can be stopped.
- Get a spill kit(s) and apply absorbent materials appropriate to the spill type. Ensure that waste containers are available in which to place used absorbents.
- Prevent the spill from spreading and contain it in as small an area as possible, using absorbent sausages, sand, earth or polythene to dam the flow. Divert any flow away from drains, sewers or watercourses or prevent pollutants from entering drains by placing sausages and/or polythene around or over the opening.
- **Never wash spillage into the drainage system** and never use detergents.



## Procedure

- If any pollutant has entered the sea, absorbent booms must be positioned to prevent the spread of the pollutant. Ensure that the booms are anchored to the shore and that water cannot flow around the edges of the boom. If there is not enough flow in the water to push the pollutant into the boom you may need to apply absorbent pads to the surface to soak up the pollutant.
- If a large volume of liquid has been contained and is not soaking into the ground (e.g. if the spill occurs on concrete) it may be more appropriate to have a waste contractor remove the liquid by drawing it directly into a tanker for disposal, or pumping it into an IBC, which can be collected for disposal.
- Alternatively, if an oil interceptor is located nearby, any oil or oil/water mixture may be pumped into this, as long as the capacity of the interceptor is not exceeded.
- Place used absorbent pads and shovel contaminated sand/earth/absorbent granules into sacks or containers. Store large volumes of contaminated soil/material in a contained impervious area, such as a plastic-lined bund.

**Non-occupational emergency**

Immediately call the site clinical nurse or a member of the ERT or the ERTL.

Name	Position	Mobile Number
TBA		

Provide the following information to clinical nurse:

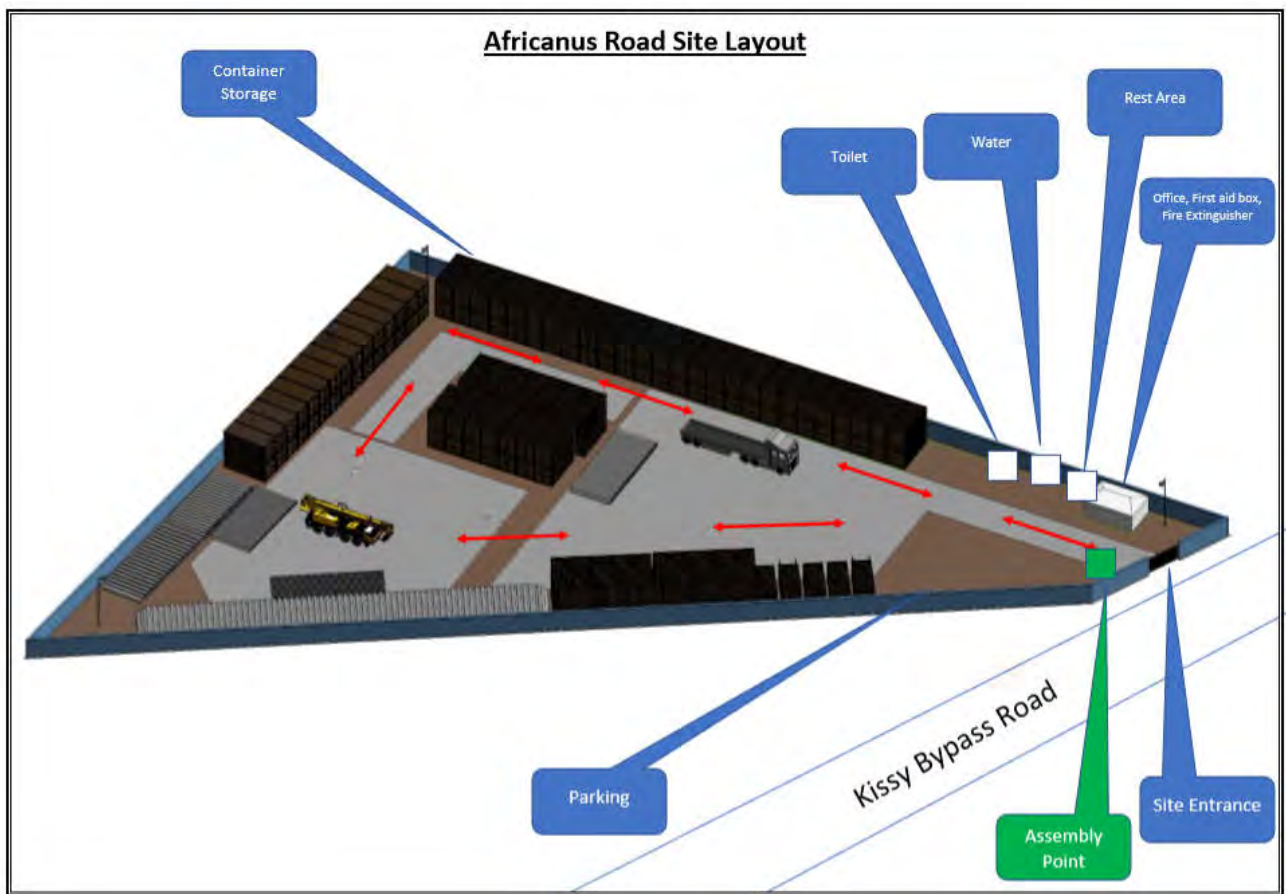
- Nature of medical emergency
- Location of the emergency (address, building, room number), and your name and phone number from which you are calling.
- Always ensure area is safe prior to approaching injured person.
- Do not move victim unless absolutely necessary, only under guidance of site nurse.
- Do not disturb the incident, immediately cordon off the area.

The above information will be communicated to all employees via site HSS induction and will be posted at all site HSS notice boards, contact details to be updated if any changes.

## 16 Appendix 1 – Assembly Point Locations

### DMG Yard



**Afriacanus Road**



## 17 Appendix 2 – Emergency Response Information

Project has various work location, Emergency response team will be updated as location.

### Emergency Response DMG Compound

Eric Jan Bergsma  
(Project Incident Controller(PIC)

Ben Goodman  
(Emergency Response Coordinator)

Ross Cawthorne  
(Emergency Response Team Leader (ERTL)  
First Aider – 030990430

Emergency Response Team Member(ERTM)

Johnson Addo Team (First Aider) 080210182	Deepak First Aider 030990432	Robert Termulo Assembly Point Coordinator 030719196	Martin Bamin/ David / Felix Fire Marshall 030733444
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#### ER Specialist Team

Driver Day/ Night	Security Day / Night
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#### Emergency Contacts

Ambulance Hotline – 999 Choithram Hospital – 078190155 Emergency Hospital – 077624737 Aspen Clinic - 099888000	Police 999	Fire Emergency Line Central Zone – 300 Eastern Zone – 301 Western Zone - 302
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#### Nearest Hospital Details



Iranian Poly Clinic, Loumly – 24/7 Open, Doctor's on call – 078435515 / 099674546

3 1/4 Km away from work location

Minor Injury cases:

- Pay as you go / An authorized call from Bam to start treatment
- Can call advance for doctor ready
- They don't have ambulance
- Administrator - Mr. Zakaria
- Full map on back



Emergency Surgery and Pediatric Center - Peninsula Road, Godrich – Amb/ Emg - 077624737

7 KM away from work location

Only Serious Injury cases:

- 24/7 Open
- Free Treatment

## Appendix 3 – First Aid Management

### Training

Selected workers will be trained by authorized agencies approved by local regulatory authorities. If no local legislation is available, a Red Cross or equivalent first aid training is required.

A team of first aid personnel will be employed on the work site (as a secondary role). They will be fully trained and conversant with the latest updates and developments. They will be identified by sticker on their helmet. The ratios of first aiders will 50:1

Refresher first aid training will be conducted for the first aiders every 3 months by the nurse or equivalent in charge to ensure that skills are kept up to date.

### Requirements of training program

All the first aiders will hold valid certificate of first aid course. The skill and competencies of trained first aiders are maintained by periodically refreshes courses and it ensure that every first aiders has the ability to manage responding both life threatening emergencies and non-life threatening emergencies.

The training program is designed to handle emergencies such as;

- Responding to life threatening emergencies:
- Establishing responsiveness
- Performing CPR (cardiopulmonary resuscitation)
- Establishing and maintaining an open and clear airway
- Performing resume breathing
- Using AED (automatic external defibrillator)
- Recognizing the signs and symptoms of shock and providing first aid for shock illness and injury.
- Assessing and treating a victim who has an unexplained change in level of consciousness or sudden illness.
- Controlling bleeding with direct pressure
- Poisoning
- Recognizing as the danger of entering a confined space without appropriate respiratory protection.
- Responding medical emergencies as chest pain, stroke, breathing problems, anaphylactic reaction, hypoglycemia, seizures, abdominal injury and reduced level of consciousness.

BAM will ensure to provide sufficient facilities; equipment and trained personnel are provided to deal with incident and injuries occurring at worksite. The location of first aid equipment and names of first aiders and contact numbers are prominently displayed across site notice boards so that assistance can be obtained at the shortest possible time.

### General

- BAM have set up a site clinic on site. The clinic will be employed with occupational health nurses, for the full duration of each working day on site.
- Telephone numbers of the nearest hospitals and emergency key contact numbers will be displayed in the clinic and at conspicuous areas across site, to help transport injured parties from site in an emergency.
- Emergency vehicles will be providing at site for transporting injured or sick employees to hospital during day and night shift hours.
- BAM policy when working in remote areas is to coordinate with the hospital for provision of the required medical care. Insert details about the hospital etc.
- Lone working is not permitted as per BAM HSS rules.
- All first aid facilities will be inspected every month by competent persons
- First aiders will be available in the office if disabled employees and visitors require first aid.
- All employees are informed of the first aid arrangements during induction training. This is supplemented by posters, which provide the following information
- First aid boxes will be in compliance with Client / local regulatory requirements.
- Names, locations and how to contact first aiders/appointed persons.
- Location of nearest hospital with map/directions

### Noise

BAM will endeavour to keep noise generating activities to a minimum level. However, this is a construction site and that certain noises will emanate during operations. All activities would have a specific risk assessment completed and control measures will be taken into account. Noise monitoring will take place on weekly basis or when noise levels are deemed excessive. Compliance with the appropriate legislation with respect to noise is mandatory.

BAM will ensure all necessary precautions to control noise. When noise levels exceed the permissible exposure limit, precautionary measures like noise exclusion zones, ear muffs and ear plugs will be developed and provided for employee

### Temperature and Heat Stress

The risks associated with heat; particularly during the peak summer period (insert period here) shall be addressed suitably for the working personnel. The following control programs will be implemented within the project:

- Awareness training (symptom & prevention of heat stress) to all staff and site operatives, with highlights in the weekly internal progress meeting.
- Display awareness posters and bulletins in different languages.
- Provide cool drinking (isotonic) water conveniently at locations close to the work area and ensure adequate number of water coolers on site.
- Ensure frequent rest time for workers.
- First aiders trained in how to recognize and deal with the symptoms of heat stress and/or heat exhaustion.
- Worker will be reminded to frequently drink sufficient amount of water before they become thirsty to maintain good hydration.
- Workers will be advised to eat regular meals and snacks as they provide enough salts and electrolytes.
- Specific PPE includes black tinted safety glasses, helmet, hand gloves, with shaded rest areas also provided on site.

### Lighting/ventilation

Adequate lighting and ventilation will be provided on the project

### Welfare Facilities

Welfare Arrangements will be provided and maintained in accordance with the provisions and requirements of local legislation. These facilities will include;

- Toilets
- Washrooms (including showers if necessary)
- Drinking water
- Rest and eating area with sufficient seating and resting arrangement facilities provided for employees will be maintained in a clean condition at all times.
- The workers will be transported by company bus to and from work location.
- Food will only be permitted on site in approved containers, no plastic bags are permitted on site
- Food will be stored in cold rooms

### Dust management

BAM will ensure effective dust and emission control measures in place for every dust generating activity carried out on site, not only to protect the health and safety of the no-site workforce, but also members of the public in the locality.

### Biological agents

The main types of biological materials at the workplaces:

- Human bodily matter (blood, tissues, vomit, urine etc.)
- Animal products (meat, offal, skins, bones, blood, milk, and eggs)
- Live animals (mammals, birds, fish invertebrates and their urine or feces.)
- Biohazard waste, sewerage and rubbish.

The following control measures will be applied for biological hazard control:

- Protective clothing
- Engineering
- Warnings and waste disposal and
- Training on safe handling of biological materials.

### Employee Camps / Villages

BAM will ensure first aid and/or medical treatment facility to employees. In addition, the following services in co-ordination with operator will be provided:

- Education of employees on communicable diseases to include blood borne pathogens, HIV, Hepatitis B & C, Sexually transmitted diseases(STD's), chicken pox, and tuberculosis (TB).
- Annual Smoking, drug and alcohol awareness programs
- A full time qualified nursing staff's services.

### Common Hazard at work site

Hazard	Typical problems	Typical injury/ illness requiring first aid
Manual handling	Overexertion/repetitive movement	Sprain, strains, fracture
Falls	Falls from heights, slips and trips on uneven surfaces	Fractures, bruises, cuts, dislocations, concussion
Electricity	Contact with electrical current	Shock, burns, loss of consciousness, cardiac arrest



## Procedure

Hazardous substances	Exposure to chemicals, e.g. solvent, acids, hydrocarbons	Dizziness, vomiting, dermatitis, respiratory problems, burns to skin or eyes
Temperature, UV radiation	Effects of heat or cold from weather or work environment	Sunburn, frostbite, heat stress, heat stroke, hypothermia
Occupational violence	Intimidation, conflict, physical assault.	Nausea, shock, collapse, physical injuries.
Noise	Continues sounds of machinery and equipment	Hearing loss, increased blood pressure and hypertension, stress.
Mechanical vibration	Prolonged operation of vibrating machinery and tools	Neurological disorders( numbness, deterioration of finger tactile perception, bone and joint disorders( osteoarthritis), vascular disorders (white fingers), muscle and tendon disorders (muscle weakness)
Dust	Inhalation of dust	Respiratory disease aggravates existing heart and lung disease.
Snakes and lizards	Snake and lizards bite	Severe and immediate pain with rapid swelling, bruising of the skin, trouble breathing, changes in heart rate.

Preventive measures will be taken at the worksite for the above common hazards and shall be initiated preventive measures for identified causes of injury /illness at the workplace. All reported occupational and non-occupational cases will be observed at the first aid clinic to find out hazards other than above mentioned common hazards. Besides the above Health Risk Assessment, site specific Risk Assessment will also be considered where required.

### Communication

Communication is one of the most important elements of the first aid plan. Suggested procedure for summoning the first aid attendant could consist of a whistle, siren, siren of light, two way radios, mobile phones etc. communication involves informing workers about:

- Who the designated first aiders are;
- How to summon first aiders;
- Where supplies and equipment are located;
- What type of transportation is available to transport injured or ill workers;
- Who to call to summon transportation;
- What the backup plan is if the first type of transportation is unavailable; and
- When to report incident to workplace Health and Safety.
- Once the plan is approved, it will be communicated to ERT members and all sub-contractors (HSS personnel, ERT members and first aiders) through a training session delivered by the HSS Manager. A copy of this plan will be provided to those who require it.

**Emergency Response Mile 13:**

**Eric Jan Bergsma**  
(Project Incident Controller(PIC))

**Ross Cawthorne**  
(Emergency Response Team Leader (ERTL))  
030743662

**Emergency Response Team Member(ERTM)**

<b>David Golomeke</b> Team(Foreman) 099261658/025477196	<b>Samuel Karbgo</b> First Aider 088348622	<b>Desmond Kanray</b> Fire Fighter 077319732	<b>Sahr Kpaika</b> First Aider 077868083
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**Emergency Contacts**

<b>Police - 999</b> <b>Ambulance – 999</b> <b>Choithram Hospital – 078190155</b> <b>Emergency Hospital - 077624737</b>	<b>Fire Emergency Line</b> <b>Central Zone – 300</b> <b>Eastern Zone – 301</b> <b>Western Zone - 302</b>
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**Nearest Hospital Details****ACCESSCARE HOSPITAL AND WELLNESS CENTER**

**Address:** Freetown Peninsular Rd  
Mile 13 Village  
Past Hamilton, Sussex, Western Rural District – Sierra Leone

**Timing**

Monday – Friday, 9am to 4pm  
Saturday, 9am to 1pm  
Sunday Closed

**Doctor:** Aminata Contoh

**Phone Number:** 088 405 307  
076 822 450  
030 812 121

**Treatment:**

Only minor treatment such as sickness, tropical diseases, abrasion, laceration and minor fractures  
Major surgery case: Patient must transfer to Emergency Hospital

**Payment:** Pay as you go

Registration and Consultancy Fee – 50000 SL  
Other treatment and Medicine cost – As require

GPS Coordination – 8°22'14.55"N 13°14'4.22"W

**Emergency Response Godrich:**

**Eric Jan Bergsma**  
(Project Incident Controller(PIC))

**Ross Cawthorne**  
(Emergency Response Coordinator)

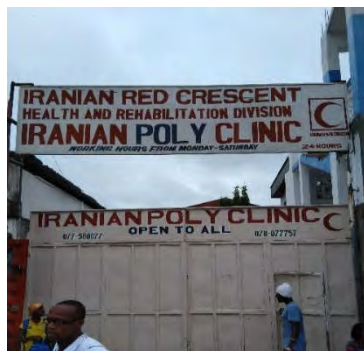
**John Burwell**  
(Emergency Response Team Leader (ERTL)  
First Aider - 030990430

**Emergency Response Team Member(ERTM)**

<b>Alexander Menesah</b> Team (Foreman) 080259616	<b>Shiaka Kawa</b> First Aider 076459653	<b>Dennis /Dennis (driver)</b> Team 030213476 / 088433004	<b>Amidu Sagor</b> Fire Fighter 030654671
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**Emergency Contacts**

<b>Police - 999</b> <b>Ambulance – 999</b> <b>Choithram Hospital – 078190155</b> <b>Emergency Hospital - 077624737</b>	<b>Fire Emergency Line</b> <b>Central Zone – 300</b> <b>Eastern Zone – 301</b> <b>Western Zone - 302</b>
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**Nearest Hospital Details**

**Iranian Poly Clinic, Loumly – 24/7 Open, Doctor's on call – 078435515 / 099674546**

**3 /4 Km away from work location**

**Minor Injury cases:**

- **Pay as you go / An authorized call from Bam to start treatment**
- **Can call advance for doctor ready**
- **They don't have ambulance**
- **Administrator - Mr. Zakaria**
- **Full map on back**



**Emergency Surgery and Pediatric Center - Peninsula Road, Godrich – Amb/ Emg - 077624737**

**2/3 KM away from work location**

**Only Serious Injury cases:**

- **24/7 Open**
- **Free Treatment**



**Emergency Response Spur Road:**

**Eric Jan Bergsma**  
(Project Incident Controller(PIC))

**Ross Cawthorne**  
(Emergency Response Coordinator)

**John Burwell**  
(Emergency Response Team Leader (ERTL))  
First Aider - 030990430

**Emergency Response Team Member(ERTM)**

<b>Ibrahim Conteh</b> Fire Fighter 088884631	<b>Ismael Kamara</b> Fire Fighter 077658868	<b>Gbassay Tarawallie</b> Emergency Team 077888082	<b>Amidu Sagor</b> Fire Fighter 030654671
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**Emergency Contacts**

<b>Police - 999</b> <b>Ambulance – 999</b> <b>Choithram Hospital – 078190155</b> <b>Emergency Hospital - 077624737</b>	<b>Fire Emergency Line</b> <b>Central Zone – 300</b> <b>Eastern Zone – 301</b> <b>Western Zone - 302</b>
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**Nearest Hospital Details**

**Iranian Poly Clinic, Loumly – 24/7 Open, Doctor's on call – 078435515 / 099674546**

- Pay as you go / An authorized call from Bam to start treatment
- Can call advance for doctor ready
- They don't have ambulance
- Administrator - Mr. Zakaria

**Emergency Response Treatment Plant:**

**Eric Jan Bergsma**  
(Project Incident Controller(PIC))

**Ben Goodman / Ross Cawthorne**  
(Emergency Response Team Leader (ERC))  
030743662

**Emergency Response Team Member(ERTM)**

<b>David Golomeke</b> Team(Foreman) 099261658/025477196	<b>Samuel Karbgo</b> First Aider(Driver) 088348622	<b>Gibril Koroma</b> First Aider 080262809	<b>Desmond Kanray</b> Fire Fighter 077319732
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**Emergency Contacts**

<b>Police - 999</b> <b>Ambulance – 999</b> <b>Choithram Hospital – 078190155</b> <b>Emergency Hospital - 077624737</b>	<b>Fire Emergency Line</b> <b>Central Zone – 300</b> <b>Eastern Zone – 301</b> <b>Western Zone - 302</b>
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**Nearest Hospital Details****ACCESSCARE HOSPITAL AND WELLNESS CENTER****3 /4 Km away from the work location**

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Major surgery case: Patient must transfer to Emergency Hospital

Payment: Pay as you go

Registration and Consultancy Fee – 50000 SL  
Other treatment and Medicine cost – As require

GPS Coordination – 8°22'14.55"N 13°14'4.22"W



Freetown Water

3 Jalloh Close, Spur Loop

Wilberforce

Freetown

Sierra Leone