Nakuru Integrated Solid Waste Management PPP Project

Feasibility Study Report and PPP Implementation Plan

3 November 2017

World Bank

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Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	16/06/17	A Guasti Various	H Forbes	David Dray	First Issue
B	19/07/17	D Dray	H Forbes	Simon Martin	Response to comments
C	03/11/17	Leonard Mathu	D Dray	David Dray	Response to comments

Document reference: 372050 | 15 | C

Information class: Standard

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Executive Summary

Introduction

The County Government of Nakuru (CGN) has expressed its desire to implement an Integrated Solid Waste Management Plan by enhancing solid waste reduction, reuse, and recycling in the urban areas of the county. Due to the significant capital investment, technical, and managerial expertise required, the CGN is being supported by the World Bank (WB), who have appointed a consortium led by Mott MacDonald to act as advisors for the project. The aim is to develop a financially and technically sound public-private partnership (PPP) solution to improve waste management in the county.

Waste Management Services

Waste Collection and Cleaning

Household waste collection is undertaken across 40 separate zones; with a different private contractor responsible for each of 31 of these and the remainder collected by the CGN. Outsourcing to the public sector commenced in approximately 2007. All collection service contracts have recently been retendered and were procured simultaneously commencing on 1 October 2016 and covering a three year period.

The CGN provides commercial waste collection services through the Environment, Natural Resources, Energy, and Water Department (ENRED). Nakuru town is served by two tipper trucks. Commercial waste is deposited in piles from where it is collected with its tipper trucks and staff. The deposited piles result in odours, litter and visual impacts on the commercial establishments and local population. The collection operation's key issues include traffic delays and lack of space for vehicle manoeuvring during collection and lack of mechanisation.

Private contractors undertake litter picking in the areas where they provide services. ENRED provides street cleansing at public spaces (squares, streets, parks and gardens) in Nakuru, Naivasha and Molo. The cleanliness levels and the bin loading levels and condition in Nakuru town areas were observed during our visit and they were found to vary significantly from location to location.

Disposal Sites and Recycling

Kiamunyi landfill is the main disposal site for the county, it has no gate, no weighbridge, and no checkpoint. On-site data collection is lacking: without effective data management, waste disposal estimates are unreliable. The CGN has stated that the landfill receives approximately 200 tonnes of waste per day (around 80 to 100 vehicles per day).

Multiple other sites receive waste from various sources throughout Nakuru, these all have no engineering and are open land dumpsites. The largest sites are: Naivasha, Gilgil, Molo, and Mai Mahiu. In general, these operate with little to no planning or control. Vehicles are allowed on-site to dump their waste and leave; and the waste is typically picked by scavengers.

No facilities treating or recycling wastes are operating in the County. CGN is considering segregation at source, with household and commercial wastes being collected in two streams, organic and inorganic. In addition to the informal recycling market, there are 400 people picking waste including their families living around Kiamunyi landfill.

Waste Arisings

The total waste generated in the County and its individual constituencies was calculated using the waste generation per capita and population data; these are based on incomplete data and are provided solely as estimates below.

Table: Waste generation and population growth in Nakuru County, 2009-2040

Year	Population	Annual growth rate	Waste generation (tonnes/year)	Annual growth rate
2009	1,603,325		121,148	
2010	1,637,474	2.13%	126,275	4.23%
2011	1,697,951	3.69%	133,640	5.83%
2012	1,760,571	3.69%	141,435	5.83%
2013	1,825,229	3.67%	149,670	5.82%
2014	1,891,739	3.64%	158,349	5.80%
2015	1,959,880	3.60%	167,472	5.76%
2020	2,320,819	3.44%	220,033	5.62%
2025	2,706,920	3.13%	285,121	5.32%
2030	3,108,708	2.81%	364,271	5.02%
2035	3,570,133	2.81%	466,027	5.05%
2040	4,100,048	2.81%	597,028	5.08%

Source: Kenya National Bureau of Statistics, 1999 Population and Housing Census - Counting our People for Development, Volume I, Table 1 p173-178 (Jan 2001); and Kenya National Bureau of Statistics: 2009 Population and Housing Census - Analytical Report on population projections, Volume XIV pages 102, 214-217 (May 2014)

A waste composition study was conducted with a total of 6,230 kg of waste. Samples were collected from 15 zones. The sampling areas were intended to cover a variety of income levels, and to cover both residential districts and commercial areas. Waste samples collected from residential areas were nearly 80% biodegradable materials which is a combination of organic food, paper, cardboard, textiles and fines. The remaining 20% non-biodegradable materials comprised plastics, glass, ferrous, non-ferrous, hazardous waste, and miscellaneous.

The wholesale market waste produces predominately fruit and vegetable waste (>97%). The remaining waste is made up of paper, cardboard, textiles and plastics. The textiles in the market wastes were worn out hessian bags used to transport fruits and vegetables. The waste from the remaining commercial areas represents the hospitality and leisure sector with packaging (paper, card, high-density polyethylene (HDPE), PET, other plastics, glass, ferrous and non-ferrous) contributing 46% and organic food 39%.

Technology Options

The long-list of technologies assessed multiple waste treatment technologies to evaluate whether they are suitable for the Project. The table with recommended initial technologies is below.

Table: Long list technologies

Technology	Recommended for inclusion in the long-list?	Reasoning
Dirty Materials Recycling Facility	Yes	Can be used as a pre-treatment for other technologies as well as a stand-alone process.
Windrow Composting	Yes	Recommended for inclusion in the long-list for treatment of the organic fraction due to the simplicity of operations.

Technology	Recommended for inclusion in the long-list?	Reasoning
In Vessel Composting	Yes	Recommended for green waste, source segregated organic waste and/or organic waste separated from mixed waste streams if there are markets for the composted product.
Anaerobic Digestion	Yes	AD is suitable for treatment of food waste, and the CGN aspires to separate green waste and food waste with an organics collection scheme, while farming and agricultural wastes can also be used as feedstock.
Incineration	Yes	Recommended as it can treat several waste streams and produce electricity.
Mechanical Biological Treatment	Yes	The technology can reduce the volume and biological activity of waste being sent to landfill.
Engineered Landfill	Yes	All treatments produce residues which require disposal, while currently there are no engineered landfills in Nakuru.
Do Minimum Scenario	Yes	Included primarily as a comparison to other long-listed options, as current management practices have significant negative impacts on the environment, economy, and local communities.

Source: The Consortium

As no single technology can treat all types of waste in a way that is considered to be good practice, a combination is required. As there will be residues for any option a landfill is included in all options (except for “do minimum”). Five solutions are listed below to take forward into the short list evaluation:

- Option 1 - Do minimum (business as usual);
- Option 2 - Engineered landfill (can accept all waste types);
- Option 3 - Dirty MRF, anaerobic digestion and engineered landfill (dirty MRF for the recyclable fraction, AD for the organic fraction and landfill for residues);
- Option 4 - Dirty MRF, in vessel composting and engineered landfill (dirty MRF for the recyclable fraction, IVC for the organic fraction and landfill for residues); and
- Option 5 - Dirty MRF, windrow composting and engineered landfill (dirty MRF for the recyclable fraction, windrow composting for the organic fraction and landfill for residues).

Evaluation of Short-Listed Options

The options identified through the short-list process were evaluated with different criterion to select a preferred option, the evaluation results are outlined below.

Table: Short list options scoring and ranking

Criterion	Weight	Option 1	Option 2	Option 3	Option 4	Option 5
Recovery - Landfill Diversion	15%	1	1	3	3	2
Environmental Impacts	20%	0	3	3	4	2
Flexibility	10%	4	5	2	4	2
Commercial Risk	10%	3	4	3	4	3
Operational and Regulatory Challenges	10%	1	3	3	5	2
Land requirements	15%	3	3	3	4	2
Market Interest	10%	1	4	3	3	3
Sustainability	10%	2	2	2	3	4

Criterion	Weight	Option 1	Option 2	Option 3	Option 4	Option 5
WEIGHTED SCORE		**1.7**	**3.0**	**2.8**	**3.8**	**2.4**
WEIGHTED RANKING		5	2	3	1	4

Source: The Consortium

Following the technology assessment, the options were costed for a preliminary Capex and Opex figure, these are presented below.

Table: Options summary capex, opex, and 25 year total

Option	Capex	Annual Opex	Opex 25yr
Option 1	174,000	50,000	1,250,000
Option 2	13,372,000	201,000	5,025,000
Option 3	31,883,000	1,046,000	26,150,000
Option 4	18,778,000	591,000	14,775,000
Option 5	16,421,000	422,000	10,550,000

Source: The Consortium

The evaluation of the short-listed options also took into account the current status of the Kiamunyi Landfill site.

Preferred Technical Option Preliminary Design

The types of equipment envisaged for the MRF are a bag opener, trommel, conveyors, shovel loaders, balers, overband magnets and a picking station. The building required will need to be able to be closed, so that ventilation can be managed within the building and odour emissions can be minimised. It will also need to be large enough to allow for a tipping hall, waste reception area, plant and equipment, a picking station and storage and management of baled recyclables.

An enclosed hall system is recommended for Nakuru's IVC as it is the simplest method allowing it to be operated by the local workforce and reducing the capital cost whilst maintaining the benefits of IVCs of reducing issues of odour and vermin. A windrow arrangement is recommended, even though it will require more space than a single pile method, as it can allow for greater air movement and may reduce the need for forced aeration, it would also allow for market waste with low contamination to be composted in a separate windrow allowing for the potential sale of this compost for agricultural use.

The new landfill will be developed as a vertical extension of the existing dumpsite; the overall footprint will not extend beyond the existing tipped profile and the new phases will be constructed over the currently deposited waste. It is recommended that the reshaping is initially undertaken using a long reach tracked excavator. Once reprofiling is complete, a barrier on a firm platform will be necessary to allow for a containment layer to be placed. It is proposed that this is a one metre thick granular layer purchased from a quarry. As well as providing a firm foundation, this will provide a barrier between waste that is alight and the containment layer above. A containing layer should be installed over the one metre thick granular layer; a geosynthetic clay liner (GCL) is recommended for this purpose. Various options have been considered including: an HDPE geomembrane, a geosynthetic clay liner, a compacted clay liner or bentonite enriched soil.

At this stage, it is considered that a geosynthetic clay liner is likely to be the best option for providing a containing layer.

- A geomembrane would be at risk of melting if it comes into contact with the heat of burning wastes. It requires a specialist contractor to install and can be affected by atmospheric high temperatures during the welding of the material.
- For an engineered clay option, consideration needs to be given to the proximity of cohesive soils, the specification and the measures required to ensure that it is engineered to form a containing layer. There is limited clay (cohesive material) in Kenya. Where available, it is remote from the site and would require significant logistical movements across Kenya to the site. In addition, it would require close control to ensure that the material is within an appropriate specification and that it is placed effectively. It is also likely to require the addition of a significant quantity of water. Specialised heavy plant would be required for compaction of the material. The layer would need to be 1 metre thick and therefore this would reduce the void space available for tipping.
- The addition of bentonite to a granular host can be undertaken in a batching plant. This option would require the addition of a significant quantity of water. A specialist contractor is required to batch the material and a separate contractor is then employed to place it. Close control is necessary to ensure that it is placed appropriately. As there is more control over the source of the material it is common that the thickness of the bentonite layer is approximately 500mm, but the permeability is an order of magnitude lower than for an engineered clay. It would still use up valuable void space that could be available for tipped materials. It requires heavy plant, but less specialised than for engineered clay. Importing bentonite is an expensive option and should only be undertaken where there is no reasonable clay-based option.

A geosynthetic clay layer (GCL) is a layer approximately 1cm thick with a bentonite layer sandwiched between two layers of fabric. This option is not as robust as the clay or bentonite enriched soil layers, but the material can be installed by a non-specialist contractor and is specified to have the equivalent permeability properties to a 1 metre thick clay layer with a permeability of 1 x 10^{-9}m/s. If punctured or torn, it will lose some of its containing properties and the fabric could be affected by fire. However, the bentonite enclosed would provide some limited benefit if this was to occur.

It is intended that the site will be split into three phases, each having approximately 4-5 years tipping space.

- Phase 1 195,000m^3 To accept waste up to approximately 2021
- Phase 2 175,000m^3 To accept waste up from approximately 2021 to 2025
- Phase 3 186,300m^3 To accept waste from approximately 2025 to 2029
- TOTAL 561,300m^3

During the operation phase, there will be employment opportunities for those who will be employed in maintenance and operation of the facilities. These are likely to be formal positions replacing the current informal economy operating at the sites. Estimated employment requirements are included below:

Table: Site Staffing

	Number of Unskilled Employees	Number of Skilled Employees
Number of people needed for MRF operations	34	8
Number of people needed for IVC operations	4	4
Number of people needed landfill operations	6	8
Site Reception and Security	16	N/A
Site Management	N/A	2

	Number of Unskilled Employees	Number of Skilled Employees
Total number of people needed onsite	60	22

Source: The Consortium

Project Due Diligence

Legal Aspects

After having considered the above PPP options and on the basis that the CGN would (i) prefer to procure the Project as an integrated solution; and (ii) require the private sector contractor to raise funding for the construction and operation phases, we have narrowed down the viable PPP options to: Build-Own-Operate-Transfer; Build-Operate-and-Transfer; Build-Lease-And-Transfer; and Build-Transfer-Operate; with the most viable option being Build-Own-Operate-Transfer. The procurement procedure under the PPP Act is highly prescriptive and care must be taken to ensure that the CGN complies with the same.

Implementing the Project will require various approvals and the process for obtaining such approvals can cause delay. Where the approvals are a condition precedent to (i) signing the Project Agreement; (ii) having the Project Agreement become effective; or (iii) financial close, such approvals may delay the start of the Project unless they are waived. Approvals should therefore be progressed as soon as is feasible by the private sector contractor. The private sector contractor can leverage on support from the CGN for the timely issuance of such approvals where it can demonstrate that it has diligently applied for and been pursuing application(s) (which diligence shall include full and timely compliance with all procedural requirements relating to the issue of such approvals and with the laws of Kenya).

Site Enablement

No available land has been identified for waste management practices within the County by the CGN; this includes any area adjacent to the current Kiamunyi site borders and any other County owned plot. As the waste generated throughout the county increases and void space in the current landfill decreases the need for further sites will become more urgent. Availability has to be prioritized for the development for suitable treatment and disposal sites prior to the termination of the current system.

The sooner an alternative site can be found the better, as waste is currently being disposed of in open landfills which are not engineered. The maximum amount of waste needing treatment is estimated to be 448,000tpa in 2040 through the waste flow model, a minimum of two facilities would be needed to treat all the waste in the county.

It is recommended that any planned displacement of the project affected persons be undertaken after compensation payments and or resettlement in the new site before any activities are undertaken at Kiamunyi dumpsite and in accordance with the prevailing law. It is proposed that the relocation site be registered as a co-operative, where the members own space in terms of shares which cannot be sold to outsiders but are transferrable to family members. An ad-hoc committee from the PAPs is already in place and it will assist in the registration of the co-operative.

Procurement Options and PPP Structure Analysis

Analysis of various PPP option types suggests that:

- Management Contracts and Output performance based contacts are excluded from modelling because they require the Public Sector to provide the capex required to finance the design and construction;
- Concessions, ROT and ROO are excluded from modelling because the project will not have sufficient revenues to pay the private party. In addition, ROT and ROO involve rehabilitation whereas this project involves installation of new equipment (MRF and IVC);
- BOO and ROO are excluded from modelling because they do not allow for the transfer of the asset back to the CGN. The landfill will continue to be a public site and the CGN is expected to continue with aftercare operations at the end of the PPP contract;
- A BLT model would require CGN to take on the operator role in its entirety. In the context of this Project, given the proposed integrated solution includes an IVC plant, specialist know-how would be required for its operation. Furthermore, this model would only cover the construction, maintenance and financing of the Project. Therefore, the CGN would need either to (i) run a separate procurement for the operation of the facility following the leasing of the facility back to the public sector, should the CGN not be willing or able to take on that role, or (ii) include a capacity building element into the Project. This is not aligned with the CGN's requirement for an integrated solution; and
- BOT structure is similar to BOOT on many metrics, the key difference under the PPP Act is that BOT is limited to a maximum term of 30 years (which is not relevant in the context of this Project given the maximum lifespan of the Kiamunyi landfill) while a BOOT can have a longer term than 30 years. Both under the BOOT and BOT models, financing is obtained on a no or limited recourse basis, however a further distinction between the two models lies with the fact that financing under BOT is heavily reliant on the income stream generated by the project. As indicated above however, the project will not have sufficient revenues to pay the private party thereby discounting a BOT option.

Therefore, only the BOOT and the BTO structures were subjected to detailed PPP modelling as the only viable PPP options for this project. The value for money analysis conducted indicated that there is value to undertake this project through a PPP option as opposed to a traditional procurement method. BOOT PPP options that include taking over the current collection contracts including commercial waste collection, requires the least subsidy totalling KES 1.9 billion over the life of the PPP contract. However, CGN will have to consider other factors before choosing an option, for example, preliminary market sounding indicate that operators are not willing to take over existing contracts without a substantial upgrade of the current dumpsites.

Preferred Procurement Options and PPP Structure

The BOOT option with a collection contract that assumes all the existing waste collection contracts plus commercial collection has the least lifetime subsidy requirement and therefore would be financially attractive to the CGN. It also produces an Equity IRR of 21% and a project NPV of KES 308 million, making it financially attractive to investors. However, preliminary sounding indicates that private operators are not willing to take on waste collection. due to perceived significant reputational risks.

This study recommends the BOOT procurement option without a waste collection contract as the preferred option. The project under BOOT requires a financing package of KES 1.6 billion excluding the subsidies from the CGN and GOK. This financing will be structured as set out below.

Table: Indicative financing structure

Sources of Funds	Amount (KES)	Percentage
Senior Debt	1,202,099,525	68.0%
Junior Debt (Returnable grant)	195,401,059	11.0%
Equity	371,409,585	21.0%
Total Financing	**1,768,910,170**	**100%**

Source: The Consortium

Senior debt will ideally come from local commercial banks. Preliminary market sounding indicate that local commercial banks will be interested in the project if public sector income sources are well-defined and ring fenced. Additionally, they would want comfort that the operator has the capability to collect third party revenues i.e. tipping fees and recyclable income. A Junior debt tranche has been introduced in the capital structure to make the Project sustainable and more attractive to private investors. The Junior tranche is structured as a seven-year subordinated loan with zero coupon. Market sounding indicated that there is appetite for such an instrument as Development Finance Institutions are moving towards returnable grants that can be drawn on financial close (after equity). The Junior tranche can also be aggressively stretched to match the tenor of the contract.

Project Risk Matrix

The project risk matrix has been developed to identify ongoing risk to the Project and suggest mitigation strategies for each of them. Below are the identified post-mitigation high-risks:

- Overall quantity of waste increases or reduces significantly above or below expected values;
- Existing status of landfill deters private sector partners; and
- Discovery of hazardous waste on-site.

Recommendation

This report recommends that the CGN undertake this Project through a PPP procurement option. It further recommends that the PPP contract be structured as a BOOT and not to include waste collection. The report notes that undertaking this project will require fiscal commitments of approximately KES 3.4 billion over the life of the project.

1 Introduction

1.1 Background to the Project

The county of Nakuru, located in the Rift Valley province of Kenya is the fourth most populous in Kenya. The county has a population of 1,600,000, as of 2009, and spans an area of 2,300km^2. The area is a major tourist destination; it is home to the Menangai crater, several soda lakes, the Hyrax Hill prehistoric site, and Lake Nakuru National Park. The county contains the municipalities of Nakuru and Naivasha, as well as several smaller towns, including Molo, Gilgil, Rongai, Mai Mahiu, Bahati, and Njoro.

The County Government of Nakuru (CGN) has expressed its desire to implement an Integrated Solid Waste Management Plan by enhancing solid waste reduction, reuse, and recycling in the urban areas of the county. Due to the significant capital investment, technical, and managerial expertise required, the CGN is being supported by the World Bank (WB), who have appointed a consortium led by Mott MacDonald to act as advisors for the project. The aim is to develop a financially and technically sound public-private partnership (PPP) solution to improve waste management in the county.

The full consortium is comprised of: Mott MacDonald as technical and lead consultant, Lions Head Global Partners (Lions Head) as financial consultant, Iseme, Kamau, & Maema Advocates (IKM), working in conjunction with DLA Piper UK LLP (DLA Piper) as legal consultants, and two local specialists undertaking local environmental and social tasks.

1.2 Project Scope

The Project has been divided into three sections:

- Project Feasibility:
  - Initial assessment describing the problems that the project is trying to solve, supported by a situational analysis of the current solid waste management (SWM) practices in the County;
  - Development of a recommended waste management solution to address current identified problems.
- PPP Feasibility:

  Assessment of contracting options, technical due diligence, market consultation, social safeguards (including environmental concerns, financial, and economic analysis and modelling), value for money, public sector comparator analysis, affordability and fiscal impact assessment, and overall transaction structuring.
- PPP Transaction Plan:
  - Outline of the recommended structure for SWM in Nakuru County including the roles and responsibilities of all parties involved, allocation of project risks to the parties, and roadmap of further implementation stages until financial closure.
  - Support securing necessary approvals for the Project. Advice on the institutional and organizational framework and building requirements to ensure knowledge transfer.

1.3 Objectives of the Feasibility Study

The consultants have prepared a feasibility study ("the Feasibility Study") consistent with the PPP Act, 2013 to a standard that will enable the CGN to establish the technical configuration, commercial attractiveness, and bankability of solutions proposed. As part of the Feasibility Study, the Consultants will recommend the best contracting model based on an analysis of several alternative technical and PPP models. The overall goal of the Feasibility Study is to improve waste management in Nakuru Town. Objectives include:

- Support the County to set up a sustainable system of integrated solid waste management;
- Build new facilities for transfer and the proper disposal of waste;
- Provision for potential waste recovery and to properly engineer the rehabilitation and closure of existing landfills;
- Facilitate implementing the new regulations; and
- Facilitate private sector and Community Based Organisations (CBOs) participation in solid waste management.

1.4 Structure of this Report

The structure of this report has been established based on an agreed profile that covers the requirements for the Feasibility Study and PPP Plan deliverables. This is as follows:

- **Section 1 – Introduction**: brief outline of project background, scope, objectives, and structure; provides an understanding of the Project requirements.
- **Section 2 – Summary of Waste Management Services**: information on current waste collection, street cleaning, recycling, and disposal practices. Also identifies the institutional setting, current plans, and information gaps.
- **Section 3 – Waste Arisings**: modelled waste figures based on known data and using assumptions and estimates for data which is not known, includes population growth, waste growth, waste composition, and additional sensitivity projections.
- **Section 4 – Technology Options**: introduction of waste treatment technologies including description of long-list, short-list, and technology selection process.
- **Section 5 – Evaluation of Short-Listed Options**: technical, financial, legal, social, and environmental analysis of short-listed waste solutions.
- **Section 6 – Recommended Technical Solution**: preliminary recommended design and performance requirements for chosen technical solution.
- **Section 7 – Project Due Diligence**: discussion on site, legal, economic, social, environmental, and financial due diligence aspects of the Project.
- **Section 8 – Procurement Options and PPP Structure Analysis**: alternatives and evaluation of various PPP and service contracts.
- **Section 9 – Preferred Procurement Option and PPP Structure:** preliminary recommended procurement option and PPP contract structure for the Project.
- **Section 10 – Project Risk Matrix**: risk breakdown for project shareholders.
- **Section 11 – PPP Project Agreement Terms Sheets**: terms of reference and head of terms for PPP contract.
- **Section 12 – Project Implementation Schedule**: outline schedule for implementation and duration of contract.
- **Appendices**: Additional support information for discussed material including various reports produced and utilised.

2 Summary of Waste Management Services

Nakuru waste management services were investigated through a series of visits conducted in January 2017. These visits, along with the review of relevant waste management documents available were utilised for the World Bank Briefing Document – Situational Analysis Report, available in Appendix A, and the Inception Report, presented as Appendix B.

2.1 Review of Waste Collection and Cleaning Operations

The existing waste collection system in Nakuru is limited. The Environment, Natural Resources, Energy, and Water Department (ENRED) operates with two trucks and 140 staff. They provide commercial and some household waste collection, street cleaning services, household waste collection contract supervision, and landfill operations, regulation, stakeholder involvement and enforcement. Further information on the waste collection systems of the County have been provided and discussed in the Waste Collection Report available as Appendix K.

2.1.1 Household Waste Collection

Household waste collection is undertaken by a different private contractor in each of 40 zones. Outsourcing to the public sector commenced in approximately 2007. All collection service contracts have recently been retendered and were procured simultaneously commencing on 1 October 2016.

CGN reported on 24 May 2017 that contractors were appointed for 31 of the 40 zones. There were no tenders submitted for the rest, as they were deemed commercially unattractive by bidders. The contractors were selected through a tendering process, where they had to meet CGN requirements on available resources. Household waste in the 9 zones which are not served by private contractors is collected by the ENRED commercial waste fleet.

As part of the performance metrics for these contracts, the contractors are required to submit monthly progress reports to the County, pay tipping and inspection fees and schedule the collection services. CGN submitted four sample monthly reports, which demonstrate that the contractors can report on their monthly expenses and revenues, operations undertaken and resources they have used. A key element which was found was that the contractors also report on problems which they have encountered. These include fly-tipping and illegal dumping incidents, as well as areas where the levels of cleanliness are below the required standard and would, thus, require remedial actions and resources from them.

The consortium interviewed the directors of four waste contractors and observed Geemwe's operatives and truck undertaking waste collection at Nakuru West. The county officers in charge of sub-counties Nakuru East and West were also interviewed.

2.1.2 Commercial Waste Collection

ENRED provides commercial waste collection services. Nakuru town is served by two tipper trucks, which are estimated to be in service beyond their typically expected operational life. Commercial waste is deposited in piles where it is collected with its tipper trucks and staff. The deposited piles result in odours, litter and visual impacts on the commercial establishments and local population. The collection operation's key issues include traffic delays and lack of space for vehicle manoeuvring during collection and lack of mechanisation.

ENRED operates with 140 staff; 20 are administration and officers, 80 provide services in Nakuru town, 20 in Naivasha, with the remainder being distributed across other towns and sub-counties. Waste from markets is not collected by ENRED, but by the Trade Department, which provides a single utilities package with its own resources. Small commercial enterprises were reported to be particularly difficult to monitor and regulate due to their high number, small / average size, and gaps in the existing planning framework.

CGN reported that the ENRED commercial waste fleet is also used during the free time left once its commercial waste collection is completed to collect household wastes from the 9 zones which are not covered by the private contractors. As there are no weighbridges installed at the existing CGN designated disposal sites, there is no recording of the quantities of commercial waste collected.

2.1.3 Street Cleansing

Private contractors undertake litter picking in the areas where they provide services. ENRED provides street cleansing at public spaces (squares, streets, parks and gardens) in Nakuru, Naivasha and Molo. Metal litter bins have been installed in busy locations and are emptied by the CGN. ENRED reported that the street cleaners operate 7 days a week and that the metal litter bins are scheduled to be emptied once every day. The cleanliness levels and the bin loading levels and condition in Nakuru town areas were observed during our visit and they were found to vary significantly from location to location.

A key issue identified by the ENRED officers was the cleansing of roadside drains. Significant quantities of litter and waste are either disposed of directly or are washed/blown into the drains. The responsibility for cleansing these drains is held by the County's highways department. The consortium was advised that in many cases, the highway department refuses to cleanse drains on the premise that waste is generated by commercial premises and households, which are under the responsibility of ENRED to enforce.

2.2 Existing Landfill Waste Disposal – Engineering and Operations

There are no engineered landfills within the county of Nakuru. The principal landfill for Nakuru is at Kiamunyi. Multiple other small dumpsites are also operational, these are discussed under Section 2.2.2.

2.2.1 Kiamunyi Landfill

Kiamunyi landfill is the main disposal site for the county, it has no gate, no weighbridge, and no checkpoint. On-site data collection is lacking; without effective data management, waste disposal estimates are unreliable. A survey of the vehicular movements to the landfill, lasting one week, showed that on average 27 vehicles delivered wastes to the site on a daily basis. Assuming a conservatively high weight of 3.5 tonnes per truck, this equates to an assumed quantity delivered of approximately 29,500 tonnes per year.

A permit system is operated where collection vehicles apply for either a number of visits or a month of access. Payments are made under the collection contracts, these are submitted by the contractors to the CGN via reports based on estimates of quantities collected.

It is understood that there are four staff members at the landfill but these were indistinguishable from the waste pickers, who informally work on the landfill.

The landfill has extensive fires throughout the site. Smoke is prevalent across the entire site. Areas of the surface waste are alight, but the bulk of the fires are more deeply seated. Smoke

billows across the road at the toe of the landfill and significantly reduces the visibility of drivers using the road.

The total depth of waste is up to 8.6m. Significant settlement is prevalent throughout the site.

Standing water is readily observed during the wet season; during this time leachate collects at the toe of the site and runs down gradient towards settlements. The leachate contaminated surface water mixes with other ditch water and runs towards Lake Nakuru.

Some site impacts are likely seasonal. Odour is likely to be more apparent during the rainy season when the site is less prone to fires. Mosquitoes may be an issue if there is standing water during the rainy season and dust is likely to be more prevalent in the dry season.

Scavenging animals are present and are likely to spread diseases. Reported animals include livestock and birds (primarily storks), although other birds were seen in smaller numbers. A pack of feral dogs also visits the site.

2.2.2 Naivasha, Gilgil, Molo, Mai Mahiu Dumpsites

Multiple other sites receive waste from various sources throughout Nakuru, these all have no engineering and are open land dumpsites. The largest sites are: Naivasha, Gilgil, Molo, and Mai Mahiu. Although conditions vary from site to site, in general, these operate with little to no planning or control. Vehicles are allowed on-site to dump their waste and leave; the waste is typically picked by scavengers.

Waste delivery information was available for Naivasha and showed that, on average, eight to ten trucks deposit waste in a day, this is estimated to equate to about fifteen tonnes.

Fire, windblown litter, dust, odour, scavenging animals, and pests are for the most part prevalent throughout the year. Leachate is usually not visible on-site but as no impermeable membrane is installed any rainwater will percolate through the waste and reach the water table or nearby body of water. Information on tonnages received, operation dates, site plans, operating permits, depth of waste, etc. are almost entirely unavailable as little to no records are kept of these sites.

2.3 Existing Recycling and Recovery Operations

Material recovery occurs throughout Nakuru through informal services. Traders primarily recover plastic bottles, other hard plastics, and metals; these are taken to Nairobi. The collection of recyclables takes place either in parallel with the waste collection or through scavenging at the Kiamunyi site. As there are take-back schemes in place for glass bottles, householders and commercial establishments often recover these; they can be returned to large beverage companies.

No large-scale facilities treating or recycling wastes are operating in the County, materials are sent to Nairobi for treatment or further distribution. CGN is considering segregation at source, with household and commercial wastes being collected in two streams, organic and inorganic.

In addition to the informal recycling market, there are approximately 400 people including their families living around Kiamunyi landfill and picking waste. Waste picking is undertaken by people of all ages and of both genders. The pickers live at the landfill and have set up a nursery school. Waste collection vehicles slowly offload their collected wastes, pickers then collect the items of greatest value.

Sorted waste from the landfill primarily comprises plastic film, organic materials, and some inorganic non-recyclable wastes. Traders come to the landfill and remove the waste collected.

ENRED reported that some composting is taking place in the County on a household and small enterprise commercial level.

2.4 Institutional Setting

- Waste collection, recycling, transfer and disposal are under the responsibility of the Environment, Natural Resources, and Energy Department (ENRED) of CGN. ENRED employs around 140 staff; 20 officers and administration and 120 operatives;
- A draft Environment and Conservation Bill is awaiting ratification by the CGN; this bill allocates waste management responsibilities and powers to the various sub-county bodies;
- Household waste collection has been outsourced by CGN to the waste collection companies. Thirty one waste collection and street cleansing services contracts covering all zones and sub-counties were agreed;
- ENRED is responsible for the supervision of the waste collection contracts, setting household collection charging, permitting of waste management activities, commercial waste collection, and public spaces cleansing;
- Trade waste collection and market cleaning is the responsibility of the Trade Department of the CGN;
- Highways cleaning is the responsibility of the Highways Department of CGN; and
- Hazardous wastes are managed and regulated by the Ministry of Environment.

2.5 Existing Spatial Plans and Master Plans

No spatial plans or master plans for the County of Nakuru or relevant SWM sites have been identified.

2.6 Infrastructure Gap Analysis

The infrastructure in the County in general, as well as in the main landfill site (Kiamunyi), is lacking. With the data collected and provided to the Consortium the Waste Flow Model was developed to bridge identified gaps and project waste growth figures; this information was utilised for the identification of a preferred option process. The preferred option builds on the current waste infrastructure identified and provides recommendations of what can be developed as improvement.

3 Waste Arisings

Waste arisings have been calculated using a waste flow model (WFM) which has been summarised and issued in the Waste Flow Model Report available in Appendix D. Waste composition analysis was also carried out through a series of studies, these have been provided under the Waste Composition Report available in Appendix C. Section 3 provides a summary of the methodology and the results that have been presented in the cited reports.

The Waste Flow Model (WFM) presented in this chapter has been based primarily on data sourced from the CGN, the World Bank, the Kenyan National Bureau of Statistics as well as a waste composition study conducted by the Lead Consultant. The Lead Consultant has combined this with best judgment assumptions based on regional indicators and similar project experience. Data has often been extrapolated or extracted from an incomplete data source as fundamental infrastructure such as weighbridges and ticketing systems is lacking. Assumptions have been made for population, waste generation per capita, total waste generation, waste composition, growth rates and capture rates.

In addition, a sensitivity analysis was conducted in relation to the anticipated capture rate of the wastes and the composition for townships where these are rural in nature. The sensitivities were then compared to the baseline waste generation figures produced in the base WFM.

3.1 Base Population and Population Growth

Nakuru County population data for 2009-2015, 2020, 2025 and 2030 were obtained from the "Kenya National Bureau of Statistics: 2009 Population and Housing Census - Analytical Report on Population Projections, Volume XIV" (pages 102, 214-217), May 2014. Data for 1999 was obtained from the "Kenya National Bureau of Statistics, 1999 Population and Housing Census - Counting our People for Development, Volume I" (p173-178), Jan 2001.

In addition, different growth rates for urban, semi-urban, and rural constituencies were used as historical urban population growth has been significantly higher than rural growth rates. The degree of urbanisation was determined using data derived from the "Nakuru County Integrated Development Plan", 2013 - Table 5: Projections of Urban Population (obtained from the Kenya National Bureau of Statistics), p32, which identified the urban/rural split in the different constituencies in 2009.

The urban growth rate used in the WFM is based on data obtained from the World Bank's World Databank that relates to historical urban and rural population growth rates in Kenya up until 2015. An average annual population growth rate of 4.3% was assumed for urban constituencies (as this approximated the average annual urban population growth rate from 2000-2015 obtained from the World Databank) for the periods 2010-2011 and 2011-2012 (during which the overall County population growth rate is at its highest). The growth rate for semi-urban constituencies was maintained as the growth rate for the County as a whole. The growth rates for urban and semi-urban constituencies were applied and the rural growth rates were then calculated to ensure that the overall growth rate for the County was achieved.

Table 1 depicts the share of the overall population for each constituency in 1999, 2009 and 2040 after applying the growth rates. Table cells shaded grey denote information derived from data collected from the Kenyan National Bureau of Statistics.

Table 1: Change in constituency share of overall population over time

Constituency	Population			Share of overall population		
	1999	2009	2040	1999	2009	2040
Nakuru Town West	117,739	152,257	445,791	9.92%	9.50%	10.87%
Nakuru Town East	113,523	157,167	468,341	9.56%	9.80%	11.42%
Naivasha	145,978	224,141	667,916	12.30%	13.98%	16.29%
Molo	97,249	124,438	318,215	8.19%	7.76%	7.76%
Njoro	138,040	184,859	422,011	11.63%	11.53%	10.29%
Kuresoi North	123,803	124,050	283,192	10.43%	7.74%	6.91%
Kuresoi South	51,295	115,435	263,525	4.32%	7.20%	6.43%
Rongai	106,140	130,132	297,076	8.94%	8.12%	7.25%
Bahati	97,566	144,266	329,342	8.22%	9.00%	8.03%
Subukia	91,076	94,478	215,682	7.67%	5.89%	5.26%
Gilgil	104,630	152,102	388,958	8.81%	9.49%	9.49%
Total	**1,187,039**	**1,603,325**	**4,100,048**	**100.00%**	**100.00%**	**100.00%**

Source: Kenya National Bureau of Statistics, 1999 Population and Housing Census - Counting our People for Development, Volume I, Table 1 p173-178 (Jan 2001); and Kenya National Bureau of Statistics: 2009 Population and Housing Census - Analytical Report on population projections, Volume XIV pages 102, 214-217 (May 2014)

3.2 Base Waste Generation and Waste Generation Growth

Waste generation per capita data for Kenya was obtained from “The World Bank: What a Waste - A Global Review of Solid Waste Management”, Annex J (p80-83), March 2012. The source identifies that the waste generation rate was 0.3kg per person per day in 2002 and projects it to attain 0.6kg per person per day in 2025. These figures were deemed to be appropriate for use in the WFM when considering Nakuru Town. However, this increase was considered high for other parts of the County and therefore all other constituencies in Nakuru County were assumed to have a waste generation per capita rate half that of Nakuru Town. In addition, the average annual waste generation per capita growth rate from 2002-2025 was also assumed to be half that of Nakuru Town. These assumptions were based on the current waste tonnages being disposed of at the Nakuru and Naivasha landfills which pointed to much higher waste generation rates in Nakuru Town than the rest of the County. Further discussion on waste collection rates is available under the Waste Collection Report in Appendix K.

From 2025 onwards, it is assumed that County-wide waste minimisation measures, educational and awareness programmes will be implemented, such that the waste generation per capita for each constituency would not increase during the period from 2025-2040.

The total waste generated in the County and its individual constituencies was calculated using the waste generation per capita and population data described previously; these are based on incomplete data and are provided solely as estimates. The data for 2017 is displayed in Table 2.

Table 2: Waste generation in Nakuru County and its constituencies, 2017

Constituency	Population	Waste generation per capita (kg/day)	Waste generation (tonnes/year)
Nakuru Town West	204,375	0.47	35,169
Nakuru Town East	214,713	0.47	36,948
Naivasha	306,209	0.19	21,052
Molo	162,752	0.19	11,190
Njoro	235,352	0.19	16,181

Constituency	Population	Waste generation per capita (kg/day)	Waste generation (tonnes/year)
Kuresoi North	157,934	0.19	10,858
Kuresoi South	146,965	0.19	10,104
Rongai	165,677	0.19	11,391
Bahati	183,672	0.19	12,628
Subukia	120,284	0.19	8,270
Gilgil	198,933	0.19	13,677
Total	2,096,866	0.24	187,469

Source: The Consortium

The waste generation and population growth in Nakuru County from 2009 to 2040 is shown in Table 3. The table cells shaded dark grey denote data obtained from the Kenyan National Bureau of Statistics.

Table 3: Waste generation and population growth in Nakuru County, 2009-2040

Year	Population	Annual growth rate	Waste generation (tonnes/year)	Annual growth rate
2009	1,603,325		121,148	
2010	1,637,474	2.13%	126,275	4.23%
2011	1,697,951	3.69%	133,640	5.83%
2012	1,760,571	3.69%	141,435	5.83%
2013	1,825,229	3.67%	149,670	5.82%
2014	1,891,739	3.64%	158,349	5.80%
2015	1,959,880	3.60%	167,472	5.76%
2020	2,320,819	3.44%	220,033	5.62%
2025	2,706,920	3.13%	285,121	5.32%
2030	3,108,708	2.81%	364,271	5.02%
2035	3,570,133	2.81%	466,027	5.05%
2040	4,100,048	2.81%	597,028	5.08%

Source: Kenya National Bureau of Statistics, 1999 Population and Housing Census - Counting our People for Development, Volume I, Table 1 p173-178 (Jan 2001); and Kenya National Bureau of Statistics: 2009 Population and Housing Census - Analytical Report on population projections, Volume XIV pages 102, 214-217 (May 2014)

3.3 Waste Composition Study and Conclusions

A total of 6,230 kg of waste was analysed. Samples were collected from 15 zones, over an 8-day period (17th January 2017 to 25th January 2017). The sampling areas were intended to cover a variety of income levels, and to cover both residential districts and commercial areas. The study was undertaken during the dry season in January when the day time temperatures were on an average 30ºC.

A total of 7 samples were analysed from the residential areas of Nakuru and 8 samples were analysed from the commercial areas of Nakuru. The results are only a snap-shot in time and it is recommended that similar studies are undertaken at 3-monthly intervals to obtain an understanding of the impact of seasonal variation.

3.3.1 Residential Waste

Waste samples collected from residential areas were nearly 80% biodegradable materials which is a combination of organic food, paper, cardboard, textiles and fines. The remaining 20% non-

biodegradable materials comprised plastics, glass, ferrous, non-ferrous, hazardous waste, and miscellaneous combustibles.

In the residential waste stream, organic food waste is the main category at 57%. It was observed that rural and high income areas to have less food waste in the residual waste stream when compared with middle income areas. The Lead Consultant was informed by CGN that the affordability of domestic help within high income families results in lower organic food waste as any excess food is consumed by house staff such as cleaners, cooks, and gardeners.

Textiles/rags were observed to be present in predominately low income and rural areas. The consortium was informed by local contractors that there is a culture within Kenyan families to hand over used clothing to those in need within and outside the family. Waste from high income areas comprised of more packaging (paper, cardboard, non-ferrous drink cans, glass, and polyethylene terephthalate (PET)).

Table 4: Residential waste composition

Waste Category:	kg:	Percentage:	Mean:	High:	Low:
Paper	179.6	7.1%	7.3%	9.9%	3.9%
Cardboard	45.5	1.8%	1.7%	2.5%	0.0%
HDPE	27.5	1.1%	1.2%	3.4%	0.0%
PET	44.0	1.7%	1.7%	4.2%	0.0%
Other Plastics	263.6	10.4%	10.3%	12.9%	4.1%
Glass	97.5	3.9%	3.9%	12.1%	0.0%
Textiles	72.0	2.8%	3.3%	10.7%	0.0%
Organic Food	1439.4	56.9%	56.6%	82.4%	39.1%
Organic Garden	0.0	0.0%	0.0%	0.0%	0.0%
Ferrous	31.2	1.2%	1.2%	1.6%	0.6%
Non-ferrous	10.5	0.4%	0.4%	1.1%	0.0%
Hazardous	3.0	0.1%	0.1%	0.6%	0.0%
WEEE	0.0	0.0%	0.0%	0.0%	0.0%
Hard Plastics	29.5	1.2%	0.9%	5.6%	0.0%
Misc. Combustibles	27.0	1.1%	1.1%	3.2%	0.0%
Nappies	46.0	1.8%	1.7%	4.7%	0.0%
Fines	212.5	8.4%	8.7%	12.4%	3.2%
Total:	2528.7	100.0%			

Source: Mott MacDonald Waste Nakuru Composition Study 2017

3.3.2 Commercial Waste

The waste stream from the commercial areas of Nakuru was distinct from the residential waste and represents the growth of the hospitality and leisure sector of a town which is expanding at a fast pace.

The wholesale market waste produces predominately fruit and vegetable waste (>97%). The remaining waste is made up of paper, cardboard, textiles and plastics. The textiles were worn out hessian bags used to transport fruits and vegetables.

Waste from the wholesale market is collected 6 days a week and has little contamination (<4%) making it ideal for organic waste treatment.

The waste from the remaining commercial areas represents the hospitality and leisure sector with packaging (paper, card, high-density polyethylene (HDPE), PET, other plastics, glass, ferrous and non-ferrous) contributing 46% and organic food 39%.

Table 5: Commercial waste collection by private contractors

Waste Category:	kg:	Percentage:	Mean:	High:	Low:
Paper	283.5	12.0%	14.1%	37.8%	6.6%
Card	168.5	7.1%	7.4%	12.4%	0.9%
HDPE	8.5	0.4%	0.4%	0.7%	0.0%
PET	66.0	2.8%	2.7%	4.4%	0.8%
Other Plastics	321.0	13.6%	13.9%	18.7%	9.7%
Glass	159.0	6.7%	5.8%	13.0%	0.0%
Textiles	77.0	3.3%	2.9%	6.1%	0.5%
Organic Food	917.8	38.9%	37.5%	57.1%	21.4%
Organic Garden	0.0	0.0%	0.0%	0.0%	0.0%
Ferrous	36.2	1.5%	1.5%	1.9%	1.0%
Non-Ferrous	39.5	1.7%	1.8%	5.6%	0.0%
Hazardous	0.0	0.0%	0.0%	0.0%	0.0%
WEEE	0.0	0.0%	0.0%	0.0%	0.0%
Hard Plastics	0.0	0.0%	0.0%	0.0%	0.0%
Misc. Combustibles	26.5	1.1%	1.3%	2.4%	0.0%
Nappies	1.0	0.0%	0.0%	0.2%	0.0%
Fines	257.5	10.9%	10.6%	12.5%	7.7%
Total	2362.0	100%			

Source: Mott MacDonald Waste Nakuru Composition Study 2017

3.4 Demand Forecasting and Additional Waste Projections

The County Government estimates that the waste capture rate in 2017 is 55% for Nakuru, compared to 40.9% that was calculated in the baseline WFM. A comparison has therefore been undertaken should the County Government's figure be correct. On the assumption that the single week collection data provides a typical weekly total, then applying a 55% capture rate means that the total waste generated in the town of Nakuru is less than calculated in the model.

In addition, if full capture is to be achieved by 2040 with a uniform increase from 2017 to 2040, then the average annual waste capture growth rate will be 2.63%. The waste capture and disposal projections from the sensitivity analysis are compared with those calculated by the baseline WFM in Table 6.

Table 6: Waste capture and disposal projections for Nakuru Town, 2017-2040

Year	Waste captured and disposed (tpa)		Average annual waste disposal growth rate (%)		Waste capture (%)		Waste generation (tpa)	
	Base WFM	Sensitivity analysis	Base WFM	Sensitivity analysis	Base WFM	Sensitivity analysis	Base WFM	Sensitivity analysis
2017	29,484	29,484			40.88%	55.00%	72,118	53,607
2018	32,858	32,437	11.44%	10.01%	42.50%	56.45%	77,304	57,462
2019	36,617	35,685	11.44%	10.01%	44.19%	57.93%	82,863	61,595
2020	40,807	39,258	11.44%	10.01%	45.94%	59.46%	88,822	66,024
2025	68,921	62,165	11.05%	9.63%	55.80%	67.71%	123,507	91,807
2030	98,337	83,159	7.37%	5.99%	67.78%	77.11%	145,082	107,843
2035	140,309	111,242	7.37%	5.99%	82.33%	87.81%	170,425	126,682
2040	200,195	148,810	7.37%	5.99%	100.00%	100.00%	200,195	148,810

Source: The Consortium

Analysis was conducted for other factors such as waste generation per capita as well as rural and urban generation rates. Further information on these as well as details on waste aspects presented in this section are available under Appendix C and Appendix D.

4 Technology Options

Following the quantification of waste arisings and the review of baseline waste management systems for Nakuru, a list of suitable technologies and treatment options was identified. The long list was devised of technologies that were deemed appropriate for further investigation, these were then reduced in number for the short list, and finally a preferred option was selected. Detailed information on this process and its findings are presented under the Technology Optioneering Evaluation Report presented in Appendix E.

4.1 Long List of Technology Options

The initial list of technologies considered for Nakuru and whether they were included in the long-list, as well as to the reasoning why, is presented in Table 7.

Table 7: Long list technologies

Technology	Recommended for inclusion in the long-list?	Reasoning
Dirty Materials Recycling Facility	Yes	Can be used as a pre-treatment for other technologies as well as a stand-alone process.
Clean Materials Recycling Facility	No	Recyclates are recovered at household level by the informal recycling network and at the landfills by waste pickers. No recycling at-source collection schemes currently operate in Nakuru that could produce the input for a Clean Mechanical Recovery Facility (MRF) and there would need to be a significant change to the existing collection arrangements for this to occur.
Windrow Composting	Yes	Recommended for inclusion in the long-list for treatment of the organic fraction due to the simplicity of operations.
In Vessel Composting	Yes	Recommended for green waste, source segregated organic waste and/or organic waste separated from mixed waste streams if there are markets for the composted product.
Anaerobic Digestion	Yes	AD is suitable for treatment of food waste, and the CGN aspires to separate green waste and food waste with an organics collection scheme, while farming and agricultural wastes can also be used as feedstock.
Incineration	Yes	Recommended as it can treat several waste streams and produce electricity.
Gasification	No	Not recommended as the scale is too small for the tonnages required for Nakuru and pyrolysis is not yet proven for mixed waste streams.
Pyrolysis	No	Not recommended as the scale is too small for the tonnages required for Nakuru and pyrolysis is not yet proven for mixed waste streams.
Plasma Arc	No	Not recommended due to lack of proven facilities and homogenous feedstock requirements.
Mechanical Biological Treatment	Yes	The technology can reduce the volume and biological activity of waste being sent to landfill.
Mechanical Heat Treatment	No	Not recommended due to lack of proven experience and the fact that the floc requires further treatment together with a high water demand.
Engineered Landfill	Yes	All treatments produce residues which require disposal, while currently there are no engineered landfills in Nakuru.

Technology	Recommended for inclusion in the long-list?	Reasoning
Do Minimum Scenario	Yes	Included primarily as a comparison to other long-listed options, as current management practices have significant negative impacts on the environment, economy, and local communities.

Source: The Consortium

The long-list of treatment options was considered against a set of criteria recommended by the consortium. The technical evaluation criteria are:

Scoring Criteria	Sub-Criteria	Description	Weighting
Landfill diversion & recovery	Landfill diversion	Diversion of waste that is currently sent to landfill.	**15%**
	Recycling	Recovery of recyclable materials from the waste.	
	Organic recovery	Waste recovery through treatment of organic waste, especially food waste.	
	Energy	Recovery of energy through waste treatment.	
Environmental impacts	Atmospheric emissions	Gaseous emissions produced by the treatment technology and associated processes that must be controlled.	**20%**
	Traffic	Traffic levels related to the treatment technology solution (inputs and outputs) including associated impacts, such as atmospheric emissions, fuel usage, dust, and noise.	
	Effluents/ Leachate	Production of effluents and leachate by the treatment technology that must be treated.	
	Odour	Odours produced by the treatment technology that must be controlled.	
	Water use	Amount of water used by the treatment technology.	
Flexibility	Capacity	Capacity of the treatment technology to work with increased amounts of waste due to day to day fluctuations and over a longer period.	**10%**
	Composition of waste/Calorific Value (CV)	Ability of the treatment technology to process a wide range of waste compositions.	
	Integration with existing practices	Ability of the treatment technology to process a wide range of waste streams collected by CGN and the private sector waste companies, and compatibility with current systems	
Commercial risk	Proven technology	Historic reliability of the technology based on existing commercial scale reference plants using similar feedstocks.	**10%**
	Potential availability of adequate site	Technology-specific necessities for the site, including footprint size and need for grid connection.	
	Market for outputs	Variety of markets, existence of current markets, reliability of the markets, risk of changes in availability/ capacity/ prices.	
Regulatory and operational challenges	Licensing	Complexity of licensing process due to lack of experience (on the part of the licencing agency) and need for multiple licenses.	**10%**
	Public acceptability/ legal challenge	Perceived level of public acceptance of the technology option including general public and legal authorities.	
	Operations & Maintenance	Complexity of operations and maintenance related to the technology option	
	Logistics & operations	Complexity of the operations and/or maintenance including need for specialized work force.	
Land requirements	Land requirements	Footprint of typical processing plant in comparison with available land	**15%**

Scoring Criteria	Sub-Criteria	Description	Weighting
Market interest	Market interest	Interest from local or international companies in participating in the bid based on the confidence in and complexity and profitability of the treatment technology option.	**10%**
Sustainability *	Financial impact to the CGN	Ability of CGN to afford new treatment infrastructure.	**10%**
	Financial impact to the local community	Systems which allow people to make an income from waste.	
	Social Impacts	Impacts on local communities and social structure of study area.	

*Sustainability is covered through the environmental impacts separately, with the financial and social aspects covered under the sustainability heading.

Table 8: Long list technological options scoring and ranking

Criterion	Weight	Dirty MRF	Windrow Composting	In Vessel Composting	Anaerobic Digestion	Mechanical Biological Treatment	Energy from Waste	Engineered Landfill	Do Minimum
Recovery - Landfill Diversion	**15%**	3	2	3	4	3	4	1	1
Environmental Impacts	**20%**	4	2	4	4	2	1	3	0
Flexibility	**10%**	4	2	3	3	3	3	5	4
Commercial Risk	**10%**	4	3	4	3	1	1	4	3
Operational and Regulatory Challenges	**10%**	3	3	5	4	2	1	3	1
Land requirements	**15%**	3	2	5	4	2	2	3	3
Market Interest	**10%**	4	3	3	3	2	2	4	1
Sustainability	**10%**	3	3	3	3	2	2	2	2
WEIGHTED SCORE		**3.5**	**2.4**	**3.7**	**3.1**	**2.2**	**2.0**	**3.0**	**1.7**
WEIGHTED RANKING		2	5	1	3	6	7	4	8

Source: The Consortium

The long-list of options were scored against these weighted criteria, in order to rank them and identify the ones which are most suitable for Nakuru and, therefore, worthy of further and more detailed consideration. The top five technologies were:

1. In vessel composting (IVC)
2. Dirty mechanical recovery facility (MRF)
3. Anaerobic digestion (AD)
4. Engineered landfill
5. Windrow composting

4.1.1 Dirty Mechanical Recovery Facility (MRF)

A dirty MRF treats the whole of the waste stream, apart from bulky materials. The plant could include various mechanical processes, but for Nakuru is more likely to be based on manual picking of recyclable materials (typically plastics, paper, metals) from the incoming waste. A

dirty MRF will produce a significant residual waste stream as only non-porous recyclables can be separated from the waste. The recyclables will be contaminated with organics and liquids found in the mixed waste stream. The dirty MRF can produce a refuse derived fuel (RDF) through the separation of combustible materials, which could be thermally treated in an alternative facility such as a cement kiln, or a bespoke energy from waste thermal treatment facility if one was available.

MRFs are inherently flexible in that they can be modular in design allowing for future expansion if required. They can be adapted to different recovery/recycling markets if space is accounted for at the design stage to include additional sorting equipment if required at a later stage. In Kenya, it would be expected that picking lines would be the primary way of removing recyclable materials. Waste pickers would stand either side of a conveyor and remove items of value for separate storage.

4.1.2 Windrow composting

Windrow composting is widely employed for the treatment of organic materials which have a low risk of bio security and odour production and are typically made up of plant matter from gardens, parks, and amenity areas. A windrow is a long pile of shredded organic waste with a roughly triangular cross section. Following treatment, the composted material is typically screened to achieve an even product size and then recycled to land, being used as a soil conditioner, mulch and in some cases employed to produce soils. Windrows may be aerated and covered by membranes to accept green and food waste.

A windrow composting system requires a concrete pad with drainage and mobile plant to turn the material to allow operations to be successful. As the composting process requires a minimum level of moisture it can be problematic to maintain the required moisture content in arid countries.

4.1.3 In-vessel composting

In-vessel composting (IVC) is widely used for the treatment of organic wastes which potentially have either human health or odour issues impacting on their treatment, including waste meat products and food waste. Enclosing the process requires the employment of aeration and process control systems, which makes the process more expensive than windrow composting. The advantage of IVC is that it is more controlled than open windrow composting and can be designed to achieve specified temperatures to facilitate pathogen destruction.

IVC has worldwide operating experience for the treatment of organic waste. For IVC to operate successfully structural material is needed. This can be green waste or wood chip. The quality of the output of the IVC is dependent on the input material and therefore good quality compost product is only produced from source segregated organic waste.

4.1.4 Anaerobic digestion

Anaerobic Digestion (AD) is typically employed for the treatment of food waste and is popular as it produces renewable energy. AD is a complex biochemical process for the treatment of biodegradable waste which takes place in a vessel in the absence of oxygen. It results mainly in the formation of a carbon dioxide and methane gas mixture known as "biogas", which is typically used to provide electrical power generation, heat, and a solid and liquid digestate.

AD requires more complex management than windrow or in-vessel composting. As for composting, the digestate quality is dependent on a source segregated organic waste stream being available. AD is not suitable for treatment of green waste.

The capital cost of building AD systems is greater than IVC, whilst the operational costs would be likely to be less than IVC systems if there is an income from the sale of gas/electricity. AD typically becomes financially viable where there is a robust market for heat and power.

4.1.5 Engineered Landfill

The Nakuru Landfill Site is not engineered to prevent pollutants from entering either the ground waters or the atmosphere. Good practice landfill design and management would typically have engineering to ensure the base is sealed so that no liquids can migrate, and systems to manage the liquids and gases formed within the landfill. Following completion of a landfill cell it would usually be capped to ensure the waste is entirely enclosed, and a gas management system would be employed to allow gases to be managed in the most sustainable manner.

The gas management system allows landfill gas to be collected and controlled following closure of the landfill or each cell. The most sustainable method of managing the landfill gas is as a fuel to a landfill gas engine with the resulting production of heat and electricity. A less sustainable option is to burn the gas without energy capture, as the combustion process reduces the global warming potential of the gases. Capping the landfill following completion allows management of the long-term pollution potential and any hazards.

4.1.6 Do Minimum Scenario

Do minimum scenario has been included in the long-list and short-list as a comparison to the current state of affairs. All disposal sites in Nakuru County, including the Nakuru Landfill Site are not engineered and have significant negative environmental impacts. Furthermore, the collection systems only collect a single, residual stream, without any source separation of materials. The informal sector has significant recovery activities, collecting dry recyclables (cardboard, plastics, metals) from households or at the landfills with resident waste pickers. No treatment of waste is currently reported to be taking place, while the formal sector does not undertake any recycling or biological treatment activities.

Rather than describing this scenario as “do nothing”, minimum requirements should be achieved. These include:

- Reducing environmental pollution by providing surface water ditches;
- Reducing nuisance impacts by providing inert material cover over each layer of waste placed;
- Reducing nuisance impacts and atmospheric emissions by introducing measures to reduce the potential for fires;
- Introducing systems to confirm waste inputs so that the lifespan of the site can be understood; and
- Working to an agreed profile, so that the site remains stable and can be capped and restored on completion.

4.2 Short List of Technology Options

Each of the top-ranking technologies can treat some of the waste which is produced in Nakuru. Table 9 illustrates the types of waste which they can treat. A red, amber, green method of highlighting suitability has been used. Green means that the method is technically feasible and considered to be good practice, amber means that it is technically feasible but not considered to be such good practice, and red means not technically feasible.

Table 9: Waste types

	Organic waste	Dry recyclables	Residues	Inert materials*
In vessel composting				
Anaerobic digestion				
Dirty MRF				
Engineered landfill				
Windrow composting				
Do minimum				

Source: The Consortium

*Note, inert materials could have a beneficial use in the operation of an engineered landfill. In that case, it would be green in the above table.

As no single technology can treat all types of waste in a way that is considered to be good practice, a combination is required. As there will be residues for any option a landfill is included in all options (except for “do minimum”). Five solutions are listed below to take forward into the short list evaluation:

- Option 1 - Do minimum (business as usual);
- Option 2 - Engineered landfill (can accept all waste types);
- Option 3 - Dirty MRF, anaerobic digestion and engineered landfill (dirty MRF for the recyclable fraction, AD for the organic fraction and landfill for residues);
- Option 4 - Dirty MRF, in vessel composting and engineered landfill (dirty MRF for the recyclable fraction, IVC for the organic fraction and landfill for residues); and
- Option 5 - Dirty MRF, windrow composting and engineered landfill (dirty MRF for the recyclable fraction, windrow composting for the organic fraction and landfill for residues).

5 Evaluation of Short-Listed Options

The evaluation of the short-listed options incorporates the technical and financial assessment in order to arrive to a preferred solution for Nakuru. This section is covered in further detail under the Technology Optioneering Evaluation Report presented in Appendix E.

5.1 Technical Analysis

The short-listed options presented in Section 4.2, which are designed to function as wholesome solutions for the county, have been evaluated based on the same parameters as those used for the long-list of technologies presented in Section 4.1. The results are presented in Table 10.

Table 10: Short list options scoring and ranking

Criterion	Weight	Option 1	Option 2	Option 3	Option 4	Option 5
Recovery - Landfill Diversion	15%	1	1	3	3	2
Environmental Impacts	20%	0	3	3	4	2
Flexibility	10%	4	5	2	4	2
Commercial Risk	10%	3	4	3	4	3
Operational and Regulatory Challenges	10%	1	3	3	5	2
Land requirements	15%	3	3	3	4	2
Market Interest	10%	1	4	3	3	3
Sustainability	10%	2	2	2	3	4
WEIGHTED SCORE		**1.7**	**3.0**	**2.8**	**3.8**	**2.4**
WEIGHTED RANKING		5	2	3	1	4

Source: The Consortium

The results are ranked as follows from best to worst technical solution:

- Option 4 - Dirty MRF, in vessel composting and engineered landfill;
- Option 2 - Engineered landfill;
- Option 3 - Dirty MRF, anaerobic digestion and engineered landfill;
- Option 5 - Dirty MRF, windrow composting and engineered landfill; and
- Option 1 - Do minimum.

5.1.1 Technical and Economic Parameters

Each option provides a range of expected parameters regarding recycling, landfill diversion, and energy production. These can vary based on factors such as composition, operation behaviours, and alterations to the facility. The ranges are presented in Table 11, bold figures indicate specific values utilised for modelling purposes.

Table 11: Estimated technical performance (modelled figures in bold)

Performance metric	Option 1	Option 2	Option 3	Option 4	Option 5
Recycling	0%	0%	10 – 20% **(17%)**	10 – 20% **(17%)**	10 – 20% **(17%)**
Landfill Diversion	0%	0%	56 – 66% **(61%)**	40 – 50% **(45%)**	40 – 50% **(45%)**
Production of potential landfill cover material	0%	0%	7 – 17% **(12%)**	23 – 33% **(28%)**	23 – 33% **(28%)**
Gas and Electricity production	none	Landfill gas recovery (will vary each year)	Landfill gas recovery (lowers as organic waste treated outside of landfill). 6.5GWh per year from AD	Landfill gas recovery (lowers as organic waste treated outside of landfill)	Landfill gas recovery (lowers as organic waste treated outside of landfill)

Source: The Consortium

5.2 Estimated Costing

5.2.1 Option 1 – Do minimum

A do-minimum option would include daily covering of the waste with a soil-based material of 150mm depth and diverting surface water from running onto the site using surface water ditches. The opex estimated for do-minimum is using the current budgetary allowance CGN has set towards managing Kiamunyi landfill (estimated $50,000 per annum).

Table 12: Do minimum capex

Task	Cost
Daily cover and gravel cover	$150,000
Drainage trench	$8,000
Inclusion of LLDPE	$17,000
Total cost	**$175,000**

Source: The Consortium

5.2.2 Option 2 – Engineered landfill

An engineered landfill involves construction of access and reception, containment of existing waste, re-profiling surface levels, drainage for surface water management, installations of landfill gas and leachate monitoring points. In addition to this mobile plant equipment, fuel stores and welfare facilities are required for operations.

Table 13: Engineered landfill capex

Task	Cost
Installation of landfill infrastructure	$7,504,000
Site preparation, mobilisation, roads, and site office	$685,000
Plant equipment	$5,060,000
Daily cover	$124,000
Total cost	$13,373,000

Source: The Consortium

Table 14: Engineered landfill opex

Item	Cost/annum
Staff costs	$18,000
Plant repair, maintenance, and fuels	$42,000
Soil material and monitoring	$108,000
Site overheads, administration, and insurance	$34,000
Total	**$202,000**

Source: The Consortium

5.2.3 Option 3 – Dirty MRF, anaerobic digestion and engineered landfill

The dirty MRF operations would to be undertaken within a building envelope. The process for the dirty MRF would have a reception for the mixed waste, trommel screen for separating the organic fraction and manual picking lines to extract any dry recyclables. The material would be separated into dry recyclables, an undersize fraction for AD and a residual fraction which would be sent to the engineered landfill. Opex for the facility includes the staff costs, maintenance, plant (which is assumed to be leased) and site overheads. The costs do not include the costs of running a PPP type project.

Table 15: Dirty MRF capex

Task	Total
Civils	$543,000
Technology	$630,000
Insurance and shipping	$23,000
Total	**$1,196,000**

Source: The Consortium

Table 16: Dirty MRF opex

Item	Cost/annum
Staff costs	$50,000
Plant	$26,000
Site overheads (1% capex)	$12,000
Maintenance (3% capex)	$36,000
Total	**$124,000**

Source: The Consortium

The AD operations would include pre-treatment of the waste sent from the dirty MRF, which could include shredding, maceration, and contaminant removal. The organic material would then be loaded into AD tanks and the process controlled using feedback systems to optimise biogas yield.

Table 17: Anaerobic digestion capex

Task	Total
Civils	$696,000
Technology	$16,278,000
Insurance and shipping	$339,000
Total	**$17,313,000**

Source: The Consortium

Table 18: Anaerobic digestion opex

Item	Cost/annum
Staff costs	$11,000
Plant	$16,000
Site overheads (1% capex)	$173,000
Maintenance (3% capex)	$519,000
Total	**$719,000**

Source: The Consortium

Table 19: Option 3 summary capex and opex

Item	Capex	Annual Opex
Engineered Landfill	$13,372,000	$201,000
Dirty MRF	$1,197,000	$124,000
AD	$17,314,000	$721,000
Total	**$31,883,000**	**$1,046,000**

Source: The Consortium

5.2.4 Option 4 – Dirty MRF, in vessel composting and engineered landfill

The main difference in option 4 as compared to option 3, is the inclusion of an IVC facility rather than AD. An enclosed hall IVC is the simplest form of this technology, so it is important to note that an IVC cost could be higher if more sophisticated technology was used. The incoming waste is laid out in long windrows and regularly turned using a compost turner. The process is subject to forced aeration and usually moisture control.

Table 20: In vessel composting capex

Task	Total
Civils	$2,177,000
Technology	$1,950,000
Insurance and shipping	$82,000
Total	**$4,209,000**

Source: The Consortium

Table 21: In vessel composting opex

Item	Cost/annum
Staff costs	$12,000
Plant	$44,000
Site overheads (1% capex)	$42,000
Maintenance (4% capex)	$168,000
Total	**$266,000**

Source: The Consortium

Table 22: Option 4 summary capex and opex

Item	Capex	Annual Opex
Engineered Landfill	$9,469,321	$201,000
Dirty MRF	$1,196,997	$131,741
IVC	$4,404,336	$249,163
Total	**$15,070,654**	**$581,904**

Source: The Consortium

5.2.5 Option 5 – Dirty MRF, windrow composting and engineered landfill

The main difference in option 5 as compared to Option 4, is the inclusion of an aerated windrow composting facility rather than IVC. This option does not offer the same level of control for processing or controlling odour and biohazards, but is less expensive so is included for comparison.

Table 23: Windrow composting capex

Task	Total
Civils	$1,764,000
Technology	$51,000
Insurance and shipping	$36,000
Total	**$1,851,000**

Source: The Consortium

Table 24: Windrow composting opex

Item	Cost/annum
Staff costs	$9,000
Plant	$33,000
Site overheads (1% capex)	$19,000
Maintenance (2% capex)	$37,000
Total	**$98,000**

Source: The Consortium

Table 25: Option 5 summary capex and opex

Item	Capex	Annual Opex
Engineered Landfill	$13,372,000	$201,000
Dirty MRF	$1,197,000	$124,000
Windrow composting	$1,852,000	$97,000
Total	**$16,421,000**	**$422,000**

Source: The Consortium

The cost information has been used to build up the financial model which has been used to compare the different options, in order to select a preferred solution for waste management in Nakuru.

Table 26: Options summary capex, opex, and 25 year total

Option	Capex	Annual Opex	Opex 25yr
Option 1	174,000	50,000	1,250,000
Option 2	13,372,000	201,000	5,025,000
Option 3	31,883,000	1,046,000	26,150,000
Option 4	18,778,000	591,000	14,775,000
Option 5	16,421,000	422,000	10,550,000

Source: The Consortium

5.3 Economic and Social Cost Benefit Analysis (ESCBA)

This ESCBA section has been extracted from the ESCBA Report provided under Appendix G.

This report is produced with reference to Task 1.2.1 of the project Terms of Reference (ToR) and describes the inputs and analyses of both qualitative and quantitative assessment of the

economic and social costs and benefits of the proposed project. Analysis is undertaken for each of the proposed technology options and the results include a calculation of the Economic Internal Rate of Return (EIRR) and the Benefit-Cost Ratio (BCR). The detailed workings are presented in the Task 1 Financial Model.

5.3.1 Economic Benefits

The economic benefits of the project include the revenues and the avoided landfill costs arising from waste that is diverted from landfill.

Income to the project includes tipping fees and the sale of recyclables.

The avoided landfill cost is calculated by multiplying the reduction in waste to landfill by the cost per tonne of managing the landfill.

The reduction of waste to landfill is the difference between the waste produced and that landfill tonnage after the treatment technology. This is very specific to the technology options employed. The cost per tonne of managing the landfill is calculated using County Government of Nakuru (CGN) financial data and is estimated at KES 1,017 per tonne of waste.

The table below shows how economic benefits are distributed per technology;

Table 27: Economic benefits per technology

Technology	Tipping Fees	Recyclates Sale	Power Sales	Avoided Cost to Landfill
Engineered Landfill	√	√	x	√
Engineered Landfill + MRF + Anaerobic Digestion	√	√	√	√
Engineered Landfill + MRF + Windrow Composting	√	√	x	√
Engineered Landfill + MRF + In-vessel composting	√	√	x	√

Source: The Consortium

5.3.2 Other Benefits (Externalities)

5.3.2.1 Uplift in Real Estate Prices

The rehabilitation of the Kiamunyi landfill is expected to improve the prices of real estate surrounding the site. The current prices in the neighbourhood have been depressed as residents choose not to develop the land neighbouring the site due to air pollution predominantly from the smoke coming from the dumpsite, encroachment, noise, and visual detriment.

The following assumptions have been made:

- The price of land in Nakuru suburb is assumed to be KES 16m per acre and will increase by inflation in subsequent years.
- The status of the site has depressed a total of 300 acres - representing 10 times the size of the landfill of land in the neighbourhood. Although the price depression is worse for adjacent land/property, a flat rate of depression is assumed.
- The land near Kiamunyi site is assumed to be priced at a discount of 40% to the Nakuru suburbs.
- The project is expected to restore 80% of the assumed 40% discount (32%). There will always be a discount of 8% for the land neighbouring Kiamunyi.

The Value of the uplift is therefore assumed to start in the 2nd year of the project (2019) and is derived as below (KES):

Table 28: Uplift in real estate prices (KES)

Year	2019	2020	2021	2022	2023	2024
Uplift in Price per Acre	0	684,800	732,736	784,028	838,909	897,633
Total Uplift for 300 Acres	0	205,440,000	219,820,800	235,208,256	251,672,834	269,289,932

Source: The Consortium

5.3.2.2 Avoided Cost of Carbon

The SWM project is expected to reduce the Total global warming potential (GWP) from the Kiamunyi landfill. The technical team has estimated the reduction in Greenhouse Gas (GHG) emissions for the Kiamunyi site for each of the proposed technologies. This reduction in emissions is measured by tonnes of CO_2.

The avoided carbon emission is therefore measured for each of the technologies. The gas prediction model produced numbers for every other year and therefore an assumption has been made that the reduction will be the same for the subsequent year without data. Below is the CO_2 reduction for each of the technologies:

Table 29: Avoided GWP emissions (CO_2 tonnes)

Technology	2019	2020	2021	2022	2023	2024
Engineered Landfill	-	13,400	13,400	15,400	15,400	17,500
Engineered Landfill + MRF + Anaerobic Digestion	-	17,600	17,600	17,800	17,800	17,800
Engineered Landfill + MRF + Windrow Composting	-	15,500	15,500	16,300	16,300	16,900
Engineered Landfill + MRF + In-vessel composting	-	15,500	15,500	16,300	16,300	16,900

Source: The Consortium

The ESCB model assumes a global social cost of carbon of US$ 85 per tonne of CO_2 as derived by STERN[1] to estimate the avoided costs of carbon by introducing treatment technology at the Kiamunyi site.

The social cost of carbon per tonne of CO_2 therefore estimates the benefit due to the reduction of pollutants in the air that would include:

- Improved health conditions
- Productive use of land
- Increased recreational value

All the above are achieved after implementing the proposed technology solutions. It is noted that the US$85 per tonne is a global figure. The avoided cost of carbon per tonne of CO_2 is then applied to the total tonnes of CO_2 avoided for the technology in use to arrive at monetary benefit value.

[1] https://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch18s18-4-2.html

5.3.2.3 Increase in Trade and Commerce

The proposed project will accrue external benefits to the business community within Nakuru and in Kenya by the importation of equipment, civil works and operations for the project. This will increase trade through:

- Supply of construction materials from local businesses that will include hardware stores, local cement companies, steel companies etc. For the supply of materials required to install the plants for the proposed technology.
- Hiring of labour to install and operate the technologies. It is envisioned that the project will hire various levels of labour from skilled to casual. This is because the technologies proposed are not very specialized and once the equipment is imported, local personnel will execute civil works and skilled personnel can handle installation with minimum supervision from the technology providers.
- Hiring of various consultants to ensure the project is undertaken as per local regulations and standards.

The increase in trade and commerce is assumed to be the profit component of the capex spend for each of the technologies for the next three years. Although there is not a detailed capex itemization for each of the technologies, it has been assumed that 50% of the Capex costs will be sourced locally.

The table below illustrates the capex costs of the project excluding establishment costs of the preferred option as an example. The landfill assessment could be done by a combination of local and foreign experts. However, most of the landfill development costs will be materials and labour that are procured locally.

Table 30: Capex costs of the project

	KES	%
Landfill Assessment Costs (VAT incl.)	36,907,528	2.1%
Landfill Development costs (VAT incl.)	940,097,769	54.7%
MRF + In-vessel composting (VAT incl.)	740,279,739	43.1%
Total Capex	1,717,285,036	100.0%

Source: Consortium

From the above we can comfortably estimate that approximately 50% of the capex will be sourced locally.

It has been further assumed the locally sourced capex has an inbuilt 10% profit margin that has been used as an approximation of the increase in trade and commerce. This has been calculated for each of the technology options.

5.3.3 Economic Costs

The economic costs for the project are the direct operating costs of each of the proposed technologies. These costs are derived from capital expenditures of the project, operating costs, closure costs and after care costs for each of the project.

Table 31: Economic costs

Technology	Capex	Opex	Closure cost	Aftercare cost
Engineered Landfill	√	√	√	√
Engineered Landfill + MRF + Anaerobic Digestion	√	√	x	x

Technology	Capex	Opex	Closure cost	Aftercare cost
Engineered Landfill + MRF + Windrow Composting	√	√	x	x
Engineered Landfill + MRF + In-vessel composting	√	√	x	x

Source: The Consortium

5.3.3.1 Social Costs and Externalities

The most significant cost for this project is the relocation of the families currently living and working within the landfill. These costs will not vary materially depending on the technology option that will be chosen by CGN. The resettlement costs as per the Resettlement Action Plan (RAP) are estimated to KES 113 million and detailed in Table 32.

Table 32 Resettlement cost breakdown

	KSH	**KSH**
Direct compensation cost		**45,052,717**
Value of Land	-	
Value of Structures	31,580,182	
Value of Crops	600,330	
40 % (Disturbance, injurious affection and severance, movement allowances)	12,872,205	
RAP implementation teams		**9,520,000**
RAPIC allowances (assume 10 days per month for 14 months implementation, 10 persons at KSH4000 per day)	5,600,000	
GRC allowances (assume 5 days per month for 14 months implementation, 10 persons at KSH4000 per day)	2,800,000	
CRC allowances (assume 2 days per month for 14 months implementation, 5 persons at KSH8000 per day)	1,120,000	
Livelihood restoration programmes		**32,800,000**
Urban farming, crops and livestock	1,000,000	
Skill training for hire and employability	1,000,000	
Financial literacy	1,000,000	
Housing support	29,800,000	
Vulnerable people support		
Monitoring and Evaluation		**10,575,000**
Performance monitoring (internal project team)	7,700,000	
Impact monitoring (consulting fees, assume 5x monitoring)	2,156,250	
Completion audit (consulting fees)	718,750	

	KSH	KSH
Other		
Administrations Costs at 10% (update of RAP, formation of RAPIC, administrative costs to county)		9,794,772
Contingency (5%)		5,387,124
Total Budget (KSHS):		**113,129,613**

We have also assumed that an additional 100 people derive direct income from the site, although they do not live there. The weekly foregone income is assumed to be KES 500[2] per person per week for 52 weeks a year. This translates to KES 26,000 of lost income per person annually.

5.3.4 Net Economic and Social Benefit of the Project

5.3.4.1 Economic Internal Rate of Return (EIRR)

The Net Economic and Social Benefit of the project will therefore be the difference between the total benefits and the total costs for each of the technology options. EIRR is calculated for each of the technology options and the results are as follows;

Table 33: EIRR

Technology	EIRR
Do Minimum*	5.5%
Engineered Landfill	44.9%
Engineered Landfill + MRF + Anaerobic Digestion	21.1%
Engineered Landfill + MRF + Windrow Composting	45.7%
Engineered Landfill + MRF + In-vessel composting	37.5%

Source: The Consortium
*Do minimum option will include the resettlement of families living on site.

5.3.4.2 Benefit Cost ratio (BR)

BCR is the ratio of the present value of the economic and social benefits of the project to the present value of the economic and social costs of the project. The benefits and the costs are discounted at the same rate. The discount rate for this project will be the cost of debt of 14% because it is assumed to be 100% financed by debt for the purposes of the options analysis.

Table 34: BCR

Technology	BCR
Do Minimum*	0.6
Engineered Landfill	1.86
Engineered Landfill + MRF + Anaerobic Digestion	1.38
Engineered Landfill + MRF + Windrow Composting	2.7
Engineered Landfill + MRF + In-vessel composting	2.26

Source: The Consortium

[2] This is the average income that people savaging at the Kiamunyi site generate per week

Windrow compositing technology presents the highest EIRR and BCR for this project. The Do Minimum Option yields the least economic and social benefit.

5.3.5 Financial Modelling

The assumptions sheet has been developed from inputs, reports and statistics from the technical consultants as well as preliminary discussions with environmental and social analysis consultants of the consortium. This has been complemented by general knowledge of the Kenyan financial market to derive the financial assumptions for testing the financial viability of the various solid waste management options.

There are two major categories of assumptions used in the financial model:

- Macroeconomic Assumptions
- Project Assumptions

The parameters (inputs and outputs) in the financial model are 'complete' and 'sufficient' from a financial modelling perspective; 'completeness' implies that they describe the financial and related aspects of the project to the level of detail that the model requires; 'sufficiency' indicates that while there are always additional parameters that describe an operation, those included in the model encapsulate all the necessary information the model needs to produce the required outputs.

5.3.5.1 Macroeconomic assumptions

These are assumptions on economy-wide (global and country) trends that have a bearing on the financial viability of the solid waste management system in Kiamunyi, but over which the operator of the SWM facility has virtually no control over.

Exchange rates

Exchange rates are an important consideration in modelling for this project because some of the equipment required for the proposed technological options have to be imported, and energy sold from the waste treatment is priced in USD as per the Kenya Feed in Tariff.

The PSC model is in Kenya Shillings (KES) being the operating and reporting currency of the CGN.

The currency for which exchange rates are key for the financial model is the United States Dollar (USD)

Inflation

The Model assumes an annual inflation of 6.375% during the operation period of the SWM project.

Interest Rates

Debt financing for the project is assumed to come from commercial banks. Interest rates in Kenya are currently based on the Banking (Amendment) Act 2016, which provides that interest premium charged for credit from banks should be at most 4% above the Central Bank Rate (CBR) and interest paid on deposits should be higher than 70% of the CBR. As of March 28, 2017, the CBR is 10%, which then means that the maximum annual interest rate that local

banks can charge for credit is 14%, and the minimum interest that banks should pay for deposits is 7%.[3]

5.3.5.2 Project Assumptions

These are assumptions specific to the implementation of the SWM project at Kiamunyi. The assumptions are important in gauging the eventual revenues, costs and cash flows of the project. These are variables over which various parties involved in the SWM project could have various degrees of influence over these items.

Revenue Assumptions

a) Tipping Revenue

The primary revenue expected from the project is the tipping fee. This is determined by the number of trucks that dispose of waste on the site, the tonnage of the waste disposed by each truck, and the fee collected for the disposal. The number of trucks that disposes of solid waste at Kiamunyi in 2017 is 27 per day and the average waste load per truck is 3.5 tonnes.

Currently, Nakuru county has a graduated scale of tipping fees (Table 35)

Table 35: Landfill tipping fees

Tonnage	Fee
<3 tonnes	KES 200
3-5 tonnes	KES 400
>5 tonnes	KES 500

For the financial modelling, we calculate the tipping fee per tonne using the fee for the average weight load disposed of by trucks at the dumpsite. This figure is KES 114.29 per tonne $(\frac{KES\ 400}{3.5\ tonnes})$.

This number is inflated annually to get the tipping fee per tonne for each year, which fee is then multiplied by the tonnage of solid waste captured to get the tipping fee revenue.

b) Power generation revenue

Should option 3 (Anaerobic Digestion) be selected as the preferred option, we estimate that the AD plant could produce power which could be sold to the national grid or a private consumer at the current Feed-in Tariff of USD 0.10 per kWh. This fee is multiplied by the estimated power that will be generated annually. The estimates for the amount of power generated will vary with the amount of organic waste received by the AD plant.

c) Revenue from sale of recyclable materials

The financial model also considers that there will be recyclable materials from the MRF stage that could be sold. We acknowledge that different materials have different market values. Without real market data on each of the recyclables in Nakuru, the model assumes an average price of KES 10 per kilogram of recyclables that is recovered from the materials recovery facility (MRF). This assumption will be refined as more accurate data is received from the CGN.

[3] In our model, we assume that this condition holds for the entire period of operation of the SWM project. However, there is possibility of borrowing at a lower interest rates, as some local authorities have done in the last year.

Operating Expense Assumptions

The different technological options have different operating expenses depending on labour, power, maintenance and licencing costs. The technical reports include itemized amounts for the Do-minimum option and the Engineered landfill option, but only estimate the operating expenditure as a percentage of the initial capital expenditure for the following cases:

- Option 3 (Engineered landfill + Materials Recovery Facility + Anaerobic Digestion),
- Option 4 (Engineered landfill + Materials Recovery Facility + windrow composting), and
- Option 5 (Engineered landfill + Materials Recovery Facility + In-vessel composting).

The Engineering Landfill costs are added to the Opex costs options 3, 4 and 5 in the financial assumptions sheet. A more granular breakdown of the operating expenses of the four options can be found in the operation, closure, and aftercare sheets for Options 1 and 2 and in the waste flow model.

Asset Schedule Assumptions

The asset schedule assumptions indicate the cost of assessment and development for each of the four options. The PSC financial model includes a schedule to show annual depreciation that is calculated from the initial and additional capital expenditure, and on the estimated asset life for each of the technology options. The current model assumes an expected life of 20 years, 20 years, 15 years, 10 years and 15 years for options 1 to 5 respectively. These assumptions are informed from discussions with technical experts and equipment suppliers. The model assumes a zero-residual value for all technology options.

The annual depreciation cost is calculated as follows:

$$\text{Annual depreciation cost} = \frac{\text{Capex} - \text{Residual value}}{\text{Estimated asset life}}$$

The calculations for capital expenditure and depreciation are in the Asset Schedule Sheet.

Tax Assumptions

The current model works assumes that the current 30% corporation tax rate will hold for the entire period covered by the model.

Financing Assumptions

The model allows for manipulation of the level of debt used to finance capital expenditure. The PSC Financial model assumes the CGN uses 100% debt financing for the project. The debt is from local commercial banks. The PSC capital structure has been adjusted to allow for an alternative structure. From subsequent market sounding, we have assumed that the project could attract a returnable grant of approx. KES 195.4 million to offset capital costs. Using the preferred the technology, this only offset 11.4% of the capital costs still retaining 88.6% to be financed by commercial debt and equity.

5.3.5.3 Funding need

The model calculates the minimum amount of subsidy funding required to make the SWM project viable. The required funding is arrived at by subtracting the total revenue received from the sum of operating costs and debt service costs.

5.3.5.4 Economic Social Cost Benefit Analysis Assumptions

In addition to the financial analysis, the model includes an Economic and Social Cost Benefit Analysis for the respective technological options. The benefits included avoided costs of landfill, increase in neighbouring real estate prices, avoided cost of carbon and increase in local trade. The social costs include resettlement costs, and forgone income for households and individuals that live or work in the Kiamunyi dumpsite. The total cost of resettlement is calculated in the Resettlement Action Plan (RAP) as KES 113 million. The results of the calculations of economic and social benefit are used to calculate the Economic Internal Rate of Return and the Benefit-Cost ratio for the various technological options.

6 Preferred Technical Option

Technical details on the recommended technical solution have been largely extracted from the Preferred Option Report, available under Appendix F; further information can be found in the report including references to relevant drawings. The preferred option comprises a materials recovery facility to extract dry recyclable materials, an in-vessel composting facility to treat the organic component of the wastes and an engineered landfill to provide sanitary disposal of residues from the up-front processes.

6.1 Preliminary Design

6.1.1 Materials Recovery Facility

The types of equipment envisaged for the MRF are a bag opener, trommel, conveyors, shovel loaders, balers, overband magnets and a picking station.

The recommended primary technology for the MRF is a trommel with a screen size ranging from 60 to 80mm; this will allow for an undersize fraction capable of feeding the IVC. Pre-treatment of the undersize fraction should include overband magnets to remove valuable metals prior to IVC processing.

The oversize fraction will require further separation. Automated equipment can be used, but is not recommended for Nakuru as skilled engineers are needed. An overband magnet may be used to remove the ferrous metals, followed by a picking line to remove non-ferrous metals, plastics and paper. A picking line is recommended as it will reduce facility capex and employ people already living on the landfill. The picking line would consist of an elevated, moving conveyor with waste spread across it, people would work in bays either side of the conveyor removing recyclable materials and sorting them into separate bins for each recyclate, situated at the ground level. The residual waste remaining after the recyclables have been removed from the oversize fraction will be sent to landfill.

The picking station will need to be ventilated, have climate control and suitable flooring and noise attenuation for people to be working in it for long periods of time. Mobile plant will be required for loading and transport of material including recyclables and the undersize to the IVC. Recyclables will need to be to be baled prior to storage, therefore baling equipment will be required.

The building required will need to be able to be closed, so that ventilation can be managed within the building and odour emissions can be minimised. It will also need to be large enough to allow for a tipping hall, waste reception area, plant and equipment, a picking station and storage and management of baled recyclables. None of the pieces of equipment which are envisaged to be needed have particularly long lead times. The estimated construction period is of 9 – 15 months depending on ground conditions and if the MRF is housed in the same building as the IVC.

The proposed location and elevation of the MRF is shown on Drawing MMD-372050-C-DR-00-XX-002 and the performance assumptions are shown in Table 36.

Table 36: MRF performance assumptions

Parameter	Quantity	Unit
Tonnage of waste into the plant	69,000	Tonnes/annum
Tonnage of waste removed in the reception hall (bulky and/or hazardous)	N/A	Tonnes/annum
Tonnage of waste separated as undersize, which is diverted to the IVC	38,000	Tonnes/annum
Tonnage of waste going through conveyors used for separation of recyclables	31,000	Tonnes/annum
Assuming operating 6 days per week (52 weeks per year) tonnage of waste per day	122+ 99 = 221	Tonnes/day
Operational hours per day	12	Hours
Tonnes per hour for sorting line	8.2	Tonnes/hour
Average amount of material a person can process per hour (assuming a positive sort, i.e. that they are picking a material out of mixed waste)	0.3	t/hr/person
Total number of people needed for manual material separation	28	people

Source: Consortium

6.1.2 In Vessel Composting

An enclosed hall system is recommended for Nakuru as it is the simplest method allowing it to be operated by the local workforce and reducing the capital cost whilst maintaining the benefits of IVCs of reducing issues of odour and vermin. A windrow arrangement is recommended, even though it will require more space than a single pile method, as it can allow for greater air movement and may reduce the need for forced aeration, it would also allow for market waste with low contamination to be composted in a separate windrow allowing for the potential sale of this compost for agricultural use. The recommended size for the windrows is 4m base by 2m high. Expanding windrow size can lead to odour problems, increased processing time, and increased likelihood of anaerobic conditions developing in the larger core zone.

Windrows are typically turned at frequencies ranging from a few days to weeks depending on conditions. Turning promotes pathogen kill by moving material from the cooler outside to the hotter core and restores permeability to allow the delivery of oxygen. Turning can be undertaken with a variety of equipment, the recommended design is to utilise self-propelled windrow turners as shown in Figure 1.

Figure 1: Self-propelled windrow turner

Source: The Consortium

The building required will need to be fully enclosed so that ventilation can be managed within the building and odour emissions can be minimised. It will also need to be large enough to allow for vehicle movements and enough space for the desired composting time for the required tonnage. None of the pieces of equipment which are envisaged to be needed have particularly long lead times. The estimated construction period is of 9 – 16 months depending on ground conditions and if the MRF is housed in the same building as the IVC. The proposed location and elevations of the IVC building is shown in Drawing MMD-372050-C-DR-00-XX-002. The performance assumptions are shown in Table 37.

Table 37: IVC Performance assumptions

Parameter	Quantity	Unit
Tonnage of waste into the IVC plant	38,000	Tonnes/annum
Tonnage of waste removed in the reception hall (bulky and/or hazardous)	N/A	Tonnes/annum
Assuming operating 6 days per week (52 weeks per year) tonnage of waste per day	122	Tonnes/day
Operational hours per day	12	Hours
Tonnes per hour	10.1	Tonnes/hour
Tonnage of compost like output	19,000	Tonnes/annum
Staffing	8	people

Source: The Consortium

6.1.3 Engineered Landfill and Kiamunyi Restoration

6.1.3.1 Site restoration

The new landfill will be developed as a vertical extension of the existing dumpsite; it will be necessary to reprofile the already placed waste and provide containment between the former and future tipped areas as part of the rehabilitation of the former deposits. The overall footprint will not extend beyond the existing tipped profile and the new phases will be constructed over the currently deposited waste. The existing profile is an undulating surface that would not provide a stable formation for the engineering required. It is recommended that the reshaping is initially undertaken using a long reach tracked excavator. Having undertaken much of the reshaping in this manner, the final profiling should then be undertaken using a bulldozer. Finally, the existing waste should be compacted using a waste compactor.

As fires may erupt during reprofiling, it is recommended that a full water bowser is kept near the works to allow for the flames to be damped down. Works should not continue if there is insufficient water in the bowser to be effective. Once reprofiling is complete, a barrier on a firm platform will be necessary to allow for a containment layer to be placed. It is proposed that this is a one metre thick granular layer purchased from a quarry.

The granular material should be well-graded to allow for compaction and should be placed in approximately 250mm layers. Each layer would be compacted with a smooth roller prior to placing the next layer. Having placed the final layer, the top layer should be compacted to leave a relatively uniform slope with no sharp edges. A containing layer should be installed over the one metre thick granular layer; a geosynthetic clay liner (GCL) is recommended for this purpose.

A GCL is a layer approximately 1cm thick with a bentonite layer sandwiched between two layers of fabric. This option is not as robust as clay or bentonite enriched soil layers, but the material can be installed by a non-specialist contractor and is specified to have the equivalent permeability properties to a 1m clay layer with a permeability of 1×10^{-9}m/s. If punctured or torn, it will lose some of its containing properties and the fabric could be affected by fire.

Having placed the containing layer, it will be necessary to cover the layer with a further 300mm thick layer of granular material. This material should not be well-graded but instead a single sized grading of approximately 20mm-50mm stone. The granular material should not be calcareous (e.g. limestone) as this can be affected by acidic leachate, when formed.

It is proposed that the entire site is prepared in this manner as an upfront task. A small section at the north of the site should be retained to allow the continuation of tipping prior to placing waste in prepared phases.

6.1.3.2 Engineered Landfill

It is intended that the site will be split into three phases, each having approximately 4-5 years tipping space.

The volume for the available void space and an indicative programme is then as follows:

- Phase 1 195,000m^3 To accept waste up to approximately 2021
- Phase 2 175,000m^3 To accept waste up from approximately 2021 to 2025
- Phase 3 186,300m^3 To accept waste from approximately 2025 to 2029
- TOTAL 561,300m^3

The total capacity was determined by establishing the difference in volume from a prepared surface and the designed final profile. The final profile is based on a maximum gradient of 1:6, which has been checked for stability under seismic conditions. The prepared formation level assumes reshaping of the site to provide a uniform surface and then placement of a 1 metre thick gravel layer.

The time periods have been determined by establishing the amount of waste that is likely to be placed in the landfill following recovery of recyclable material and composting of organic wastes. The waste flow model included as Appendix D has been used to develop the anticipated treated volumes and waste inputs. If the treatment technologies are not used then the landfill is anticipated to be filled by 2026. The date of 2029 includes an assumption that a use for the composted organic wastes cannot be found. Only a proportion of the composted material is actually needed at the site, for use as a daily cover. On the assumption that 75% of the residues from the composting process can be used, primarily as a soil improver for non-agricultural uses, then the site could continue until 2033 based on the assumptions in the waste flow model.

The first stage of the engineering will be to develop a toe bund at the base of the site along the edge of the road that runs east-west to the south of the site. This bund will be formed of granular material, will be 2m high, have a crest of 2m and a side slope profile of 1:3. This will require excavation of waste at the toe and it is recommended that the construction of this bund is the first task prior to remediating the site. The GCL will then be placed over the bund and fixed in an anchor trench in the crest. Tipping will then be provided to the inside face of the top of the bund. The eastern, western, and northern edges will be retained by providing a 1m high bund along each side. The aim of this bund is to ensure that leachate does not enter a surface water drainage system. The bund would be constructed on top of the 1m thick remediating gravel layer. It would also be covered with the GCL and fixed in the crest.

Waste should be placed so that it reaches the final contours as soon as possible and waste should always be placed from the toe of the site upwards to reduce potential for instability. Temporary slopes should be a maximum of 1:3 for wastes within each phase. When filling Phase 1, the internal slope down to Phase 2 can be placed with a slope of 1:3.

Leachate will collect in the site as the containment should reduce infiltration to groundwater. This can be minimised by preventing surface water from entering the site and by progressively capping the site as each phase is complete. Any leachate that is generated should be checked for depth to ensure that there is no danger of the leachate overtopping the edge bund. Leachate should be extracted through pumps in the leachate sumps and recirculated within the waste. Recirculation trenches should be excavated in freshly placed wastes for the discharge of the leachate. Collection of leachate will be through the general base slope of each phase combined with the granular layer installed and through the installation of HDPE pipework leading to a leachate sump.

Surface water management measures will need to be introduced. A drainage trench will be constructed as part of the rehabilitation of the existing dumpsite. The bund will prevent leachate from entering the surface water drainage. This bund will need to be constructed in phases to allow surface water from later phases to be directed towards the water channels prior to these areas being filled.

Monitoring installations should be placed around the site. There should be at least one monitoring point up-gradient of the site and two down gradient. These will primarily be used to assess groundwater contamination. Gas monitoring should also be undertaken where

communities may be affected by landfill gas. Following the geophysical investigation, it will be necessary for a site investigation to be undertaken.

The basic equipment required for the appropriate operation of an engineered landfill includes a dozer, a backhoe excavator, a dump truck, a landfill compactor, and a water bowser.

Whilst operations to reshape the existing wastes are undertaken, fresh deposits will need to be organised so that the works are not disrupted. It is proposed that deposits would be undertaken at the northernmost point whilst Phase 1 is prepared.

An operational plan will need to be developed to ensure that measures are in place to prevent the site returning to its current status. This operational plan should be split into various chapters covering the following: reception, waste acceptance control systems and procedures, engineered containment and drainage, environmental impacts, mobile plant and maintenance, monitoring, records, closure, capping and restoration, and emergencies.

6.1.4 Site-wide Consideration

It is envisaged that most vehicles would tip their waste at the MRF would not need to drive onto the landfill, thus, sufficient room to queue prior to the flat platform where a reception area would be constructed would be necessary. The reception area would comprise a weighbridge and an associated office. A weighbridge would need to be set up on solid foundations or founding material and should not be placed on waste material. A hard-paved primary access road would be provided culminating at a 20m x 20m hard paved area to permit turning.

The landfill must be secure. As the site operates during the day, it would be feasible to close the site overnight to avoid illegal dumping and prevent access by unauthorised staff. As the site is currently home to approximately 100 families, they would need to be resettled. Perimeter fencing is recommended as it provides delineation of the site and can act as a litter trap. One of the main purposes of a fence is to prevent unauthorised tipping. The preliminary design includes a 1.8m chain link fence with three strands of barbed wire. Care needs to be taken with respect to security as some people may feel that their livelihood has been affected by preventing unauthorised access. This can lead to vandalism of fencing.

To market the recyclables and compost like output (CLO) it is expected that one person is needed. CLO is likely to be managed through long term contracts, so should not need detailed management, however recyclates are usually sold using shorter term contracts in order to maximise income and flexibility. This takes careful management and staff who know the market.

During the operation phase, there will be employment opportunities for those who will be employed in maintenance and operation of the facilities. These are likely to be formal positions replacing the current informal economy operating at the sites. Estimated employment requirements are included in Table 38 below:

Table 38: Site Staffing

	Number of Unskilled Employees	Number of Skilled Employees
Number of people needed for MRF operations	34	8
Number of people needed for IVC operations	4	4
Number of people needed landfill operations	6	8
Site Reception and Security	16	N/A
Site Management	N/A	2
Total number of people needed onsite	60	22

Source: The Consortium

In addition, to the 42 staff required to work in the MRF, the 8 required for the IVC and the 14 landfill. There will also be approximately 18 other staff working on-site. This will include security and site reception staff as well as a site manager, to oversee the entire site for each shift. The number of staff required is expected to be 4 weighbridge staff (2 per shift) and 12 security personnel, assumed to be working on a three-shift system to cover 24 hours per day, with 3 people per shift.

6.2 Performance Requirements

Performance requirements have been included as a schedule to the draft heads of terms included in the Task 2 Report provided in Appendix L.

The Contractor shall be required to design, build, finance and operate the Waste Management Facility/ies to deliver a safe, efficient, reliable and cost effective waste management service for Contract Waste in accordance with all applicable Legislation, the CGN's policies, and contributing towards the International Finance Corporation (IFC) EHS Guidelines.

The Contractor shall provide and operate Waste Management Facility/ies for the treatment, Recycling, and disposal of Contract Waste diversion targets. The design throughputs for the various technologies are included as Table 36 and Table 37. The CGN will guarantee to provide a minimum of [60,000]tpa, but there must be capacity to treat [78,000]tpa of mixed solid waste.

The Contractor shall accept Contract Waste delivered by Authorised Vehicles during the Opening Hours, which are expected to be: Mon-Fri 7am – 6pm, Sat-Sun 7am – 3pm.

The Contractor shall design and construct the Waste Management Facilities to include suitable storage for Contract Waste of a size and volume which is capable of storing up to [72 hours] average Contract Waste.

The Contractor shall design and construct the Waste Management Facilities to include equipment capable of monitoring, weighing and electronically recording each load and vehicle bringing all input and output wastes.

Other key technical requirements for the treatment facilities are:

The Contractor must implement all works and provide the Services in agreement with the Service Delivery Plan. The treatment technology chosen shall have the ability to deliver the following:

- Recycle at least [40%(kg/kg)] of the Recyclable Content of the Contract Waste received
- Divert at least [40%kg/kg] of the Contract Waste received from landfill
- Wherever possible the Contractor should employ people who will be resettled from their current dwellings on Kiamunyi Landfill Site, this should amount to at least [50] of the site staff.

The Contractor will be required to remediate the existing Kiamunyi Landfill Site, and develop a lined landfill as part of the treatment solution. Measures will be required for containing the waste, managing leachate and gas emissions, managing surface water and monitoring the emissions.

The Contractor shall develop a detailed Commissioning Plan for each Waste Management Facility and include these as part of the Works Delivery Plan.

6.3 Naivasha

The focus of this study has been at the Kiamunyi Landfill, as alternative sites were not available. Consideration was given as to whether the Naivasha dump site could be suitable for redevelopment and provide support to the Kiamunyi site in managing the county's waste.

Unfortunately, the Naivasha site is relatively small and is understood to cover approximately 1 hectare. Applying a final 1:6 profile to try to ensure stability of the final restoration soils under seismic conditions, the site will only have sufficient capacity for approximately 3 years. This is based on a low capture rate applied to the collection services delivering material to the dump site. It is, therefore, important that the CGN identifies an alternative site as soon as possible.

In this situation, it is not appropriate to provide engineering to the site as this would use up valuable void space and reduce the time available to locate an alternative site.

It would be feasible to provide a do-minimum approach to the landfill. This would include providing fencing, using daily cover and capping the site on completion. Mobile plant, a mobile weighbridge and a water bowser could be used at the site and then moved to the alternative site, once that site is available.

Funding for the capital works and mobile plant would have to be found by the CGN and could not be part of a wider procurement for the County as the site will be nearing completion by the time the procurement would be finalised.

7 Project Due Diligence

The Government of Kenya ("GOK") has prioritized Public Private Partnerships ("PPPs") as a means by which to develop infrastructure in the country and in this regard, has developed a National Priority List of projects which it proposes to implement by way of PPP arrangements. Among such projects is an Integrated Solid Waste Management system for Nakuru County.

Further information is available under the Task 1 Legal Due Diligence Report and the Task 2 Procurement Optioneering Report provided in Appendix G and L.

7.1 Legal Aspects

7.1.1 Project Policy Justification

There is broad National and County policy justification for undertaking the Project. This includes the Kenya Vision 2030 Development Blue Print, the Medium-Term Plan 2013 – 2017, Sessional Paper No. 10 of 2012 on Kenya Vision 2030, the PPP Policy, the National Environment Policy, 2013, and the first Nakuru County Integrated Development Plan 2013 – 2017.

7.1.2 Procuring Authority Powers

There is a clear legal framework which (i) designates the CGN as the entity responsible for procurement of the Project and (ii) gives the CGN the requisite power and authority to undertake the Project in the manner proposed.

7.1.3 Project Procurement Legislation Analysis

The primary laws governing public procurement in Kenya are:

- the Constitution of Kenya, 2010;
- the Public Private Partnerships Act, 2013 ("PPP Act"); and
- the Public Procurement and Asset Disposal Act, 2015.

The Project satisfies the criteria for a PPP and can therefore be carried out under the PPP Act.

7.1.4 Legal Framework Governing Solid Waste in Kenya

There is an enabling framework governing solid waste management in the Country. In addition to the national laws, the CGN has two proposed laws, i.e., the County Government of Nakuru Waste Management Bill, 2016 and the County Government of Nakuru Environmental Conservation and Management Bill, 2015, which would further support the Project if enacted. Some of the provisions of these proposed laws would however need to be aligned with those of the Environmental Management and Co-ordination Act, 1999 ("EMCA"), before they are passed into law.

7.1.5 Project Procurement Considerations and PPP Options

The Request for Proposals in respect of procurement of the consortium states that the Project is for the "*procurement of one or multiple private sector partners for designing, constructing, operating, and maintaining the Integrated Municipal Solid Waste management project (the "Project") in the County through a PPP arrangement*." The Second Schedule to the PPP Act contains a list of thirteen (13) different PPP arrangements or structures that a contracting

authority (in this case, the CGN) may enter into with a private sector contractor. These thirteen (13) options are set out in the table below:

Table 39: PPP Options under the PPP Act

PPP Options	Details under the PPP Act (Second Schedule)
Management contract	Private party is responsible for the management and performance of a specified obligation, within well-defined specifications for a specified period of time not exceeding ten years, and the contracting authority retains ownership and control of all facilities and capital assets and properties
Output performance based contract	The private party is responsible for the operation, maintenance and management of an infrastructure facility for a specified period of time not exceeding ten years and the contracting authority retains ownership of the facility and capital assets
Lease	The private party pays the contracting authority rent or royalties and manages, operates and maintains the facility or utilises the leased property for the purpose of exploration, production and development of minerals and receives fees, charges or benefits from consumers for the provision of the service or sale of products for specified period of time not exceeding thirty years
Concession	The contracting authority issues a contractual licence to the private party to operate, maintain, rehabilitate or upgrade an infrastructure facility and to charge a user fee while paying a concession fee to the contracting authority
Build-Own-Operate-Transfer scheme	The private party designs, constructs, finances, operates and maintains an infrastructure facility owned by the private party for a specified time period not exceeding thirty years, or such longer period as may be agreed, after which the private party transfers the facility to the contracting authority
Build-Own Operate scheme	The private party designs, finances, constructs, operates and maintains the infrastructure facility and provides services for a specified period of time
Build-Operate-and-Transfer scheme	The private party finances, constructs, operates and maintains an infrastructure facility and transfers the facility to the contracting authority at the end of a specified term which shall not exceed thirty years
Build-Lease-and-Transfer	The contracting authority authorizes the private party to finance and construct an infrastructure or development facility and upon its completion, lease it to the contracting authority for a specified period upon the expiry of which the ownership of the facility automatically transfers from the private party to the contracting authority
Build-Transfer-and-Operate	The private party constructs an infrastructure facility and assumes the costs and risks associated with the construction of the building and upon completion, transfers the ownership of the facility to the contracting authority and continues to operate the facility on behalf of the contracting authority.
Develop-Operate-and-Transfer	Favourable conditions external to a proposed infrastructure project by a private party are integrated into the arrangement by giving that private party the right to develop adjoining property, and enjoy the benefits the investment creates as the parties agree on condition that the private party transfers the infrastructure facility to the contracting authority within a period not exceeding thirty years from the commencement of the project and the developed property remain the property of the private party in perpetuity
Rehabilitate-Operate-and-Transfer	The private party refurbishes, operates and maintains for a specified period, an existing facility at the expiry of which the private party transfers the facility to the contracting authority
Rehabilitate-Own-and-Operate	An existing facility is transferred by the contracting authority to the private party to refurbish and operate it with no time limitation imposed on ownership and the private party abides by the conditions of the arrangement during the operation of the facility
Land Swap	A contracting authority transfers existing public land or an asset to the private party in consideration of an asset or facility that has been developed by that private party

Source: The Consortium

After having considered the above PPP options and on the basis that the CGN would (i) prefer to procure the Project as an integrated solution; and (ii) require the private sector contractor to raise funding for the construction and operation phases, we have narrowed down the viable PPP options to:

- Build-Own-Operate-Transfer;

- Build-Operate-and-Transfer;
- Build-Lease-And-Transfer; and
- Build-Transfer-Operate,

with the most viable option being Build-Own-Operate-Transfer.

The procurement procedure under the PPP Act is highly prescriptive and care must be taken to ensure that the CGN complies with the same.

In the recent past, numerous procurement contests have been lodged against award decisions taken by procuring entities following the selection of bidders. Some of the issues that have been raised in previous procurement cases include failure to comply with the Constitution, conflict of interest, failure to put in measures to ensure value for money, awarding contracts to persons who have been blacklisted from participation in tender proceedings, lack of technical and financial capacity on the part of the bidders awarded the tenders, failure to comply with the evaluation criteria, change in consortium members, double tendering, breach of the applicable procurement laws and lack of transparency and accountability.

The above procurement challenges, if they were to be lodged, would delay the Project. To ensure that the Project will be insulated against any potential legal challenges / contests, and avert costly delays, the CGN will need to map out in advance and strictly adhere to the procurement process as provided for under the PPP Act.

7.1.6 Project Sites

The Project is proposed to be carried out on the existing dumpsite at Kiamunyi, as the CGN does not currently have alternative or new sites to include for the project. We, however, understand that there are constitutional petitions pending before the High Court in which the petitioners are seeking closure of the Kiamunyi and Naivasha dumpsites on grounds of alleged violation of the right to a clean and healthy environment. Given that the Project is meant to ensure that solid waste in the County, and therefore the dumpsites, is managed in a manner that is compliant with the relevant environmental requirements, the CGN may advance the same in support of its case.

We must point out that the High Court could still find in favour of the petitioners (and assuming that such a finding is upheld by the Court of Appeal and the Supreme Court on appeal), then there would be need for the CGN to acquire alternative sites for Nakuru and Naivasha. It is therefore critical that the petitions are settled or concluded before the commencement of the procurement process if the Project is to proceed on the existing dumpsites, as has been proposed.

There are families currently living within the Kiamunyi dumpsite in Nakuru (and possibly on some of the other dumpsites) which would need to be resettled as part of Project implementation. This would necessitate the CGN having to acquire alternative land for such resettlement.

The process of land acquisition is lengthy and prone to legal challenges. It would therefore be necessary for the CGN to (i) develop a legally compliant land acquisition strategy; and (ii) commence the land acquisition process as soon as it determines to implement the Project to minimize delays on account of disputes and litigation.

7.1.7 Project Implementation

The existing regulatory framework accommodates the Project and the anticipated risk transfer for a PPP project.

7.1.7.1 Project Approvals

Implementing the Project will require various approvals and the process for obtaining such approvals can cause delay. Where the approvals are a condition precedent to (i) signing the Project Agreement; (ii) having the Project Agreement become effective; or (iii) financial close, such approvals may delay the start of the Project unless they are waived. Approvals should therefore be progressed as soon as is feasible by the private sector contractor. The private sector contractor can leverage on support from the CGN for the timely issuance of such approvals where it can demonstrate that it has diligently applied for and been pursuing application(s) (which diligence shall include full and timely compliance with all procedural requirements relating to the issue of such approvals and with the laws of Kenya).

7.1.7.2 Use and User Rights

Once the CGN has acquired land or is ready to have the private sector contractor mobilise to the existing site, such contractor will require land rights to enable it to undertake the Project. The land rights could take various forms including a transfer of ownership, lease, or licence.

Considering the nature of the Project, the CGN would need to consider whether transfer of ownership of land to the private sector contractor is an appropriate option. In the event that it is, this option would invariably be more capital intensive for the private sector contractor due to (i) the cost of the land which shall be front loaded; and (ii) stamp duty implications, which in this case is either 2% or 4% (depending on the location of the land) of the higher of cost of the land and the value assessed by the GOK valuer. The private sector contractor may lobby GOK for an exemption from stamp duty by virtue of Section 106 of the Stamp Duty Act, which allows the Cabinet Secretary, National Treasury, upon recommendation of the Cabinet Secretary for Lands and Physical Planning, to exempt any instrument from stamp duty in the public interest. Nevertheless, the capital outlay for the purchase of the land may still be a disincentive for this option.

In the case of a lease or licence (whose duration would be limited to the Project term), the cost would be significantly lower than an acquisition. Neither a lease nor a licence would entail an outlay for purchase of land and the stamp duty implication for both would be considerably lower. The stamp duty payable in case of a lease would be 2% of the annual rent for which the property is leased. The stamp duty payable in case of a licence would be nominal under the Registration of Documents Act (Chapter 161) Laws of Kenya.

Other than cost implications, the CGN will also need to consider its internal policy objectives regarding transfers of ownership of land owned by it as well as possible implications on Project risk allocation.

7.1.7.3 Project Company

Section 59 of the PPP Act requires a successful bidder to incorporate a project company through which the Project will be implemented. This Section and Regulation 49 of the PPP Regulations can be summarised as follows:

The project company:

- Should be incorporated in Kenya;

- Should be incorporated specifically to execute a project in accordance with the PPP Act and the PPP Regulations;
- Should incorporate the provisions of the Project Agreement and the tender documents in its constitutive documents;
- Should have a shareholding structure which is in accordance with the Project Agreement; and
- May include a public body (e.g. the CGN) as a minority shareholder.

The position on having a public body as a shareholder in the project company is a development from the traditional PPP model, designed to allow either profit sharing, or an increased level of contracting authority involvement in the Project operations. We would however not recommend that the CGN takes up any shares in the Project company given the potential complication of being a shareholder and a counterparty to the Project Agreement. A level of involvement in the Project operations may be achieved by the exercise by the CGN of its project monitoring rights in the Project Agreement.

There are restrictions on winding up, alteration of legal structure, reduction of share capital, transfer of shares, pledging of a project company's shares without obtaining written approval from the contracting authority. These restrictions include the requirement that:

- A majority shareholder cannot transfer any of their shares before being issued with an acceptance certificate by the contracting authority confirming its acceptance of the quality of a project undertaken in accordance with a project agreement;
- Where transfer of shares results in the transfer of the control of a project company to a third party, the transfer shall not be valid unless the existing shareholder has applied for, and obtained the written approval of the relevant contracting authority; and
- Pledging of shares in a project company is not allowed except for the purpose of financing the project.

7.1.7.4 Project Funding

Any unitary payments as well as the cost of early works such as planning and land acquisition (if applicable) and resettlement should be provided for in the CGN's annual budgets for each relevant financial year.

It is envisaged that second phase financing for the construction and operation of the Project shall be secured by the private sector contractor. Returnable grants and guarantees can be used to attract commercial debt into the project. To offset the any funding gap, the Project can apply for grants that are available for such projects. We have identified two types of grants that could be used to offset the subsidy requirement:

a) Technical assistance grants - these could be tapped to offset studies or assessments that will be required in the initial stages of the project. Potential providers would include technical assistance facilities of various Donor funded vehicles for example DevCo under the Private Sector Infrastructure Group (PIDG). We have assumed USD 50,000 dawn in the first year of the project

b) Output Based Aid (OBA) - due to the impactful nature, this Project qualifies for OBA grants that are available based on certain pre-agreed milestones. The Global Partnership for Output Based Aid has provided such grants to Solid waste management projects that would be similar to this project. We have assumed that the project could access USD 4 million of OBA over a 4-year period drawn after achievement of pre-set output milestones.

With regards to National Treasury backstopping, the PPP Act allows the Cabinet Secretary, National Treasury, in consultation with the Debt Management Office and the Public Private Partnerships Committee, to issue a guarantee, undertaking, or letter of comfort where GOK considers it necessary to support a project and in order to reduce premiums factored for political risks. GOK has moved away from issuing sovereign guarantees to projects of this nature and now mainly provides credit support through letters of support. Typically, such GOK letters of support only cover political events. A GOK letter is not issued automatically. To the extent that a GOK letter of support will be considered for the Project, there would be benefits to including, within the tender documents, the key risks expected to be covered by such letter as this has the potential for increased market confidence, lower prices due to reduced political risk and reduced negotiation periods. GOK could also provide direct financial assistance to the CGN through grants, payment of subsidies in order to lower user charges (e.g. tipping fees) and tax incentives to the private sector contractor.

Other ways the Project may be funded include allocations from the Project Facilitation Fund with the approval of the PPP Committee (such funds to be utilised to fund the preparation phase) and/or levying of user charges (either by the CGN or the private sector contractor).

7.1.7.5 Relevant Environmental Considerations

The Constitution of Kenya, 2010, sets out the overarching principles on the care and management of the environment, and those which could impact the Project include:

- Article 42 provides for the right of every person to a clean and healthy environment which includes the right to have the environment protected for the benefit of present and future generations;
- Article 69 imposes an obligation on the State to:
  - Ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits;
  - Encourage public participation in the management, protection and conservation of the environment;
  - Establish systems of environmental impact assessment, environmental audit and monitoring of the environment;
  - Eliminate processes and activities that are likely to endanger the environment; and
  - Utilize the environment and natural resources for the benefit of the people of Kenya;
- Article 70 gives every person the right to enforce their rights to a clean and healthy environment. It is noteworthy that a person seeking to enforce such rights need not demonstrate that he has incurred any loss or suffered any injury.

Under EMCA (the substantive law on environmental conservation), it is prohibited for anyone to operate a waste disposal facility without having first obtained an Environmental Impact Assessment Licence ("EIA Licence") from the National Environmental Management Authority ("NEMA"). Public participation is required as part of the EIA process.

Under Section 60 of EMCA, NEMA is allowed to require lead agencies to comment on an EIA Study Report before granting an EIA Licence. Some agencies which may be called upon to comment include the Water Resources Authority, the Kenya Tourism Board, Kenya Wildlife Service and the Lake Naivasha Management Committee.

There is also a requirement for the carrying out of environmental audits on activities which are likely to have a significant effect on the environment. As part of these audits, NEMA is required to determine how those activities conform to the statements made in the EIA Study Report. In view of this, it shall be necessary for the private sector contractor or any sub-contractor it engages under the Project to maintain accurate records and make annual reports to NEMA confirming its compliance with the EIA Study Report and to take reasonable measures to mitigate any undesirable effects not contemplated in the EIA Report. The CGN should receive copies of such reports.

Notwithstanding the delegation of the waste management function to the private sector contractor, the CGN will retain ultimate responsibility for same in line with Section 65(3) of the PPP Act which states that "*a project agreement involving the performance of a function of a contracting authority by a private party shall not divest the contracting authority of the responsibility for ensuring that its function is effectively and efficiently performed in the public interest or on behalf of public service*." It shall therefore be necessary for the CGN to work closely with the private sector contractor to ensure compliance with the above environmental and heritage requirements.

7.1.7.6 Labour Considerations

The private sector contractor and any sub-contractor(s) it engages will be required to comply with all the labour laws and immigration requirements in Kenya (including work permits where applicable).

In the case of transfer of employees, the private sector contractor, as an employer, will be required to, among other things, consult with the relevant employees and to engage fair procedures as stipulated in the Constitution including:

- Providing individual notice to affected employees of the proposed transfer of employment and engage in documented consultations;
- Securing consent of affected employees to any transfer;
- Providing alternatives to all the employees, including resignation from previous employer and payment of all terminal benefits; and
- Clearly spelling out the manner in which termination benefits are to be computed.

There is also the:

- Occupational Safety and Health Act, 2007 which has requirements on the safety, health and welfare of workers and all persons lawfully present at workplaces. The private sector contractor will be required to register the Project site as a work place with the Director of Occupational Safety and Health Services. The Contractor will also be required to carry out annual safety and health audits; and
- Work Injury Benefits Act, 2007, which imposes an obligation on employers to obtain a Work Injury Benefits Insurance to cover employees' compensation for work related injuries and diseases.

7.1.7.7 Anti-Trust Considerations

The Competition Act, 2010 contains anti-trust requirements which the private sector contractor would have to abide by during Project implementation. Section 41 prohibits the implementation of a merger (defined as an acquisition of shares, business or other assets, whether inside or outside Kenya, resulting in the change of control of a business, part of a business or an asset of a business in Kenya in any manner and includes a takeover) in certain instances without the

prior approval of the Competition Authority of Kenya. Such provisions may apply in the case of changes in the Project company's shareholding.

There also restrictions against the transfer of shares in the Project company, as set out in section 7.1.7.3 above.

7.1.7.8 Zoning Rights and Land Use Regulations

There is a myriad of requirements that land should be used for the authorised use and in congruence with any development plans. These laws include the Physical Planning Act, Chapter 286, Laws of Kenya, the Urban Areas and Cities Act, 2011, and the County Governments Act, 2012. It shall therefore be necessary to ensure that the use of dumpsites (and any additional land acquired for the Project) as waste processing and/or disposal facilities and/or transfer stations is in congruence with the above laws.

7.1.7.9 Development Permission and Building Codes

The Fourth Schedule of the Constitution allocates to the County Governments the function of county planning and development. Section 29 of the Physical Planning Act empowers the Counties to control the use and development of land and buildings in the interests of proper and orderly development of their respective area(s). Consequently, the private sector contractor will be required to seek development permission and approval of the building plans from the CGN.

7.1.7.10 Likely Project Agreements

The likely Project documents shall include:

- The Project Agreement;
- Constitutive documents of the Project company;
- Shareholders' Agreement, if the private sector contractor shall be a consortium;
- Engineering, Procurement and Construction contract between the Project company and the relevant contractor;
- Operations and Maintenance contract between the Project company and the relevant contractor;
- Land access agreements, such a purchase agreement, land lease, etc.;
- If lenders are involved, facility agreements, security documents, lenders direct agreements;
- Other sub-contracts between the private sector contractor and its sub-contractors, which may include waste collection contracts, and off-take contracts (if applicable);
- Insurance contracts; and
- Collateral warranties between the CGN and the principal subcontractors.

7.1.7.11 Dispute Settlement Mechanism and Legal Jurisdiction

Proper dispute resolution mechanisms need to be in place to ensure that any disputes relating to the Project are quickly resolved. Resolution of disputes in Kenyan courts takes a relatively long period and is a costly process and accordingly, to ensure uninterrupted implementation of the Project, it will be necessary to consider alternatives to the court process such as mediation and arbitration, with court proceedings being reserved as a last resort. The CGN could, subject to the dispute resolution provisions of the Project Agreement, consider an internal project liaison committee, typically composed of persons involved in the monitoring and implementation of the Project. Such persons would typically include some or all the members of the CGN PPP Node and such other persons with technical, financial, legal and / or other relevant expertise and

would be tasked to resolve any disputes with the private sector contractor in the first instance, with the possibility of escalation to the executives of the CGN and the private sector contractor, followed by escalation through dispute resolution mechanisms contained in the Project Agreement.

One of the recent developments is that the Office of the Attorney General has issued an administrative directive that the seat and rules to be used for purposes of arbitration shall be Nairobi and UNCITRAL Rules, 2013 respectively. This would need to be considered in developing and negotiating the Project Agreement.

7.1.7.12 Insurance

Insurance in respect of all aspects of the Project, including construction and operational risks and environmental related losses/liabilities arising from the development of projects is normally regulated through contractual provisions.

It is important to note that Section 20 of the Insurance Act, Chapter 487, laws of Kenya, requires that any insurance relating to a Kenya business (which would include development and operation of the Project) be taken out with an insurer registered under the Insurance Act. Where the relevant insurance is not available in the Kenyan insurance market, there is a process under the Insurance Act which would enable the private sector contractor or its sub-contractor(s) to procure the same in the international insurance market, subject to the approval of the Commissioner of Insurance.

7.1.7.13 Infrastructure use

It shall be necessary to obtain approvals from road, port and police authorities if the Project shall involve the carriage of wide and/or abnormal loads across any of these infrastructure facilities. The private sector contractor may seek to leverage on the CGN to procure or expedite such approvals.

7.1.7.14 Investments Benefiting Local Communities

The Constitution contains a requirement that investments in land ought to benefit local communities and that Parliament shall enact legislation to provide clarity on this. As no legislation has been passed to date, guidance as to how claims by the local community around the proposed Project sites will be handled and the criteria to be used to identify the local community and the benefits that they are entitled to may be sought from proposed legislation, which provides an indication of the policy and statutory direction that the country is taking. Examples of such legislation are the Energy Bill, 2015, the Natural Resources (Benefit Sharing) Bill, 2014 and the Local Content Bill, 2016.

In addition, developing and implementing mechanisms for community participation in planning and implementation of the Project will be critical to secure the local community buy-in to the Project as well as minimise the potential for delay due to community resistance.

7.1.7.15 Registration of Construction contractors and Project Sites

Under Section 15 of the National Construction Authority Act, 2011 (laws of Kenya), there is a requirement that all construction contractors should be registered with the National Construction Authority ("NCA"). It shall therefore be necessary to ensure that any construction contractor(s) engaged on the Project are duly registered with the NCA.

Regulation 17(1) of the National Construction Authority Regulations, 2014 requires all construction works to be registered with NCA, meaning therefore that the private sector

contractor shall also be required to register the Project sites with NCA. In an effort to lower the cost of doing business in Kenya, GOK has waived the official fees payable to NCA for such registration.

7.1.7.16 Existing Waste Collection Contracts

The CGN has outsourced the collection of household solid waste to waste collection agents ("Waste Collection Agents") through three year contracts ("Waste Collection Contracts"). The existing service is described in Section 2.1 and the collection contracts are reviewed in Appendix K. It shall be necessary to determine the extent to which any Waste Collection Contracts which would be in force at the onset of Project implementation would be suitable for delivery of the Project throughout its term or whether they should be terminated or varied.

A sample contract was provided by CGN which demonstrated that there is a functioning contractual framework in place for the delivery of waste collection, transport and disposal services. The majority of the key waste service parameters are captured by the sample contract and the provisions are in line with our expectations. Improvements in the contracts would be needed to bring them in line with typical good practice and to make them robust for the introduction of new disposal and treatment contracts.

The direct user charging provisions are assessed to be inadequate however, as we would expect more clarity and detail on the allowed levels and cost recovery process employed by the contractors. Contract performance monitoring systems were also assessed to be lacking detail and standardisation, while the lack of a waste quantity recording system at the designated disposal sites hinders the formulation of a per tonne based performance monitoring system and payment structure. These parameters would be expected to be addressed in a consolidation exercise of the household waste collection contracts.

The consortium recommends the following technical and commercial improvements for the consolidation of the contractual framework for waste collection, transportation and disposal services:

Short term improvements

- Include clean-up operations under contracts in order to improve cleanliness levels of public areas and streets.
- Clear provisions on cleaning up of illegal dumping and utilisation of contractors where appropriate.
- Clarify ENRED’s powers on waste collection service contract regulation, supervision and management with an appropriate CGN statutory framework. It would need to be aligned with contractual framework, concentrate waste service responsibilities to ENRED to resolve current authority overlaps and gaps between multiple County departments.
- Definition of direct charging levels, processes, responsibilities and user rights.
- Contract zones more clearly defined in contractual documentation (i.e. with maps or lists of streets, districts and locations of interest).
- Contract supervision process: develop a set of performance indicators managed by CGN that will be applied to all zones and introduce requirements to contractors to provide information. These could include: collection coverage, pollution incidents, customer complaints, CGN service requests, households served, waste quantities managed, missed households, penalties paid, direct charging level statistics, missed direct charge payments.
- Review responsibilities for street cleansing and consolidate under a single CGN department (that would preferably be ENRED, as it already holds responsibilities for smaller streets,

public areas and parks). Strengthen supervision capacity of department and gradually increase allocation of resources for street cleansing operations (staff and equipment).

Medium term improvements

- Consolidation of contracts to a number below 20 during the next procurement cycle in order to reduce supervision onus to CGN and encourage supply side capacity building via consortia, acquisitions and mergers, which would lead to larger contracting organisations. This consolidation would also be expected to include merging of commercially attractive with non-attractive zones in order to encourage contractors to invest and develop services for the 9 zones which are currently not served by the private sector.
- Review service charge levels and consider householder incentivisation schemes for increase of collection system coverage.
- Introduce new collection methods, such as community collection points in areas which are currently not served by the CGN household waste collection system in order to increase coverage. Interfaces and synergies with Community Based Organisations would also need to be reviewed and controlled under these plans.
- Clarify waste definitions and review responsibilities on commercial and market waste collection.
- In conjunction with the development of the designated disposal sites, introduce requirements for recording of quantities disposed by contractors (continuous reporting using weighbridge records). Align with a simple and clear tipping charging mechanism and future disposal contract requirements.
- Further requirements to contractors for their disposal operations in line with future disposal contract requirements. (i.e. adherence with site operator instructions, recording of vehicles and quantities, interfacing with informal waste pickers based on site).
- Review length of contract so that it can be optimised to encourage new vehicles, value for money and a sufficient period of time to integrate with any new treatment and disposal contracts. Contracts of approximately 5-7 years should allow for purchasing new vehicles.
- Add requirements to contractors on how they respond to emergencies and what contingency resources they maintain.
- More detailed requirements on health and safety management, working practices and training.
- To review and amend the contracts to make them more robust. Some of the areas which may require amendment include mode of compensation, roles and responsibilities of the parties, default and termination, dispute resolution, etc.
- If transfer stations or recycling facilities are included in the integrated waste management system in the future, amend contract terms to include them in the designated receptor sites for the waste collection contractors and add delivery and acceptance requirements as appropriate.
- Introduce appropriate equipment (weighbridges, data recorders) in designated receptor sites for recording the waste quantities delivered.

Long term improvements

- Health and safety and environmental performance included in technical criteria for future procurement exercises of waste services contracts.
- Waste collection, transportation and disposal vehicle and equipment condition to be clearly specified (age, health and safety and adherence with relevant quality standards).
- Review collection contract duration from current three year to 5-7, in line with estimated life of new vehicles and equipment, as appropriate.

- Direct charging levels to users by contractors added to financial criteria for future procurement exercises of waste services contracts to improve value for money.
- Service contract extension can be considered to be greater than the 90 days' maximum if contractor performance is good to ensure continuity of services and incentivise contractors.
- Contractors to undertake clean-up operations of illegal dumping. Specify responsibilities, resource requirements and methods.
- Include significant breaches of permits or their loss by contractors in termination clauses.
- Consider including in specifications waste containerisation methods in addition to current (bags and loose waste for householders, waste piles in commercial areas).
- Consider further consolidating the collection contracts, when local market can cover demand for larger contracts and areas.

The longer term improvements should be associated with a review of legislation and charging, which should focus on measures that would reduce the potential for people to opt out of waste collection services. Enforcement of the service would require institutional strengthening of the waste management arrangements relating to collection, disposal and revenue recovery, so that the CGN/contractors are not disadvantaged by reluctance to pay.

7.1.7.17 Political Economic Environment

As part of the project implementation strategy, there will be a need to procure the buy-in of the political leadership then in place, given the strategic roles of each level of governments in project implementation, particularly approval of budgetary allocations. In this regard, it is important to note that among the projects in GOK's National Priority List of projects which it proposes to implement by way of PPP arrangements is an Integrated Solid Waste Management system for Nakuru County – which would help greatly in obtaining such political buy-in.

There is also a need to weigh the possible social and/or political backlash if a foreign private party takes over waste collection from the existing waste collection contractors.

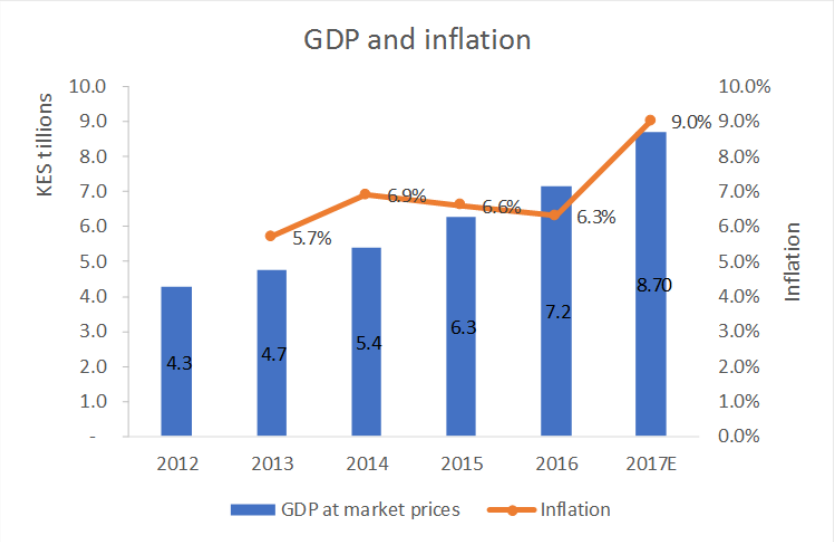
It is useful to understand the economic context in which this solid waste management project will operate. In this section, we provide a brief survey of key economic variables that could either impact, or be themselves impacted by, the implementation of the SWM project. First, Kenya's GDP has steadily grown from KES 4.2 trillion in 2012 to KES 7.2 trillion in 2016. The Kenya National Bureau of Statistics (KNBS) expects the 2017 GDP to be KES 8.7. The impact of the debt raised for this project on the country's debt-to-GDP ratio is explained in Section 9.5.

The Central Bank of Kenya has an inflation target of $5\% \pm 2.5\%$. In the period between 2013 and 2016, inflation has been maintained within this band. The KNBS estimates, however, that inflation in 2017 could be as high as 9% because the drought that has been experienced in the country.[4]

Figure 2 below shows the GDP and inflation trends over the last five years, and projections for 2017.

[4] Kenya Economic Survey 2017, KNBS

Figure 2: Kenya GDP and Inflation



7.2 Site Enablement

7.2.1 Need for New Development

Identifying and securing one or more new suitable sites for the development of waste management infrastructure is key to allow the CGN to operate and regulate stable long-term best-in-practice services. Benefits and reasons for this requirement are listed below:

- Allow for suitable disposal of waste post 2029, the projected year for the current landfill to run out of engineered and safe void-space;
- Without a new available landfill the CGN will run the risk of the current Kiamunyi site being filled and further waste having no suitable location for disposal, this would likely result in widespread littering, fly-tipping, and unsafe landfill management as waste is tipped beyond the designed final profile; and
- Securing suitable locations for operating transfer stations will reduce vehicle movement requirements and allow for bulk carrier transport to disposal sites.

7.2.2 Land Requirements

7.2.2.1 Landfill

The sooner an alternative site can be found the better, as waste is currently being disposed of in open landfills which are not engineered. Therefore, the consortium has provided two sets of sizing for landfill, showing the differences should the site be procured and developed as quickly as possible (assumed to be three years) or developed at the latest date possible (assumed to be 2029 when Kiamunyi is completed). The date of 2029 is based on the anticipated completion date for the landfill assuming that the treatment processes are developed (see Section 6.1.3.2).

Table 40: Landfill development data

Landfill	2021 development	2029 development
Cumulative tonnage requiring disposal	3,653,000t	1,990,000t

Landfill	2021 development	2029 development
Assumed density once landfilled	0.75t/m^3	0.75t/m^3
Size of landfill needed*	560m by 560m (313,600m^2)	460m by 460m (211,600m^2)
Additional land needed for access roads, security, weighbridge, and welfare facilities	15m by 560m (8,400m^2)	15m by 460m (6,900m^2)
Total land needed	322,000m^2	218,500m^2
Land value - high	$9,016,000	$6,118,000
Land value - medium	$6,440,000	$4,370,000
Land value - low	$1,030,400	$699,200

Source: The Consortium

*The area needed assumes the land available would be flat. If an old quarry or valley could be found then a smaller area may be needed, as filling up a void means that slopes can be steeper.

If one engineered landfill were to be developed the areas above would be needed. If multiple engineered landfills were to be developed a factor of approximately 1.3 would need to be used to work out the total additional area needed for each landfill. This is if the two landfills would be roughly equally sized, and the ratio could change if one landfill was much smaller than the other. For example, if two equally sized landfills were developed in 2029 the total land needed would be approximately 1.3 x 218,500 = 284,100m^2.

If the land was purchased between 2021 and 2029 the amount of land needed would need to be calculated, based on collection coverage and tonnage received. This figure will be highly dependent on the rate of increase of collection coverage, so the larger the site available the better.

7.2.2.2 Treatment

The maximum amount of waste needing treatment is estimated to be 448,000tpa in 2040 through the waste flow model. The largest capacity successful facilities operating with IVC of which the consortium is aware are in the region of 300,000 to 350,000tpa, so a minimum of two facilities would be needed to treat all the waste in the county.

For the purposes of determining new land requirements it is assumed that the treatment facility at Kiamunyi would continue to be operated, as it has a capacity of 69,000tpa, approximately 379,000tpa of waste is expected to require treatment by 2040. It is important to note that there are different relationships between capacity and footprint requirement for the different aspects of the technology. The IVC grows linearly with the amount of waste delivered, but the MRF does not, as the building requirements are not based on the tonnage of waste alone, but also on the processing equipment used.

Table 41: Treatment land estimates

Treatment facility	One site	Two sites
Capacity	379,000tpa	2 x 190,000tpa
MRF estimates	14,000m^2	2 x 8,000m^2
IVC estimates	67,000m^2	2 x 34,000m^2
Roads, delivery points, weighbridge, security, product storage and welfare facilities	10,000m^2	2 x 6,000m^2
Total	91,000m^2	2 x 48,000m^2
Land Value - high	$2,548,000	$2,688,000
Land Value - medium	$1,820,000	$1,920,000

Treatment facility	One site	Two sites
Land Value - low	$291,200	$307,200

Source: The Consortium

The site area should be flat and without the need for complex design due to slopes, areas of unsuitable land, or other non-standard requirements. The areas indicated are minimum requirements, and any additional land would be beneficial for ease of operation.

7.2.2.3 Transfer

A network of transfer stations across the county would provide a more efficient transportation system, particularly if the number of landfill sites is reduced to one or two. The specific size of the transfer station would depend on its location and capacity, but as an indication, a typically sized facility would be 30m by 60m. A single transfer station would reduce the number of collection vehicles required but up to four stations would be beneficial, especially if the site found for the landfill and treatment facility(ies) are towards the county boundaries.

7.2.2.4 Other Requirements

Other than the appropriate size and topography, the site for further landfill and waste treatment developments should ideally have:

- Low population and building density area;
- Low traffic area;
- Accessibility by road and close to the main road network;
- Low flood risk;
- Lack of water abstraction points;
- No significant soil contamination;
- Absence of significant native vegetation within site;
- Absence of water sources; and
- Absence of legitimate use by the population.

7.2.3 Land Valuation

Discussions were taken with the County Valuer who provided the following land values:

Table 42: Land valuation estimates

Location	Rates (KES/m^2)	Rates (KES/acre)	Rates (US$/ha)
Naivasha Urban	KES 2,000	8,093,720	200,000
Naivasha Rural	KES 2,000	8,093,720	200,000
Gilgil Rural	KES 320	1,294,995	32,000
Lake Elementita	KES 430	1,740,150	43,000
Lanet Urban	KES 2,500	10,117,150	250,000
Nakuru Urban	KES 2,800	11,331,208	280,000

Source: The Consortium

The land rates listed in the table are indicative prices based on current market conditions for a typical land plots, however, it should be noted that land prices for specific plots vary significantly.

7.2.4 Land Availability and Title Deed Endorsements

No available land has been identified for waste management practices within the County by the CGN; this includes any area adjacent to the current Kiamunyi site borders and any other County owned plot. Although Kiamunyi is County owned, all adjacent plots are understood to be privately owned and thus unsuitable for development.

As the waste generated throughout the county increases and void space in the current landfill decreases the need for further sites will become more urgent. Availability has to be prioritized for the development for suitable treatment and disposal sites prior to the termination of the current system.

7.2.5 Resettlement Needs

Resettlement needs for the project are provided under the Resettlement Action Plan, available as Appendix J. The conclusions and recommendations of the RAP are as follows:

7.2.5.1 Conclusions

The Resettlement and Action Plan will be implemented by compensating the individuals affected by the proposed solid waste management project, the compensation and assistance allowances will enable the Project Affected Persons (PAPs) to relocate and pave way for the project. However, if the land is finally acquired, there will be a need to resettle the PAPs in a mode of a co-operative so as to lock their ability to sell the pieces of land to third parties.

7.2.5.2 Recommendations

It is recommended that any planned displacement of the project affected persons be undertaken after compensation payments and or resettlement in the new site before any activities are undertaken at Kiamunyi dumpsite and in accordance with the prevailing law.

The PAPs must be given at least 1 month to relocate to a new site after notice to relocate is provided.

It is proposed that the relocation site be registered as a co-operative, where the members own space in terms of shares which cannot be sold to outsiders but are transferrable to family members. An ad-hoc committee from the PAPs is already in place and it will assist in the registration of the co-operative.

7.2.6 Relocation of Utilities

There are no utilities on the Kiamunyi site at present, these are expected to be developed with the engineered landfill and treatment facilities as they will be required for appropriate operation. Detailed site design will have to identify suitable connections to the electrical grid, sewage system, water system, etc.

7.3 Identified Environmental and Disaster Risk Concerns

A Preliminary Environmental and Social Impact Assessment was developed in parallel with the Feasibility Study that examined options for resolving ongoing issues at the Kiamunyi site. This is presented in full in Appendix I. This assessment was considered “Preliminary” as the scheme is a potential PPP scheme and much of the detailed design for the scheme will be undertaken by the contractor.

7.3.1 Preliminary Environmental and Social Assessment

The approach taken to the preliminary assessment was to understand the key risks through a largely qualitative assessment, to look at those risks against National and World Bank requirements and to determine how to manage those issues which may cause harm to people and the environment around the site.

While field visits and a household survey were undertaken, the assessment relies largely on observation and desk based research, rather than detailed primary data collection and analysis. Some quantitative techniques have been applied where possible.

Reference has been made to National Standards as well as international standards, primarily the International Finance Corporation's Performance Standards (2012) but also the World Bank's recent Environmental and Social Framework (noting that this is not yet in force).

Mitigation Measures are proposed and a Preliminary Environmental and Social Management Plan is provided to assign clear responsibility for the implementation of those actions.

7.3.2 Legal and Other Requirements

The following section summarises the legal requirements (Table 43) and key International Finance requirements (Table 44) for Environmental and Social Risks and references their relevance to the scheme. It also provides a reference to the key section of the PESIA (Appendix I) that addresses the potential impacts/risks associated with that requirement.

Table 43: Summary of Legal Requirements

Requirement	Relevance to Scheme	Impact Assessment
• The Employment Act, 2007 • The Occupational Safety and Health Act, 2007	The project has potential to: • create employment and training opportunities; and • expose workers to occupational health and safety risks	Please see section 8.3 of the PESIA Report
• The Environmental Management and Co-ordination Act, 1999 • The Environmental Management and Co-ordination (Water Quality) Regulations, 2006 • The Water Act, 2016 • The Ramsar Convention	The project has potential to: • pollute groundwater and surface water through run-off and infiltration; and • generally affect water sources	Please see sections 8.4.1 and 8.7.2 of the PESIA Report
The Agriculture and Food Authority Act, 2013	The project has potential to affect surrounding land through soil erosion	Please see section 8.4.2 of the PESIA Report
The Environmental Management and Co-ordination Act, 1999 • The Environmental Management and Co-ordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009	The project has potential to cause noise pollution	Please see section 8.4.3 of the PESIA Report

Requirement	Relevance to Scheme	Impact Assessment
• The Environmental Management and Co-ordination Act, 1999 • The Environmental Management and Co-ordination (Fossil Fuel Emission Control) Regulations, 2007	The project has potential to cause air pollution	Please see section 8.4.4 of the PESIA Report
• The Environmental Management and Co-ordination Act, 1999 • The Environmental Management and Co-ordination (Waste Management) Regulations, 2006	The project will result in the generation of construction wastes which are likely to be used within the scheme or disposed of at the landfill itself	Please see section 8.4.5 of PESIA Report
• The Constitution of Kenya, 2010 • The Public Health Act, Chapter 242, laws of Kenya	The project has potential to affect the health and safety of the community living around the site	Please see section 8.5 of the PESIA Report
• The Constitution of Kenya, 2010 • The Land Act, 2012	The project will entail resettlement of the families living within the Kiamunyi dumpsite	Please see section 8.6 of PESIA Report
The National Museums and Heritage Act, 2006	Whilst there is no known intangible cultural heritage value to the site, there is evidence of pre-historic archaeology in the area, indicating a potential for archaeological finds in the area	Please see section 8.8 of PESIA Report

Source: The Consortium

Table 44: Summary of International Finance Requirements

Requirement	Relevance to Scheme	Impact Assessment
• Assessment and Management of Environmental and Social Risks and Impacts	• The project is likely to be considered a Category B project in terms of WB environmental and social safeguarding an Environmental and Social Assessment must be prepared and disclosed.	This document represents a preliminary Environmental and Social Assessment of the design to date, suitable for disclosure.
• Labor and Working Conditions	The project has potential to: • create employment and training opportunities; and • expose workers to occupational health and safety risks	Please see section 8.3 of the PESIA Report
• Resource Efficiency and Pollution Prevention	The site is currently likely a source of pollution in particularly in terms of water quality but also air pollution from fires, litter, noise and dust from operation.	Please see section 8.4 of the PESIA Report
• Community Health Safety and Security	The project has potential to affect the health and safety of the community living around the site The site will also be secure	Please see section 8.5 of the PESIA Report

Requirement	Relevance to Scheme	Impact Assessment
• Land Acquisition and Involuntary Resettlement	The project will entail resettlement of the families living within the Kiamunyi dumpsite	Please see section 8.6 of PESIA Report
• Biodiversity Conservation and Sustainable Management of Living Natural Resources	While the site itself is not natural or critical habitat, there are potential secondary impacts on Lake Nakuru. The works are likely to improve these but consideration has been given to Biodiversity.	Please see section 8.7 of PESIA Report
• Indigenous Peoples	No indigenous peoples or people from marginalised or vulnerable groups have been identified and therefore performance standards associated with Indigenous Peoples are not considered relevant.	Please see section 8.6 of PESIA Report
• Cultural Heritage	Whilst there is no known intangible cultural heritage value to the site, there is evidence of pre-historic archaeology in the area, indicating a potential for archaeological finds in the area	Please see section 8.8 of PESIA Report

7.3.3 Key Issues

7.3.3.1 Resettlement

There is an existing community of people living on the site who will be displaced both physically and potentially economically. A Resettlement Action Plan (RAP) has been prepared to direct resettlement in such a way that it is undertaken in a way that is fair and provides appropriate compensation to those who are affected. As part of developing the RAP, a census and asset valuation survey has been undertaken, as well as a sample socio-economic baseline survey, identifying 138 Project Affected Persons (PAPs) (comprising 137 households) who own assets (including structures, crops and trees). These PAPs are generally considered squatters on the project site, however, CGN has indicated that land will be made available to which the PAPs could be resettled. One private nursery school is also located on the site.

Most of the PAPs derive their primary livelihoods from the waste facility. The RAP includes measures to resettle the PAPs through provision of compensation and resettlement assistance, including livelihood restoration support. Further consultation will be required on the RAP to finalise compensation, livelihood restoration, and resettlement site options.

7.3.3.2 Air Quality

While analysis shows that emissions from the landfill itself are unlikely to be significantly harmful, there are extensive fires burning on the site which are causing visible and substantial impacts in terms of air quality for site users and the surrounding area. Engineering the landfill and providing formal venting is likely to significantly improve the emissions from the site, although it is noted that deep set fires are likely to continue to burn and are not economically feasible to extinguish and therefore residual impacts will exist.

7.3.3.3 Drainage and Leachate Management

Current management of drainage at the site is likely to be resulting in leachate contaminating soils, groundwater and surface water which, in turn, could lead to pollution of waterbodies (e.g. eutrophication or acidification) and potentially water supplies. Under the proposed remedial

works, leachate will collect in the site and the containment should reduce infiltration to groundwater. The aim will be to minimise this by preventing surface water from entering the site and by progressively capping the site as each phase is complete. Any leachate that is generated will be checked for depth at specific monitoring locations to limit the risk of the leachate overtopping the edge bund. This leachate will then be extracted through pumps in the leachate sumps and recirculated within the waste.

7.3.3.4 General Environmental and Social Management

There are a number of additional environmental and social management issues that will need to be considered in the planning and execution of the project, if not well managed. These include issues such as noise, traffic, dust, hazardous materials management, waste management, influx, security, odour, litter and clandestine dumping of wastes, biodiversity (and invasive species management) and cultural heritage.

These topics are assessed in the main document and appropriate management plans proposed to ensure that they are addressed appropriately by the PPP contractor when appointed.

7.3.4 Preliminary Environmental and Social Management Plan

A Preliminary Environmental and Social Management Plan was developed setting out the likely key management actions for eliminating, minimizing or mitigating adverse impacts on the environment and the associated institutional responsibilities. Indicative timeframes and costs are provided. The main management table is presented below, although it is noted there is greater institutional context in Appendix I and this table should be read in conjunction with that.

Table 45: Preliminary Environmental and Social Management Plan

Issue	Management Measure	Responsibility	Timeframes	Costs
Labour	Project policy set for labour issues including: - Compliance with labour laws and GIIP (e.g. IFC PSS2 requirements) - Position on preferential recruitment from local groups/affected people (in line with the Resettlement Action Plan Commitments). - Commitment to Occupational Health and Safety and Welfare - Worker accommodation proposals - Training and skills development - Grievance management	Grantor	Pre-tender	Nominal
	Development of a Labour Plan identifying the concessionaires approach to delivering the policy above.	Concessionaire	Prior to mobilisation	$5,000
	Development of an OHS Management System which systematically identifies risks and provides appropriate management measures. Particular consideration must be given to: • Risks associated with fires in the existing waste • Risks associated with heavy machinery and traffic • Occupational health risks from handling waste • Exclusion of non-workers from working areas of the site The management system should follow requirements of OHS18001 or similar standard. This must be comprehensively reviewed and re-issued prior to commencement of operation	Concessionaire	Prior to mobilisation and throughout the construction period. Revisions and ongoing implementation prior to operational opening	$25,000 (development only)
Leachate Drainage	• Ensure that project is executed as per design to include: • Recirculation of effluent • Appropriate monitoring for leachate depth and quality • Appropriate surface drainage to minimise infiltration	Concessionaire	During design and ultimately implementation of the project.	$1,500,000 Capital costs for leachate infrastructure, monitoring, surface water drainage
General Housekeeping	In their ESMP the contractor must document their approach to general environmental management issues such as: - Good housekeeping - Risk of spills and accidental pollution (including application of spill kits and training) - Management of construction waste - Storage of hazardous materials (including fuels) - Regular management of litter around site permitted (at end of each shift)	Concessionaire	Through the life of the project but prior to commencement of construction works. To be reviewed prior to operation.	$15,000

Issue	Management Measure	Responsibility	Timeframes	Costs
Air Quality Management	Undertake a baseline monitoring activity (prior to taking ownership of the site) in particular to consider Furans and dioxins, to establish ambient air quality. Implement GIIP in terms of maintenance of plant and preferential use of less polluting vehicles.	Concessionaire	Prior to mobilisation to site.	$10,000
	Establish a baseline for off-site air quality at sensitive receptors	Grantor	Prior to mobilisation	
	Construct gas venting structures as per feasibility design and implement ongoing monitoring for the site during operation.	Concessionaire	During Construction and Operation	$770,000 Capital cost of gas vents and granular gas collection layer
Noise	Undertake a Baseline Noise survey at sensitive receptors (off site) to establish a baseline for daytime and night-time noise.	Grantor	Prior to mobilisation	$5,000
	• Implement appropriate good practice on site such as: • Sensitive site layout • Controlled working hours • Use of silencers/covers on machines and plant • Appropriate maintenance of equipment • Ongoing monitoring of both noise and grievance through a stakeholder engagement plan.	Concessionaire	Construction and operation	Included in environmental monitoring plan Part of daily works for supervisor
	Undertake noise modelling to ensure that the proposed building/building layout provides sufficient noise attenuation for nearby residents and design building accordingly (considering ventilation as well as plant).	Concessionaire	Prior to construction of building MRF and IVC.	$5,000
	Ensure all borrow pits/quarries are appropriately permitted and consistent with lender requirements prior to purchase or extraction of materials from any particular site.	Concessionaire	Prior to commencement of works at any particular site.	Ongoing management cost
Soil Erosion	Include appropriate construction best practice in method statements to minimise soil erosion. Including measures such as minimising steepness of slopes, revegetating or mulching to stabilise exposed areas.	Concessionaire	During design and Implementation.	$30,000
Waste management	Develop and implement a waste management plan as a part of the design specifying the volumes of wastes generated and their appropriate disposal locations (noting that the Kiamunyi site is not registered for hazardous wastes)	Concessionaire	Prior to mobilisation.	Ongoing management cost
Odour	Develop operational practices which minimise the active working face of the landfill site	Concessionaire	Prior to commencement of operation by Concessionaire.	Included in environmental monitoring plan Part of daily works for supervisor
	Install Granulated Active Carbon filters on ventilation points of the building.	Concessionaire	Prior to commencement of operation.	$45,000 Capital cost

Issue	Management Measure	Responsibility	Timeframes	Costs
Community Health Safety & Security	Develop a Traffic Management Plan to manage risk of conflict between vehicles and communities. This should include: - improvements to site access - definition of routes for heavy vehicles (noting the collection vehicles need to pass through residential areas to collect refuse) - Training and awareness sessions for project drivers - community outreach through the Stakeholder engagement plan	Concessionaire	Prior to commencement of construction to be revised on commencement of operation	$30,000
	Development of a policy towards scavenging at the site (presumed to be exclusion) including appropriate security for the site. This is anticipated to include: - 1.8m perimeter fencing - Security personnel - Support to current scavenging community through the Resettlement Action plan (details to be defined)	Concessionaire	Plan to be developed prior to commencement of work. Fence and security measures to be implemented after conclusion of RAP and compensation process.	$65,000 Capital costs for fencing
Resettlement	Development of a resettlement action plan in line with the requirements of IFC PS4 and WB requirements, prior to commencement of work. This must cover both physical displacement and economic displacement.	Grantor	Prior to commencement of works on site and prior to any resettlement taking place.	To be confirmed in RAP
Biodiversity	Develop an Invasive species plan with species specific strategies for minimising the risk of exacerbating existing alien species on site.	Concessionaire	Prior to commencement of site clearance.	$5,000
	Implement drainage improvements as described above for indirect benefit to lake Nakuru.	Concessionaire	Prior to commencement of works	Included under leachate/ drainage
Cultural Heritage	Develop and implement a chance finds procedure and conduct appropriate training for staff on recognising finds.	Concessionaire	Prior to commencement of works	$1,000
Environmental Monitoring Plan	Develop a plan to cover monitoring procedures to be undertaken by the site supervisor as part of the daily activities – includes noise, odour, litter, dust, stability, leachate, surface water, engineering, meteorology, gas management, security, phasing, insects, traffic, vermin, birds, fires, accidents	Concessionaire	Prior to commencement of works	$25,000
Restoration and closure plan	Develop a plan for the final pre-settlement profile, post settlement profile, planting strategy, aftercare management	Concessionaire	Prior to commencement of works	$15,000

7.3.5 Further Proposed Management Plans

It is also proposed that the Private Sector Partner further develops the following plans depended on the detailed design (further commentary on these plans are provided in Appendix I).

- Emergency Preparedness and Response Plan
- Occupational Health and Safety Management Plans
- Security Management Plan
- Stakeholder Engagement Plan
- Decommissioning Environmental Management Plan

The Preliminary ESMP chapter also recognises the need to develop and implement a Resettlement Action Plan which has been developed in parallel during this study and is presented in Appendix J.

7.3.6 Climate and Disaster Risk Vulnerability Assessment

An assessment of the project was undertaken using the World Bank's Climate and Disaster Risk Screening tool. According to the tool's website "The Climate and Disaster Risk Screening Tools developed by the World Bank, provide a systematic, consistent, and transparent way of considering short and long-term climate and disaster risks in project and national/sector planning processes. Screening is an initial, but essential, step to ensure these risks are assessed and managed to support mainstreaming of climate and disaster resilience into key development policies, programs, and projects."

The assessment is presented within the PESIA document in Appendix I but concludes that climate factors do not appear to present significant risks to the delivery of the aspirations and likely improvements could lead to greater resilience of the site and workers to climate impacts rather than exacerbate these impacts.

Geohazards considered included volcanic activity, earthquakes and landslip. The main concern identified was around landslip (potentially exacerbated by seismic activity) however the study concluded that a conservative design of a 1:6 slope has been applied based on the principle that a 1:6 slope in seismic conditions has a factor of safety 20 to 25% higher than a 1:3 slope in non-seismic conditions. This was considered adequate to address slope stability issues however it will require review at detailed design stage.

Other external factors such as population growth and urbanisation (which could broadly be categorised as demand) and financial resources could inhibit longer term effective management of the site.

8 Procurement Options and PPP Structure Analysis

Procurement options and PPP structure has been presented in detail under the Task 1 and Task 2 Legal Due Diligence Reports (Appendix G and L). Extracts are provided below to summarise the work undertaken and the conclusions reached.

8.1 Alternative Procurement and PPP Options

Various procurement and PPP options that have been considered and discussed throughout the Project, these have been as follows:

- Traditional Procurement Methods;
  - Turnkey (EPC) Contract and Services Contract;
  - Prime Contracting;
- PPP Structures;
  - Management Contract;
  - Output Performance Based Contract
  - Concession;
  - Build, Own, Operate, and Transfer Scheme (BOOT);
  - Build, Own, and Operate (BOO);
  - Build, Operate, and Transfer (BOT);
  - Build, Lease, and Transfer (BLT);
  - Build, Transfer, and Operate (BTO);
  - Rehabilitate, Operate, and Transfer (ROT); and
  - Rehabilitate, Own, and Operate (ROO).

8.1.1 Key Roles and Responsibilities of the Private Sector

The PPP Act lists 13 PPP options that a contracting authority may enter with the Private Sector. The matrix developed below has only included options that are considered viable for the Project. Prime Contracting and Turnkey (EPC) Contract (Services Contract) have been included as traditional procurement options.

Key

	Private Sector Responsibility
	Public Sector Responsibility
	Public/Private Sector Responsibility

Table 46: Key roles and responsibilities

		Traditional Procurement		PPP Models									
		Prime Contracting	**Turnkey EPC Contract/ Services Contract**	**Management Contract**	**Output Performance Based Contract**	**Concession**	**BOOT**	**BOO**	**BOT**	**BLT**	**BTO**	**ROT**	**ROO**
PROJECT STAGE	**Land Acquisition (if applicable) and resettlement**	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector
	Project Approvals[i][5]	Public/Private Sector	Public/Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector
	Design	Private Sector[6]	Private Sector[7]	N/A	N/A	The design and construction elements are not included in the PPP Act. If an existing site is rehabilitated/	Private Sector	Private Sector	The design element is not included in the PPP Act. If design is required as part of a project, it would be	The design element is not included in the PPP Act. If design is required as part of a project, it would be	Private Sector	Private Sector	Private Sector

[5] Note that the responsibility for project approvals for PPP models will sit with the private sector, except where by law only the owner of the site can obtain the relevant permits and consents.

[6] Responsibility for design would sit with private sector, except in situations where the design element is undertaken before the procurement of the Prime Contractor.

[7] Responsibility for design would sit with the private sector, except in situations where the design element is undertaken before the procurement of the relevant contractor.

	Traditional Procurement		PPP Models									
	Prime Contracting	**Turnkey EPC Contract/ Services Contract**	**Management Contract**	**Output Performance Based Contract**	**Concession**	**BOOT**	**BOO**	**BOT**	**BLT**	**BTO**	**ROT**	**ROO**
					updated, this will be the responsibility of the private sector			more appropriate that this be a private sector responsibility	more appropriate that this be a private sector responsibility			
Construction	Private Sector	Private Sector	N/A	N/A		Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector
Operation	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Public Sector	Private Sector	Private Sector	Private Sector
Maintenance	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector
Capital Expenditure	Public/Private Sector	Public Sector	Public Sector	Public Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector
Asset Ownership	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Private Sector- following project term, transferred to Public.	Private Sector	Private Sector- following project term, transferred to Public Sector.	Leased back to public sector for project term, then ownership transferred.	Private Sector- transferred to public sector on completion of construction.	Private Sector- transferred to the public sector following project term.	Private Sector
Project Term	Unspecified	Unspecified	Maximum 10 years	Maximum 10 years	Unspecified but typically for 25-30 years	Maximum 30 years (or such longer period as may be agreed). Typically for 10-30 years	Specified period of time.	Maximum 30 years	For a specified period	Unspecified	For a specified period	No time limit on ownership for private sector

Source: The Consortium

8.1.2 Key Risk Allocation

As with the matrix above, only PPP options which may are considered viable have been displayed. Prime Contracting and Turnkey (EPC) Contract (Services Contract) have been included as traditional procurement options.

The PPP Act defines a PPP as an arrangement between a contracting authority and a private party under which the private party, inter alia, is generally liable for risks arising from the performance of the function in accordance with the terms of the project agreement. In this connection:

- the PPP Policy provides that:
  - in allocating risk, GOK (and in this case, the CGN) will seek to optimize, rather than maximize, the transfer of project risks to the private party;
  - GOK (and in this case, the CGN) will seek to allocate risk to the party that is best able to manage controllable risks, or best able to insure uncontrollable but insurable risks or best able to bear the financial consequences of uncontrollable and uninsurable risks;
- the FCCL Framework provides that:
  - its aim is to ensure that GOK's (and in this instance, the CGN's) risk exposure arising out of PPPs is identified, justified, quantified, provisioned, mitigated and managed; and

one of the drivers of PPPs is risk transfer, under which costs to GOK (and in this instance, to the CGN) can be reduced through an optimal risk allocation which transfers specific risks to the private party.

Key

	Private Sector Risk
	Public Sector Risk
	Private/ Public Risk or Shared Risk

Table 47: Key risk allocation

		Traditional Procurement		PPP Models									
		Prime Contracting	**Turnkey EPC Contract/ Services Contract**	**Management Contract**	**Output Performance Based Contract**	**Concession**	**BOOT**	**BOO**	**BOT**	**BLT**	**BTO**	**ROT**	**ROO**
NATURE OF RISK	**Design Risk, including Change in Design and Construction Standards and Failure of Design**	Private Sector[8]	Private Sector[9]	N/A	N/A	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector
	Construction Completion Risk	Private Sector	Private Sector	N/A	N/A	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector
	Cost Overrun During Construction	Private Sector	Private Sector	N/A	N/A	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector
	Cost Overrun During Construction due to Variation in Project Output Requirements requested by the public sector[10]	Public Sector	Public Sector	N/A	N/A	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector
	Land Purchase Risk	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector

[8] Design risk would sit with private sector, except in situations where the design element is undertaken before the procurement of the Prime Contractor.

[9] Design risk would sit with the private sector, except in situations where the design element is undertaken before the procurement of the relevant contractor.

[10] The public sector would make the payments arising from this cost overrun during the operations phase – typically in the form of an increase in the unitary payments

	Traditional Procurement		PPP Models									
	Prime Contracting	**Turnkey EPC Contract/ Services Contract**	**Management Contract**	**Output Performance Based Contract**	**Concession**	**BOOT**	**BOO**	**BOT**	**BLT**	**BTO**	**ROT**	**ROO**
Site Access Rights	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector
Site/ Ground Conditions[11]	Public Sector	Public Sector	N/A	N/A	Shared[12]	Shared	Shared	Shared	Shared	Shared	Shared	Shared
Discovery of Hazardous Waste onsite	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector
Operational Risk	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Public Sector	Private Sector	Private Sector	Private Sector
Maintenance Risk	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Public/Private Sector[13]	Private Sector	Private Sector	Private Sector
Performance Risk	Shared	Shared	Shared	Shared	Shared	Shared	Shared	Shared	Public Sector	Shared	Shared	Shared
Availability Risk[14]	Shared	Shared	Shared	Shared	Shared	Shared	Shared	Shared	Public Sector	Shared	Shared	Shared
Tariff Risk	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector
Environmental and Social Risk	Shared	Shared	Shared	Shared	Shared	Shared	Shared	Shared	Public Sector	Shared	Shared	Shared
Permitting/ Licensing Risk[15]	Shared	Shared	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector

[11] In the waste sector, especially on brown field sites, the private sector will be reluctant to take on all the risk and may seek to take on only the risk associated with worsening problems inherent with the site.

[12] Will usually be taken on by the private sector but there are situations when they will be reluctant to do this e.g. in relation to inherent condition with the land. The private may seek to limit their risk to not worsening pre-existing ground conditions.

[13] This is dependent on who it is decided under the relevant contract who will take on maintenance responsibilities under this model.

[14] The public sector will seek to transfer availability risk to the private sector. However, there may be circumstances in which the private sector will be excused from failure to make the asset/facility available e.g. force majeure/ public sector breach of obligations i.e. circumstances beyond the control of the private sector.

[15] The permitting and licensing risk in relation to PPP models will sit with the private sector, except where by law only the owner of the site can obtain the relevant permits and consents.

	Traditional Procurement		PPP Models									
	Prime Contracting	**Turnkey EPC Contract/ Services Contract**	**Management Contract**	**Output Performance Based Contract**	**Concession**	**BOOT**	**BOO**	**BOT**	**BLT**	**BTO**	**ROT**	**ROO**
Change In Law	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector
Inflation and Foreign Exchange Risk[16]	Shared	Shared	Shared	Shared	Shared	Shared	Shared	Shared	Shared	Shared	Shared	Shared
Country Risk (to the extent not covered in Force Majeure or Change in Law)	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector
Financing Risk	Shared	Shared	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector
Force Majeure	Shared	Shared	Shared	Shared	Shared	Shared	Shared	Shared	Shared	Shared	Shared	Shared
Termination for Authority Default	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector	Public Sector
Termination for Contractor Default	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector	Private Sector

Source: The Consortium

[16] Note that prior to contract signature i.e. during the bidding process, this would be an entirely private sector risk

8.2 Evaluation Criteria Description and Justifications

The “Evaluation Criteria Description and Justifications” section has been extracted from a standalone report provided as a response as part of Task 2.1. The purpose of this report is to describe the criteria used to evaluate the alternative procurement and PPP options for the Nakuru integrated Solid Waste Management PPP Project. The evaluation criteria were guided by financial modelling.

8.2.1 Financial Modelling Approach

The PPP modelling follows the following key stages;

- Screening of PPP structures for modelling;
- Developing assumptions for the chosen options;
- Incorporating waste collection into the financial model; and
- Evaluation of the results.

8.2.1.1 Screening of PPP Structures for Modelling

The screening of the PPP options involved an analysis of the at the PPP structures under the PPP Act and screening against the following critical factors;

- Ability to transfer financing risk to the private party;
- Ability to allocate the operating responsibilities to the private party; and
- Ability of the project to generate sufficient project revenues to cover private party payments.

The table below shows how the evaluated PPP structures fair under the above considerations;

Table 48: PPP structure screening

PPP Structure	Financing	Operating	Project Revenues	Remarks	Model?
Management Contract	Public	Private	N/A	CGN does not have capacity to finance	No
Output Performance Based Contracts	Public	Private	N/A	CGN does not have capacity to finance	No
Concessions	Private	Private	Insufficient	Lack’s sufficient project revenues	No
BOOT	Private	Private	N/A	Ok	Yes
BOO	Private	Private	N/A	No requirement to Transfer	No
BOT	Public/Private	Private	N/A	CGN not able to finance designs	No
BLT	Private	Public	N/A	CGN not able to operate	No
BTO	Private	Private	N/A	Ok	Yes
ROT	Private	Private	Insufficient	Insufficient revenues to pay private party	No
ROO	Private	Private	Insufficient	Insufficient revenues to pay private party	No

Source: The Consortium

The above snap shot highlights the key considerations leading to a decision whether to subject the PPP structures to a financial model. Key highlights from the table are;

- Management Contracts and Output performance based contacts are excluded from modelling because they require the Public Sector to provide capex required to finance the design and construction;
- Concessions, ROT and ROO are excluded from modelling because the project will not have sufficient revenues to pay the private party. In addition, ROT and ROO involve rehabilitation whereas this project involves installation of new equipment (MRF and IVC);
- BOO and ROO are excluded from modelling because they do not allow for the transfer of the asset back to the CGN. The landfill will continue to be a public site and the CGN is expected to continue with aftercare operations at the end of the PPP contract; and
- A BLT model would require CGN to take on the operator role in its entirety. In the context of this Project, given the proposed integrated solution includes an IVC plant, specialist know-how would be required for its operation. Furthermore, this model would only cover the construction, maintenance and financing of the Project. Therefore, the CGN would need either to (i) run a separate procurement for the operation of the facility following the leasing of the facility back to the public sector, should the CGN not be willing or able to take on that role, or (ii) include a capacity building element into the Project. This is not aligned with the CGN's requirement for an integrated solution.
- BOT structure is similar to BOOT on many metrics, the key difference under the PPP Act is that BOT is limited to a maximum term of 30 years (which is not relevant in the context of this Project given the maximum lifespan of the Kiamunyi landfill) while a BOOT can have a longer term than 30 years. Both under the BOOT and BOT models, financing is obtained on a no or limited recourse basis, however a further distinction between the two models lies with the fact that financing under BOT is heavily reliant on the income stream generated by the project. As indicated above however, the project will not have sufficient revenues to pay the private party thereby discounting a BOT option.

Therefore, only the BOOT and the BTO structures were subjected to detailed PPP modelling as the only viable PPP options for this project.

8.2.1.2 Key assumptions for PPP Modelling

The modelling is carried out on the assumption that there is a possibility of having two discrete contracts:

- Contract for the treatment and disposal facilities at the Kiamunyi landfill; and
- Contract for Waste collection.

The model has the capability of evaluating the PPP options for waste treatment alone and waste treatment plus a waste collection contract. The model only looks at the preferred technology option i.e. the Engineered landfill with MRF and an IVC plant. This is guided by the Task 1 outputs that included an optioneering report and the PSC model that recommended the adoption of this technology. The CGN, the World Bank and the PPP unit approved the recommendations. The technology is then modelled under BOOT and BTO PPP options. The countywide waste collection contract is modelled under the following three scenarios:

- Scenario 1 – the private party takes over all the commercial waste collection in the County. This is basically taking over the collection services currently undertaken by the CGN Trade Department;
- Scenario 2 - in addition to 1 above, the private party takes over all the existing contracts for household waste collection currently executed by private collection companies; and
- Scenario 3 - the private party takes over all household waste collection in Nakuru County, including areas not currently served. A network of transfer stations will be introduced by

upgrading some of the current dumpsites. It has been assumed that the CGN will immediately commence the identification and procurement of new landfills as Kiamunyi is expected to have a much shorter life than the envisioned 2029.

The waste collection has been modelled at the same tenors as the technology options.

The simulations of the BOOT and BTO options with the different waste collection scenarios were evaluated for the following metrics:

- Indicative financing required
- Public sector payments
- Affordability, booth for the user and the government
- Value for Money

Section 9 describes the values of the metrics above for the preferred option.

9 Preferred Procurement Option and PPP Structure

This section has been extracted from the Task 2 Report available as Appendix L.

9.1 Preferred PPP Option

The Evaluation Criteria indicates that there is value created in using the BOOT and BTO PPP option to deliver the Project compared to traditional procurement method. This report therefore recommends a PPP procurement option.

With the BOOT option, the private party will design, construct, finance, operate and maintain the MRF facility and IVC plant and own it for the duration of the Project Agreement, after which the private party transfers the facility to CGN. The transfer will be at the end of the Project Agreement and will be at no cost to the CGN as the payment mechanism will ensure that the contractor is able to recover all the costs plus margin before the transfer.

The BOOT option with a collection contract that assumes all the existing waste collection contracts plus commercial collection has the least lifetime subsidy requirement and therefore would be financially attractive to the CGN. However, the model assumes that all householders pay for collection, so if this risk were to sit with the CGN, as suggested during the market sounding, there could be significant additional costs if householders did not pay collection fees. Preliminary sounding indicates that private operators are not willing to take on waste collection. They anticipate significant reputational risks in assuming exiting waste collection contracts arising from the main reasons below:

- Tipping by current private waste collectors is on uncontrolled dumpsites that poses significant health and environmental hazards. Reputable operators would not tip in the dumpsites until significant upgrades of the sites is conducted;
- The current private waste collectors are private companies that take on the revenue risk of the contract. The contracts would have to be such that the CGN assumes the risks of non-payment by the households; and
- It is likely that there will be social and/or political backlash if a foreign entity takes over collection from local private waste collectors. It was also understood that the CGN does not want to disrupt the current arrangement.

From the above, the preferred option then becomes the BOOT option without a waste collection contract.

9.2 Tariff Arrangements and Payment Mechanism

The project under the preferred option will have the following lines of incomes:

- Tipping fee - tariff is set on a per tonne basis. The model assumes a starting rate of KES 164 per ton of waste tipped and will be paid by waste collectors;
- Recyclables fees - the tariff is set on per kg basis will be levied on a per tonne basis to traders and recycling plants. The recyclable tariff depends on the nature of the recyclables as paper and aluminium will attract different prices. These are assumed to follow market prices and will be adjusted accordingly. In modelling the recyclable revenues, it has been assumed that only low value materials will make it to the landfill as it is expected that private

waste collectors (and their employees) will siphon the high value material before arrival at the landfill. A conservative tariff of KES 10 per tonne has therefore been used in the first year;

- Unitary Payments from CGN – this is a normal budgetary contribution from the MTEF. Ideally this should be ring-fenced and payable to project company on a periodic basis on pre-agreed milestones; and
- Technical assistance grants such and Output Based Aid of approximately KES 462m over the life of the project. This income will be earmarked against certain project milestones.

The table below illustrates the lifecycle sources and uses of funds under the preferred PPP option:

Table 49 Detailed lifecycle uses and sources of funds

Detailed Lifecycle Uses and Sources of Funds	
Uses Of Funds	**KES**
Opex	2,156,892,256
Capex excl VAT	1,519,600,085
VAT	249,310,085
Debt Service	2,210,822,286
Pymts to Equityholders	1,477,361,673
Total outflows	**7,613,986,385**
Sources of Funds	
Tipping fees	166,261,528
Recyclates revenues	1,844,011,441
Waste collection	0
Senior Debt	1,202,099,525
Junior Debt	195,401,059
Equity	371,409,585
	3,779,183,138
Funding gap	**-3,834,803,246**
Grants	**462,335,509**
Viability Gap Funding Required	**-3,372,467,737**

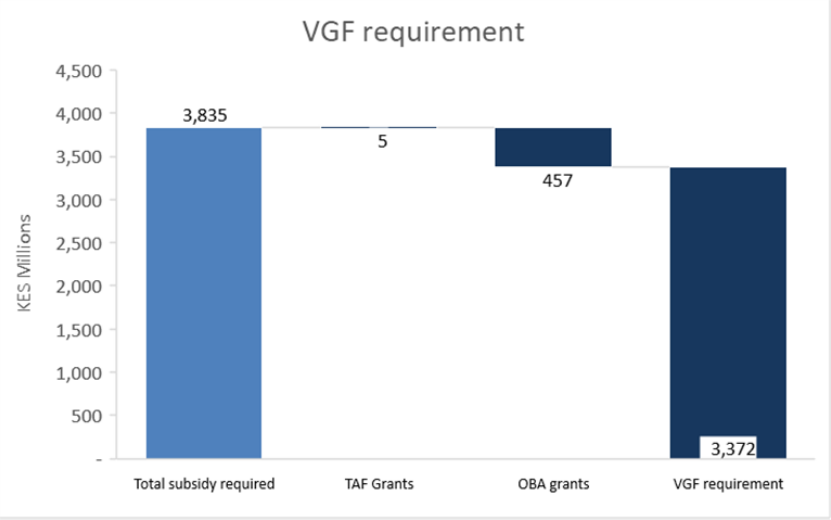
The above shows a funding gap of KES3.8 billion which can be partly offset by grants (discussed below in the affordability section). This leaves a Viability Gap Funding (VGF) of KES 3.4billion.

The VGF requirement is assessed and driven by the Project's lack of sufficient cashflows to cover operating costs. It therefore follows that the VGF payments will be required on a periodic basis for example monthly or quarterly to meet the needs of the project as well as allow for the government disbursement procedures. This will avoid the need for onerous extra disbursement procedures on the part of the public sector. In addition, the average annual VGF commitment of KES 281 million could easily be disbursed through the normal mechanisms.

To incentivize the private sector, The VGF, could be structured on a per ton basis. for example, the BOOT contract could allow for an output based incentive whereby the CGN will pay the

subsidies depending on the tonnage and quality of waste sent to recycling and compost produced.

Figure 3: VGF Requirement



9.3 Indicative Financing Structure and Source

The project under BOOT requires a financing package of KES 1.8 billion excluding the subsidies from the CGN and GOK. This financing will be structured as set out below.

Table 50: Indicative financing structure

Sources of Funds	Amount (KES)	Percentage
Senior debt	1,202,099,525	68.0%
Junior debt	195,401,059	11.0%
Equity	371,409,585	21.0%
Total Financing	**1,768,910,170**	**100%**

Source: The Consortium

Senior debt will ideally come from local commercial banks and will be in local currency Preliminary market sounding indicates that local commercial banks will be interested in the project if public sector income sources are well-defined and ring fenced. Additionally, they would want comfort that the operator has the capability to collect third party revenues i.e. tipping fees and recyclable income.

Since the project size is smaller relative to other infrastructure projects, it is not advisable to expose the project to FX risks by seeking foreign currency financing. Furthermore, in addition to adding another treasury management complication to the project, FX hedging strategies (swaps and forwards) will end up pushing the cost of debt to similar or beyond KES costs.

Guarantors have expressed willingness to guarantee banks providing the senior debt. The advantage is that this will attract more banks as the risk profile of the Project is greatly improved.

A Junior debt tranche has been introduced in the capital structure to make the Project sustainable and more attractive to private investors. The Junior tranche is structured as a seven-year subordinated loan with zero coupon. Market sounding indicated that there is

appetite for such an instrument as Development Finance Institutions are moving towards returnable grants that can be drawn on financial close (after equity). The Junior tranche can also be aggressively stretched to match the tenor of the contract.

Private operators sourcing the MRF and the IVC plants abroad can also get export credit financing from the exporting countries. However, this will introduce a foreign currency risk that will require to be hedged.

Equity financing will come from development, social and private investors with a history of backing waste management operators. There could be interest from local investors who would partner with an international operator. In a structure where the private party consortium does not include operators, it will enter into an operations and maintenance contract with qualified operators.

9.4 Affordability

Affordability has been assessed at two levels, at the CGN level and at the ultimate user level i.e. the households and the commercial users. The model considers the technology treatment option and the collection costs. Both BOOT and BTO options transfer the financing risk to the private party. However, the CGN will be required to make periodic payments at various levels:

- The first level payments are based on the MTEF estimates. The MTEF estimates that the CGN will contribute KES 37,243,800 in FY 2020/2021 towards waste management for Nakuru Town, which will be approx. 36% of its total operating budget for waste management. This translates to KES1,017 per tonne of total waste captured. We assume that this rate (KES1,017/tonne) of County contribution will continue and it is extrapolated to calculate the annual unitary payments to the Project.
- The second level of payments is the subsidy required to make the project solvent. This subsidy is calculated to ensure that project achieves minimum cash balances enough to cater for the projects operating costs. It is envisioned that this subsidy could be budgeted at the CGN level.
- Third level payments are the tariff subsidies required to make the project investable i.e. attract private parties by moving the project to realizing the required equity IRR, estimated at 25%. This type of subsidy will mostly come from Viability Gap Funding from the National Government.

The MTEF contributions are considered affordable as they are part of the current budgets.

To offset the viability gap funding required, the project can apply for grants that are available for such projects. We have identified two types of grants that could be used to offset the subsidy requirement:

a) Technical assistance grants - these could be tapped to offset studies or assessments that will be required in the initial stages of the project. Potential providers would include technical assistance facilities of various Donor funded vehicles for example DevCo under the Private Sector Infrastructure Group (PIDG). We have assumed USD 50,000 dawn in the first year of the project

b) Output Based Aid (OBA) - due to the impactful nature, this Project qualifies for OBA grants that are available based on certain pre-agreed milestones. The Global Partnership for Output Based Aid has provided such grants to Solid waste management projects that would be similar to this project. We have assumed that the project could access USD 4 million of OBA over a 4-year period drawn after achievement of pre-set output milestones e.g.

i. 20% on financial close

ii. 30% on installation of equipment

iii. 25% on achievement of certain tipping and treatment milestones

iv. 25% on successful capping of the first landfill portion

The table below is a summary of 3 projects that benefited from similar grants to boost affordability.

Table 51: Case studies of Grants for Solid Waste Management PPP Projects

Project	West Bank (Palestine)	Berhampur (India)	Tansen, Dhankuta, Lalitpur, Ghorahi and Pokhara municipalities (Nepal)
Description of project	The project aims to provide quality and financially sustainable SWM service coverage. At the beginning of the project, willingness to pay, willingness to bill and collection of billings were low. Target population: 840,000	The aim of this project was to improve waste collection, treatment, and disposal. The technological solution is a combination of sanitary landfill, waste sorting and composting. An estimated 350,000 people are expected to benefit from the project, including 100,000 low income residents.	The project aims to improve SWM service coverage and financial sustainability. Target population: 800,000
Grants/concessional finance	USD 75,000 Capacity Building Support from DevCo USD 8.3 mn output-based grant from GPOBA over four years	4-year grant and concessional loan from Odisha Urban Infrastructure Development Fund, financed by KfW. Concessional loan capped at 25% of initial project cost	USD 4.3 mn output-based grant from GPOBA over 4 years
Results monitoring and how the grant is drawn	Payment of the grant is linked to outputs measured in terms of quality of services and improved financial sustainability. Indicators include implementation of monitoring systems, cleanliness of areas, total waste managed, and improvement in fee collection and cost recovery	Payment of the grant is linked to outputs measured in terms of quality of services and improved financial sustainability. Indicators include implementation of monitoring systems, cleanliness of areas, total waste managed, and improvement in fee collection and cost recovery	Payment of the grant is linked to outputs measured in terms of quality of services and improved financial sustainability. Indicators include implementation of monitoring systems, cleanliness of areas, total waste managed, and improvement in fee collection and cost recovery
Waste generated per day	500 tons	500 tons	150 tons

Affordability at the ultimate consumer level is assessed in two ways:

a) The level of tipping fees that the project requires. It is assumed that waste collection companies will pass on an increase in tipping fees to the households in form of increased waste collection charges. From our survey with the collection companies, they are willing to pay an extra KES 50 per tonne on tipping fee from the current average of KES 114 per tonne. The waste collection companies were confident that they could pass on a portion of this increment to the households by increasing the monthly collection fees by KES 20 per household on average. The tipping fees and waste collection fees used in the model take into account these levels of increments and are therefore considered to be affordable.
b) The extra subsidy required from the CGN will ultimately be borne by the residents in the form of increased taxes or permit fees. This effect is beyond the scope of the assignment.

9.5 Public Sector Borrowing Impact Assessment and Contingent Liabilities

The PPP options evaluated will not require direct borrowing from the public sector. The borrowing entity will be the SPV. Total capex requirement is for KES 1.7 billion. However, the Project requires an additional KES 1.02 billion of MTEF funds plus KES 3.4 billion of VGF to be viable.

For the private sector to be comfortable, the public-sector financing will have ultimate recourse to the sub-sovereign (CGN) and subsequently the Sovereign (GOK). This recourse will impact the budgeting process of both the CGN and the GOK – with regards to the VGF. The PV of the VGF discounted at an estimated cost of capital for the CGN of 16% is KES 1,314,922,644.

As of March 2017, the total stock of public debt was 4.1 trillion.17 According the World Bank's Kenya Economic Update 2017, Kenya's debt accumulation has been "generally consistent with fiscal responsibility principles". However, as much as debt in Kenya is sustainable and within required margins, those margins have narrowed. For example, public debt increased from 44% of GDP in 2013 to 52.4% in 2015, and is expected to stabilise around 54-55% in 2017-2018 and gradually decline thereafter.18 The National Treasury estimates that the GDP for FY 2017/2018 will be KES 8.7 trillion. The VGF requirement of KES 3.4 billion over 12 years (KES 281m annually) would be considered affordable as it does not impact the sovereign debt levels. Compared to the March 2017 levels for the 2017/2018 financial year, the VGF will result in 0.08% increase from the current debt levels.

9.6 Fiscal Commitments and Contingent Liabilities

A FCCL analysis has been undertaken to identify the fiscal commitments i.e. direct liabilities and the contingent liabilities associated with the Project and assess if the same are affordable. At this stage, the cost assessment with respect to these liabilities are indicative in nature and the actual costs may vary. The actual costs of the direct liabilities associated with the Project will be known after the preferred private party has been selected. On the other hand, the contingent liabilities, given their nature, will be known in case the trigger events occur. The FCCL analysis also allocates different risks associated with the chosen procurement option for the project in the Project risk matrix.

[17] Central Bank of Kenya, https://www.centralbank.go.ke/public-debt/. Accessed July 5, 2017

[18] IMF and IDA, *Kenya: Debt Sustainability Analysis Country Report 2016.*

Fiscal commitments are the key direct liabilities associated with the Project and are described below.

Table 52: Fiscal commitments (KES)

Fiscal commitments	KES
VGF required	3,372,467,737
Resettlement costs	113,129,613
Independent expert[19]	120,000,000
Total	3,605,597,350

Source: The Consortium

Contingent liabilities are obligations that arise from uncertain events which are outside the control of any party. It is therefore difficult to estimate the amount and the probability of such liabilities accruing. While some contingent liabilities may be indeterminate, there could be certain contingent liabilities that could be estimated. These include (i) claims on the Kiamunyi land site; (ii) termination payments; (iii) force majeure events; and (iv) change in law.

The table below shows the events that could trigger contingent liabilities and the approach to estimate the quantum.

Table 53: Contingent liabilities

Contingent Liability	Trigger	Extent of Liabilities
Claims on the Kiamunyi land site	• Litigation arising from, inter alia, (i) people opposed to relocation; (ii) the resettlement package offered; (iii) the civil society, etc Ambiguity o land ownership	Damages difficult to establish (Land value estimated at KES 319 million[20])
Termination payments	• Premature cancellation of the PPP contract due to breach by the CGN e.g. the county not providing unitary payments on time or not providing certain minimum tonnages of waste as stipulated in the contract	Foregone income depending on the timing of cancellation
Change in Law	• Introduction of new environmental legislation that renders the treatment mechanism not viable or exposes to private party to unforeseen losses due to stringent compliance mechanisms • Law that would make the current technology illegal or the PPP contract void	Compensation for the financial loss directly arising from the change in law
Political event	• Occurrence of events arising from an action or inaction of GOK, the CGN or any authority which impairs the implementation or continuation of the project and/or which adversely and materially affects the private party	Compensation for the financial loss directly arising from the occurrence of the political event

Source: The Consortium

The amounts payable when contingent liabilities crystalize because of termination of the PPP contract will include:

a) Outstanding lender liabilities
b) Return on equity component – as per the financial model for an agreed period

[19] Assumed the independent expert will cost approximately KES 10 million/year. This is not based on a comparison of any local PPP contract as this does not exist yet but based on the consultants estimate of what they would charge for such an assignment

[20] Assumes the current is valued at KES11 million per acre as described in the PESIA. Total size of the site is 29 acres

c) Redundancy payments for employees of the private party that have been or will be incurred
d) Value of construction works done up to such termination which have not been paid for but as certified by the independent expert, together with any breakage costs
e) Termination and/or breakage costs payable

9.7 Value for Money Analysis

A public-sector comparator (PSC) model produced key financial metrics for procuring the preferred technology under the traditional public-sector procurement. The PSC model assumed that the project is financed through 100% debt by the CGN and the effective discount rate applied was 14%. VfM assessment is a test for the net benefit to the CGN for procuring the Project through a PPP model. The NPV of the PSC is adjusted for retained and adjusted risks to enable a like-for-like comparison with the NPV of the BOOT option.

The tabulation below shows the calculation of VfM using a VfM template shared by the PPP Unit. The VfM is calculated by adjusting the PSC NPV with retained risks during construction and operation of the project by CGN. Key construction risks are project delays due to procurement and other causes and cost overruns.

Cost overruns: The Public Procurement and Disposal Act 2015 sets a cost overrun ceiling of 25% of the initial cost of construction. The VfM calculation therefore inflates the Capex costs by the 25% and calculates the present value of the cost increase. A 50% probability of cost overrun is then assumed[21] to arrive at the cost overrun figure used to adjust the PSC NPV.

Time overrun: the VfM calculation assumes that the project is delayed by one year. This means that the project cashflows are delayed and an NPV is then recalculated using the delayed timeline. The model then subtracts the NPV of the delayed cashflows from the NPV of the original cashflows. Because the PSC NPV is negative, it follows that there are cost savings realized from delaying the project by one year which translates to KES 74.8 million by applying a 50% probability.

[21] No estimates were received from the CGN on the historical cost and time overruns for their capex projects

Figure 4: VfM analysis (KES)

Value for Money Summary	KES
Raw Public Sector Comparator NPV	(1,219,369,354)
Adjustments for retained risk:	
a) Retained Construction risks:	
Cost overrun	(185,263,938)
Project delay	74,873,557
	(110,390,381)
b) Retained operating risks	
Fire	(46,260,000)
Breach of Liner	(20,046,000)
General Instability	(3,855,000)
Breach of engineering	(2,570,000)
Poor maintenance	(5,374,861)
	(78,105,861)
c) Transferred risks during operations	
Fire	10,280,000
Breach of Liner	2,672,800
General Instability	514,000
Breach of engineering	2,570,000
	16,036,800
a) Adjusted PSC	(1,391,828,796)
b) PV of Public sector payments for a PPP	(1,314,922,644)
Value for Money (b-a)	**76,906,152**

Source: The Consortium

The operating risks are evaluated as per the project risk matrix (Appendix O). These risks include risk of fires, breach of the surface liner, general instability, breach of engineering and poor maintenance. Retained risks are calculated by multiplying the cost of remediation with the probability of occurrence without proper mitigation. Transferred risks is calculated by multiplying the probability of risk occurrence with best practice mitigation by the cost of remediation by the private party.

The raw PSC NPV is KES - 1.22 billion. After adjusting for retained and transferred risks as described above, the adjusted PSC NPV is KES - 1.39 billion. This adjusted NPV is then compared with the present value of the public-sector payments under the PPP option of KES - 1.31 billion. The outflows to the public sector under the PPP option are lower than the outflows when the project is undertaken by the CGN. This difference of KES 77 million is therefore the VfM of the project

9.8 Scenario Analysis

Variations in the different independent variables considered in the financial modelling affect the outputs in different levels. Two variables that affect the financial viability of the Project significantly are the revenues received from recyclable materials recovered from the MRF and the amount of grants that the Project attracts. Table 54 below shows the impact of variation in the above two variables on the estimated VGF.

Table 54: Scenario Analysis for Viability Gap Funding

Change in total grants received	Change in price of recyclable materials				
	-20%	-10%	0%	10%	20%
-20%	3,673,932,651	3,627,699,100	3,581,465,549	3,535,231,998	3,488,998,447
-10%	3,546,630,093	3,500,396,542	3,454,162,991	3,407,929,441	3,361,695,890
0%	3,464,934,839	3,418,701,288	3,372,467,737	3,326,234,186	3,280,000,636
10%	3,383,239,585	3,337,006,034	3,290,772,483	3,244,538,932	3,198,305,381
20%	3,301,544,331	3,255,310,780	3,209,077,229	3,162,843,678	3,116,610,127

Table 55 translates the absolute values in Table 54 to percentage changes over the estimated VGf required to make the Project viable. For instance, if the Project received 20% less grant funding and the recyclable materials were sold for 20% less than the estimated KES 10,000 per tonne, then the VGF would be 8.9% higher than estimated.

Table 55: Scenario Analysis for Viability Gap Funding as a Percentage of Project Revenues

Change in total grants received	Change in price of recyclable materials				
	-20%	-10%	0%	10%	20%
-20%	8.9%	7.6%	6.2%	4.8%	3.5%
-10%	5.2%	3.8%	2.4%	1.1%	-0.3%
0%	2.7%	1.4%	0.0%	-1.4%	-2.7%
10%	0.3%	-1.1%	-2.4%	-3.8%	-5.2%
20%	-2.1%	-3.5%	-4.8%	-6.2%	-7.6%

9.9 Preliminary Market Sounding Private Sector Feedback

Detail on market sounding, including the preliminary market feedback, is provided under the Market Sounding Report available as Appendix N. The conclusions of the Market Sounding Report are as follows:

There was some interest in the project but not by the largest players in the waste management industry. There are, however, companies with experience in waste management in Africa who would be interested in the treatment and landfill aspect of the contract. Most thought that a long-term PPP contract was unrealistic due to the value and the uncertainty of the collection, however an adapted PPP in the form of BOOT held some interest and the timescale for a contract start in 2019 was considered reasonable.

The concerns of the contractors did focus around funding and payment and none of the contractors would be prepared to rely on the funding being provided by the waste collection contractors and the payment arrangements would need to be directly between them and the County Government.

From an investor perspective, there was interest from Local commercial banks to provide the required debt for the project. There was preference to provide local currency funding as the project cashflows are expected to be in local currency. There was interest from guarantee providers to provide credit enhancements to the project making it attractive to debt investors. Some donor funded institutions expressed an interest to provide a returnable grant to the project that would make the project more viable by reducing the level of debt service required. Detailed feedback is presented in the Market Sounding Report.

10 Project Risk Matrix

The project risk matrix has been developed to categorize, describe, and mitigate risks to the Project. These include elements from a variety of sources such as technical, financial, legal, and political. The risk matrix is preliminary and it is recommended that is it treated as a live document and updated on a regular basis throughout the procurement and duration of the project. An editable format has been included in Appendix O.

The risks shown in the risk matrix in Table 59 have been quantified using a likelihood, consequence severity, and risk classification system. The description of these figures and their meaning is provided in the tables below:

Table 56: Likelihood Rating

Rating	Descriptor	Description
5	Almost Certain	Expected to occur in many circumstances
4	Likely	Will probably occur
3	Possible	Might occur
2	Unlikely	Might occur, but not expected
1	Rare	May occur in exceptional circumstances

Source: The Consortium

Table 57: Consequence Rating

Rating	Descriptor	Cost	Time	Quality
5	Catastrophic	Project unaffordable	Project no more deliverable/termination clause triggered	Dysfunctional/not fully constructed facilities
4	Major	Major project cost increase	Major delay significantly affecting Project timetable	Significant disruption to operations
3	Moderate	Moderate project cost increase	Moderate delay with some impact on Project timetable	Some disruption to operations
2	Minor	Minor Project cost increase	Minor delay with limited impact on Project timetable	Minor defects to be rectified with little impact on operations
1	Insignificant	Insignificant Project cost increase	Delay has no impact on overall Project timetable	Minor defects easily rectified with no impact on operations

Source: The Consortium

Table 58: Risk Classification

	Consequence				
Likelihood	Insignificant	Minor	Moderate	Major	Catastrophic
Rare	1	2	3	4	5
Unlikely	2	2	6	8	10
Possible	3	6	9	12	15
Likely	4	8	12	16	20
Almost Certain	5	10	15	20	25

Source: The Consortium

Table 59: Project Risk Matrix

No.	Category	Sub-category	Risk Title	Description	Initial Risk Level (before mitigation)			Risk Management Strategy (Accept, Mitigate, or transfer)	Risk Management Action				Target Risk Level before start of procurement			Overall Risk Status	Risk Allocation once PPP contract signed		
					Likelihood	Consequence	Risk level		Owner	Description	By When	Status	Likelihood	Consequence	Risk level		Private Sector	Public Sector	Shared
1	Technical	Waste Quantity	Overall quantity of waste increases or reduces significantly above or below expected values.	This is a key risk that would affect the long-term viability of waste management infrastructure. If much greater quantities of waste are generated and captured than anticipated, then treatment capacity would not be enough and waste might need to be taken directly to landfill. Also, the landfill could be filled prior to a new site being ready to accept waste. If much lower quantities are generated, feedstock would need to be sourced from alternative sources or infrastructure would be underutilised.	5	4	**20**	Mitigate:	CGN	Improving the baseline data by implementing traffic counts for all vehicles delivering wastes to site including size of vehicle and an estimate of the volume (percentage full).	Immediate	Open	4	3	**12**	Open:			Y
									CGN	Introduce a transfer note type system that records the name of the collection fleet operating company, the registration number of the vehicle, the size of the vehicle, provides an estimate of waste quantity and describes the material being deposited. Undertake material checks to confirm that the material complies with the transfer note.	Immediate	Open							
									CGN	Ensure weighbridge is a requirement of new contract.	As part of contract development	Open							
2	Technical	Waste Quantity	Quantity of material increases beyond expected values as a result of improving the waste collection capture rate.	As the capture rate increases, the waste quantity requiring treatment and disposal increases, reducing the lifespan of the landfill and meaning treatment capacity may be insufficient.	3	4	**12**	Mitigate:	CGN	Undertake step by step improvements to the waste collection service until a new landfill can be developed that could accept additional waste quantities.	End of current collection contracts	Open	2	4	**8**	Open:			Y
									CGN and Sub-County Governments	Ensure that other towns in the County of Nakuru plan to manage their own wastes, until a new landfill can be commissioned that can accommodate the material.	Immediate (until new landfill at a new location is commissioned)	Open							
3	Technical	Waste Composition	The quantity of individual material types varies above or below expected values.	If waste composition is not in line with sample data then the contracts may not yield sufficient returns from the sale of recyclables etc. to support funding. If organic materials are less than expected then the design of the treatment facility may not be fully efficient.	4	3	**12**	Mitigate:	CGN	Undertake quarterly compositional surveys to provide greater baseline of data and examine the impact of seasons.	Every 3 months	Open	3	3	**9**	Open:			Y
									CGN	Require the private sector partner to undertake material checks at the entrance and build on a transfer note type system to adequately record data electronically to assess the number of deliveries and total tonnage of different waste streams. This will allow the private sector partner to direct specific loads away from the typical point of deposition for household wastes and record such quantities managed in this way.	As part of contract development	Open							
No.	**Category**	**Sub-category**	**Risk Title**	**Description**	**Initial Risk Level (before mitigation)**			**Risk Management Strategy (Accept, Mitigate, or transfer)**	**Risk Management Action**				**Target Risk Level before start of procurement**			**Overall Risk Status**	**Risk Allocation once PPP contract signed**		

No.	Category	Sub-category	Risk Title	Description	Initial Risk Level (before mitigation)			Risk Management Strategy (Accept, Mitigate, or transfer)	Risk Management Action				Target Risk Level before start of procurement			Overall Risk Status	Risk Allocation once PPP contract signed		
					Likelihood	Consequence	Risk level		Owner	Description	By When	Status	Likelihood	Consequence	Risk level		Private Sector	Public Sector	Shared
					Likelihood	Consequence	Risk level		Owner	Description	By When	Status	Likelihood	Consequence	Risk level		Private Sector	Public Sector	Shared
4	Technical	Waste Quantity and Composition	Changes to targeting materials to be collected for recycling.	Communication and education campaigns change people's behaviour so that additional volumes or materials are put out for recycling. This could lead to an increase in recycling tonnages or change in materials being recycled, impacting technology performance.	2	3	**6**	Mitigate:	CGN	Provide the private sector partner with the right to input into education programmes so that materials targeted for recycling are beneficial for all parties.	Prior to developing contracts and then ongoing	Open	1	3	**3**	Open:			Y
									CGN	Recommend requirements in the new contracts.	Immediate	Open							
5	Financial	Offtake	Poor or absent markets for recycling materials.	If markets for recyclables are poor or unavailable, this will result in a financial burden to the private sector partner and, potentially the CGN if this risk is shared.	3	3	**9**	Mitigate:	CGN	Ensure that the private sector partner has the option of distributing and selling recyclables on a worldwide market.	Prior to developing contracts and then ongoing	Open	2	3	**6**	Open:	Y		
6	Financial	Waste Quantity and Composition	Significant increase or decrease in market value for recyclables during contract term drives significant change in informal sector activity.	An increase / decrease in market value of recyclables will affect the activity of the informal sector, resulting in greater/lower quantities of recyclables being extracted from both the waste streams, altering: a) the amount of recyclables available to the Contractor; and b) possibly the amount and composition of any recyclables in the residual waste stream to be recovered via the waste treatment contract.	3	4	**12**	Mitigate:	CGN	Ensure targets set for the contractor are based on the level of recyclable materials in the waste, rather than a fixed mass of recycling each year.	Prior to developing contracts and then ongoing	Open	3	3	**9**	Open:	Y		
7	Technical	Environmental and Social	Failure to acquire necessary authorisations, consents, licenses and permits.	Waste infrastructure developed for the project will require appropriate authorisations, consents, licenses and permits. Failure to obtain consents would imply a delay in project construction.	2	5	**10**	Mitigate:	CGN	Undertake/procure background work providing an outline on permits in preparation for the design. Commence process of obtaining permits as soon as possible.	Prior to developing contracts and then ongoing	Open	2	4	**8**	Open:	Y		
8	Technical	Environmental and Social	Geotechnical and/or geoenvironmental issues present at the landfill and the MRF and IVC .	The geotechnical and environmental characteristics of sites identified by the CGN (if any) have the potential to prevent, delay or add cost to development of waste treatment infrastructure.	2	4	**8**	Mitigate:	CGN and Contractor	Identify the geotechnical investigations required, building on the geophysical testing already undertaken, to limit the risk.	Immediate	Open	2	4	**8**	Open:	Y		Y (some risk may be taken by public sector)
									CGN and Contractor	Decide if CGN will procure and warrant a geotechnical investigation or if this will be a requirement for the contractor.	Prior to developing contracts	Open							

No.	Category	Sub-category	Risk Title	Description	Initial Risk Level (before mitigation)			Risk Management Strategy (Accept, Mitigate, or transfer)	Risk Management Action				Target Risk Level before start of procurement			Overall Risk Status	Risk Allocation once PPP contract signed		
					Likelihood	Consequence	Risk level		Owner	Description	By When	Status	Likelihood	Consequence	Risk level		Private Sector	Public Sector	Shared
9	Technical	Mobilisation, Construction and Operation	Plant and equipment fails to meet performance requirements.	If plant and equipment is not robustly designed and maintained it can fail to meet performance requirements.	2	4	8	Mitigate:	Contractor	Ensure that the contract specifies design responsibility and includes for regular maintenance of equipment over the project life and requires key spare parts to be retained on site.	Prior to developing contracts	Open	1	3	3	Open:	Y		

No.	Category	Sub-category	Risk Title	Description	Initial Risk Level (before mitigation)			Risk Management Strategy (Accept, Mitigate, or transfer)	Risk Management Action				Target Risk Level before start of procurement			Overall Risk Status	Risk Allocation once PPP contract signed		
					Likelihood	Consequence	Risk level		Owner	Description	By When	Status	Likelihood	Consequence	Risk level		Private Sector	Public Sector	Shared
10	Technical	Mobilisation, Construction, and Operation	IVC or sorting line construction programme delays.	Delays in construction will delay the operational phase of the project. This may become a critical issue if delay is significant, incurring additional disposal costs/reduced revenues.	3	3	**9**	Mitigate:	Contractor	Include realistic programme for project delivery in the contract documents.	During contract procurement	Open	2	3	**6**	Open:	Y (if partly shared depends on Liquidated Damages for delays view)		
									Contractor	Include liquidated damages, request performance security and insert longstop date in the contract documents.	During contract procurement	Open							
11	Financial	Stakeholders	Optimum VfM not achieved due to low market interest.	Inadequate number of bidders results in low competition and failure to achieve optimum value for money for the CGN.	2	4	**8**	Mitigate:	Consortium	Undertake market sounding exercise to determine interest and feedback any concerns to World Bank, PPP Unit and CGN.	Undertaken during feasibility study	Closed	1	4	**4**	Open:		Y	
12	Financial	Construction Cost	Cost overrun during construction.	There may be cost overruns caused by the contractor's failure to properly cost the project or caused by risks which are not the responsibility of the CGN.	2	4	**8**	Mitigate:	Contractor	Construction contract to be fixed price and with a limitation on the circumstances in which variations to that price may be permitted.	During contract procurement	Open	2	2	**4**	Open:	Y		
13	Financial	Construction Cost	Cost overrun during construction due to variation in project output requirements.	Risk of any changes in project output requirements, scope and minimum performance specifications and standards after commencement of construction as requested by the CGN.	2	4	**8**	Mitigate:	CGN	CGN to have certainty of the design/output before contract signing.	During contract procurement	Open	1	3	**3**	Open:		Y	
14	Financial	Offtake	Tarif risk.	Risks pertaining to changes in tariff structure impacting the revenues and returns of the project.	3	4	**12**	Mitigate:	CGN	The contractor to receive fixed availability payments irrespective of the tariff rates.	During contract procurement	Open	2	4	**8**	Open:		Y	
15	Financial	Currency Fluctuations	Inflation and foreign exchange risk.	Since significant capital cost and debt would be in foreign currency, fluctuations in exchange rates would pose a risk for investors in terms of reducing returns and debt repayment obligations.	3	3	**9**	Mitigate:	CGN and Contractor	Contractor to bear the risk except beyond a level where an indexation may be considered by reference to indices. User charges to be inflation indexed – to be passed on to users. Availability payment to be fixed. Necessary forex hedge to be procured by respective parties.	During contract procurement and prior to financial close, as the case may be	Open	2	3	**6**	Open:			Y
16	Financial	Funding	Financing risk.	Ability to secure debt financing and to financially close the project which will determine its success.	2	4	**8**	Mitigate:	Contractor	Proper structuring of the project. Treasury back-stopping to be considered to increase bankability.	During contract procurement	Open	1	3	**3**	Open:	Y		
17	Technical	Stakeholders	Proposed development met by strong public opposition.	Development of the existing landfill and other waste facilities may meet strong public opposition which can result in blocking or disruption of the project.	3	4	**12**	Mitigate:	Consortium	Undertake stakeholder review to examine and collate concerns raised by the local communities and larger stakeholders.	Undertaken during feasibility study	Closed	2	4	**8**	Open:		Y	
									Procurement Team	Continue consultation and regular communications and education throughout the procurement and planning process.	During procurement and planning process	Open				Open:			Y (depends when project is blocked)

No.	Category	Sub-category	Risk Title	Description	Initial Risk Level (before mitigation)			Risk Management Strategy (Accept, Mitigate, or transfer)	Risk Management Action				Target Risk Level before start of procurement			Overall Risk Status	Risk Allocation once PPP contract signed		
					Likelihood	Consequence	Risk level		Owner	Description	By When	Status	Likelihood	Consequence	Risk level		Private Sector	Public Sector	Shared
18	Technical	Stakeholders	Conflict between contactor and informal sector.	Experience in other regions where informal sector activity forms a key part of the waste management system suggests that positive relations between the sectors needs to be fostered carefully. If this does not occur, there are risks of conflict which may affect the availability and composition of waste for the contract.	2	4	**8**	Mitigate:	Consortium	Development of a resettlement action plan and undertaking stakeholder surveys.	Undertaken during feasibility study	Closed	2	3	**6**	Open:			Y (requires further assessment pending consultation outcome)
									CGN	Specify employment of local waste pickers in the contract to service the sorting line. Specify relevant security measures in the contract requirements to prevent access to the landfill for the informal sector.	Prior to developing contracts	Open							
									CGN	Consider alternative employment options for the remaining community that cannot be employed within the project.	Prior to developing contracts and then ongoing	Open							
19	Political	Stakeholders	Key stakeholders do not support the project.	It will be necessary to gain executive approval for the project for it to proceed.	2	5	**10**	Mitigate:	CGN	Continue to consult and engage with stakeholders to build on existing work undertaken by the Consortium to survey and understand the views of key stakeholders.	Ongoing	Open	1	5	**5**	Open:		Y	
20	Technical	Performance Levels	None of the proposals submitted meet the performance requirements specified in the bid documentation.	Contractors may be unwilling to guarantee robust performance requirements due to lack of previous waste PPP experience in Kenya, or the level of uncertainty surrounding aspects such as the ability to manage the landfill.	2	4	**8**	Mitigate:	CGN	Allow for thorough technical assessment of responses to the contract.	During contract procurement	Open	1	4	**4**	Open:	Y		
21	Technical	Maintenance	Failure to maintain project to the required operating level.	The risk that the contractor will not maintain the landfill during the project term.	3	4	**12**	Mitigate	Contractor	Having appropriate criteria to use in selection of experienced operators, specify equity lock-in period for key sponsors who participated in the bidding process during the implementation of the project, specify output specifications with which the CGN would monitor the performance of the project and imposition of penalties in case of failure.	During contract procurement	Open	2	3	**6**	Open:	Y		
23	Technical	Environmental	Existing status of landfill deters private sector partners.	Contractors may be unwilling to take the risk of environmental pollution, inherent stability and adequacy of engineering over a non-compacted dump site.	4	5	**20**	Mitigate:	Consortium	Undertake market sounding to establish concerns of potential private sector partners.	Undertaken during feasibility study	Closed	3	5	**15**	Open:			Y
									CGN	Include within the contract that the public sector takes responsibility for historic pollution and undertakes monitoring to establish baseline parameters. CGN to determine level of risk that they are willing to accept.	During contract procurement	Open							

No.	Category	Sub-category	Risk Title	Description	Initial Risk Level (before mitigation)			Risk Management Strategy (Accept, Mitigate, or transfer)	Risk Management Action				Target Risk Level before start of procurement			Overall Risk Status	Risk Allocation once PPP contract signed		
					Likelihood	Consequence	Risk level		Owner	Description	By When	Status	Likelihood	Consequence	Risk level		Private Sector	Public Sector	Shared
									CGN	Transfer the risk of making any environmental issues worse to the private sector.	During contract procurement	Open							
24	Legal	Land	Land purchase risk.	Risk that the CGN will not be able to procure alternative project land (if applicable) and land for purposes of resettlement in time.	3	4	12	Mitigate:	CGN	We understand that the project will be implemented on the existing landfill and therefore this risk would not be applicable in respect of the project site.	N/A	N/A	3	3	9	Open:		Y	
										CGN to commence the process of acquiring land for resettlement as soon as possible.	Immediately. The land to be available prior to procurement	open							
25	Legal	Site	Site access risk.	The risk that the contractor will not have sufficient rights of access to and within the project site to enable the efficient construction and operation.	1	2	2	Mitigate:	CGN	CGN to ensure that the contractor has site access rights at all times.	Prior to construction	Open	1	1	1	Open:		Y	
26	Legal	Site	Discovery of hazardous waste on-site.	The risk that there may be a discovery of hazardous waste onsite which could lead to delays and increase in costs or even lead to the project becoming unviable.	3	4	12	Mitigate:	CGN	CGN will indemnify the contractor for any direct losses for any hazardous waste onsite prior to the commencement date (except if covered by insurance).	Prior to construction	Open	3	4	12	Open:		Y	
27	Legal	Law Change	Change in law.	There may be a change in law post procurement leading to invalidity or illegality or increase in expenses.	2	4	8	Mitigate:	CGN	The CGN to be responsible for any additional costs arising due to a change in law after the execution date, provided such change was not reasonably foreseeable on such date. If the financial impact of the change in law is more than a pre-agreed threshold, CGN to compensate the contractor or extend the project agreement for such a period as would make the contractor whole.	During contract procurement	Open	2	4	8	Open:		Y (except when foreseeable or above threshold)	
28	Legal	Political Instability	Country risk.	Project adversely affected by political and economic instability of Kenya.	2	4	8	Mitigate:	CGN	The CGN will be required to compensate the contractor through a deemed availability payment, as well as giving it termination rights.	During & after contract procurement	Open	2	4	8	Open:		Y	
29	Legal	Force Majeure			2	4	8	Mitigate:				Open	2	4	8	Open:			Y

No.	Category	Sub-category	Risk Title	Description	Initial Risk Level (before mitigation)			Risk Management Strategy (Accept, Mitigate, or transfer)	Risk Management Action				Target Risk Level before start of procurement			Overall Risk Status	Risk Allocation once PPP contract signed		
					Likelihood	Consequence	Risk level		Owner	Description	By When	Status	Likelihood	Consequence	Risk level		Private Sector	Public Sector	Shared
			Force majeure risk.	Force majeure events can lead to significant project delays, increase in costs and in some cases termination.					CGN and Contractor	The affected Party shall be relieved from performing the affected obligations. If, during the O&M period, the contractor is prevented from making the project available because of a force majeure event, then the unitary charge payment shall be abated. If the contractor is still servicing the debt with the unitary charge payments, then it may make an application to the CGN to continue to receive such unitary charge payment as is required to service the principal plus interest payment on the project debt. Insurances may also be required.	During contract procurement							
30	Legal	Termination	Termination for CGN default.	The project agreement may be terminated due to a default by CGN.	2	4	**8**	Mitigate:	CGN	CGN to put in measures to ensure that it performs its obligations, makes required payments on time and does not perform any material breaches.	After contract procurement	Open	1	3	**3**	Open:		Y	
31	Legal	Termination	Termination for contractor default.	The project agreement may be terminated due to a default by the contractor.	2	4	**8**	Mitigate:	Contractor	Contractor to put in measures to ensure it performs it obligations in accordance with the contract, including not performing persistent breaches, achieving the service commencement by the longstop date, etc.	After contract procurement	Open	1	3	**3**	Open:	Y		

Source: The Consortium

11 PPP Project Agreements Terms Sheets

The PPP Act:

- Requires that a contracting authority shall enter into a Project Agreement with the successful bidder; and
- Allows a contracting authority to appoint an independent expert to manage, in consultation with it, the implementation of the Project Agreement.

Arising from the above, the Consortium is required to prepare an outline of the terms of reference for the independent expert and the key heads of terms for the proposed PPP structure. These are provided below and in Appendix L.

DATED 201♦

HEADS OF TERMS FOR

INDEPENDENT EXPERT

relating to an integrated solid waste management system in Nakuru County

(the "**Agreement**")

(1) COUNTY GOVERNMENT OF NAKURU

-and-

(2) [CONTRACTOR]

-and-

(3) [INDEPENDENT EXPERT]

[Drafting Notes:

a) ***The Heads of Terms herein are based on the assumption that the independent expert will be appointed by both the CGN and the contracting entity.***

b) ***Given that (i) the agreement for the appointment of the independent expert is deemed to form part of the PPP project agreement; and (ii) the independent expert will be responsible for overseeing the implementation of the project agreement, there will be need to ensure that both the project agreement and the agreement for the appointment of the independent expert are aligned***]

THIS AGREEMENT is made on the day of 201♦

BETWEEN:

(1) **COUNTY GOVERNMENT OF NAKURU** ("**CGN**");

(2) [ ] (the "**Contractor**"); and

(3) [ ] (the "**Independent Expert**").

together the **"Parties.**"

BACKGROUND

1. DEFINITIONS AND INTERPRETATION

2. TERMS OF APPOINTMENT

Agreement by Independent Expert to perform its obligations

Duties of the Independent Expert and scope of services

Independent Expert's joint duty of care to CGN and Contractor

Form of Instructions from CGN / Contractor to the Independent Expert

Independent Expert's acknowledgement of the project's main agreements and contracts

3. OBLIGATIONS OF THE CGN AND THE CONTRACTOR

Obligations of the CGN and the Contractor

4. DURATION

Duration of Agreement

5. PAYMENT

Agreement by CGN / Contractor to pay the Independent Expert's fees

Amount of the Independent Expert's fee

Invoicing / payment procedure

Circumstances in which payment may be withheld

6. TERMINATION

Circumstances under which CGN / Contractor may terminate immediately

Circumstances under which CGN / Contractor may terminate with notice

Damages payable to CGN / Contractor by the Independent Expert for termination due to breach of contract

Independent Expert's right to terminate if CGN / Contractor fail to pay fees

Minimum notice for termination by Independent Expert

7. LIMITATIONS ON AUTHORITY OF INDEPENDENT EXPERT

Limitations on the authority of the Independent Expert, to include (for example):

- issuing instructions at the site without CGN / Contractor's consent;
- agreeing or waiving obligations of CGN / Contractor's contractors;
- approving designs without CGN / Contractor's consent; or
- expressing opinions outside the scope of services.

8. [INDEPENDENT EXPERT'S PERSONNEL]

Appointment of Independent Expert's Director to direct and control overall performance

9. [ADDITIONAL SERVICES]

Agreement to perform any additional services as instructed from time to time by CGN / Contractor

10. PROFESSIONAL INDEMNITY INSURANCE

Requirement that the Independent Expert has professional indemnity insurance

11. CONFIDENTIALITY

Requirement that the Independent Expert does not disclose confidential information

Duty of the Independent Expert to comply with relevant data protection laws

12. COPYRIGHT

Independent Expert's right of copyright over its documents

CGN and Contractor's right to royalty-free transferrable licence to copy and use the Independent Expert's documents

13. QUALITY ASSURANCE

Frequency of the Independent Expert visits to the site

Independent Expert's duty to notify CGN / Contractor of site visits

Right of CGN / Contractor to accompany the Independent Expert on site visits

Implementation of a quality system by the Independent Expert

14. LIMITATION OF LIABILITY

Maximum liability of Independent Expert to CGN/Contractor

15. ASSIGNMENT

Restriction on transfer of rights or obligations by the Independent Expert

CGN's right to transfer its rights or obligations without consent

16. [STEP-IN PROVISIONS]

The Parties' right to step-in in the event of default by another Party and the circumstances under which this can occur

17. VARIATION

Alterations only binding if signed in writing by all Parties

18. CUMULATIVE RIGHTS AND ENFORCEMENT

Rights within Agreement are cumulative and in addition to rights and remedies available to the Parties

19. WAIVER

Failure to enforce a provision does not constitute a waiver

Waivers not to be held as a waiver of subsequent breaches of contract

20. ENTIRE AGREEMENT

Agreement will constitute entire agreement between Parties

21. NOTICES

Procedure for notification between the Parties

Addresses of the Parties

22. SEVERABILITY

Remainder of the Agreement will stand where any clause is unenforceable

23. THIRD PARTY RIGHTS

Third parties will have no rights under the Agreement

24. GOVERNING LAW

Governed by Kenyan law

Jurisdiction to be agreed in accordance with the dispute resolution provisions.

25. DISPUTE RESOLUTION

Dispute resolution procedure

KEY HEADS OF TERMS FOR THE PROPOSED PPP STRUCTURE

DATED 201♦

(**1) COUNTY GOVERNMENT OF NAKURU**

-and-

(2) CONTRACTOR

HEADS OF TERMS

relating to an integrated solid waste management system in Nakuru County (the "Project")

(the "Agreement")

Note: with the exception of provisions relating to the duty of both Parties to negotiate in good faith in relation to these Heads of Terms and provisions relating to confidentiality, this document and the provisions within it are not intended to be legally binding and do not constitute representations on which either party can rely. On receipt of these Heads of Terms, the receiving party agrees to keep the contents of these Heads of Terms confidential until such time as such contents become publicly available.

[*Note: these Heads of Terms for a Project Agreement are drafted on the basis of a BOOT structure.*]

THIS AGREEMENT is made on the day of 201♦

BETWEEN:

(1) COUNTY GOVERNMENT OF NAKURU ("CGN"); and

(2) [ ] (the "**Contractor**");

together the "**Parties**" and each a "**Party**".

The Parties to these Heads of Terms agree to negotiate in good faith the basis and the terms of the Project Agreement.

PART A: PRELIMINARY

1. DEFINITIONS AND INTERPRETATION

The Project Agreement to provide a list of defined terms used thereunder and the applicable rules of interpretation for an agreement of this nature.

2. DURATION

2.1.1 The term of the Project Agreement will be [♦] years from the Effective Date subject to extension or termination in accordance with its terms. The Project Agreement to specify the term of the Project and the relevant milestone dates, including:

2.1.2 Effective Date - the Effective Date will be the date on which all the conditions precedent to the commencement of the Project Agreement have been satisfied or waived;

2.1.3 Long-Stop Effective Date - this shall be the long-stop date for satisfaction or waiver of the conditions precedent. If the Effective Date does not occur on or prior to the Long Stop Effective Date, either Party may terminate the Project Agreement by delivering to the other such notice as set out thereunder;

2.1.4 Service Commencement Date - the Service Commencement Date will be a milestone date after the construction period when the Contractor will be required to commence performance of the Services; and

2.1.5 Long-Stop Service Commencement Date - this shall be the long-stop date for completion of the works and commencement of service provision. If the Contractor does not commence service provision by the Long-Stop Service Commencement Date, CGN may terminate the Project Agreement.

11.1.1 [*Note: Under the Kenya PPP Act, the Project Agreement term for a BOOT model can be thirty (30) years, or such longer period as may be agreed*.]

3. THE PROJECT

3.1.1 Design, construction, operation and maintenance of the Project - the Contractor will be responsible for the design, financing, construction, integration, installation, testing, commissioning, operation and maintenance of the Kiamunyi (and others if applicable) landfill site in Nakuru County and all Project assets that will be procured or developed for the purposes of meeting the requirements of the output specification, including the IVC and the MRF also at the Kiamunyi site.

3.1.2 CGN shall pay the Contractor Unitary Payments at the agreed intervals as from the Service Commencement Date until the termination or expiry of the Project Agreement, as the case may be.

3.1.3 Contract Waste - the Project Agreement shall set out the agreed arrangements between the Parties in respect of:

3.1.4 [exclusivity arrangements]; [Note: CGN to consider with its technical advisers whether its wishes to grant to the Contractor exclusivity rights in respect of the waste stream and processing and disposal of that waste.]

3.1.5 minimum tonnage of Contract Waste to be supplied by CGN;

3.1.6 Contractor's rights to process third party waste;

3.1.7 the treatment of supply by CGN of contract waste in excess of [♦] tonnes;

3.1.8 the Contractor's rights, if any, to refuse to accept contract waste and grounds therefor (e.g. issues relating to waste composition or breach of relevant legislation); and

[*Note: the position above assumes that waste collection is not included within the Project.*]

4. NATIONAL GOVERNMENT SUPPORT

4.1 CGN to consider whether a letter of support (or other form of National Government support) will be provided to the Contractor and its lenders in respect of CGN's ability to make payments under the Project Agreement as well as political risk.

5. WARRANTIES AND INDEMNITIES

5.1 The Contractor to provide standard waste sector PPP project warranties and indemnities.

5.2 CGN to provide any relevant indemnities and warranties.

6. FINANCIAL MODEL

6.1 Electronic copies of the audited Financial Model to be provided by the Contractor to CGN on financial close and on any change in accordance with the Project Agreement.

6.2 Financial model custody arrangements to be agreed.

PART B: OPERATIONS

7. LAND

7.1 Ownership - CGN shall maintain ownership and title over the landfill site.

7.2 The Contractor's access - CGN shall grant the Contractor land access rights (possibly in the form of a lease) for the term of the Project Agreement in consideration of the Contractor undertaking the works and providing the Services for the term of the Project Agreement. The lease shall set out the details of CGN's obligations as the landlord as well as the boundaries of the site. The Project Agreement to set out any limitations on access granted by CGN to the Contractor and the independent expert. In the event that the Contractor requires access to any site other than that subject to the Project lease, it

shall secure such access at its own risk and cost. CGN to provide support to the Contractor in securing such access.

7.3 Additional land - should the Contractor require any additional land (for instance, land adjoining the site) to enable it to perform its obligations, it shall acquire such additional land at its sole cost and risk on behalf of and in the name of CGN and with the prior written consent of CGN. CGN not to unreasonably withhold such consent.

7.4 Expiry of Project Agreement - on expiry of the Project Agreement, the lease over the Project site shall be automatically terminated and the Contractor shall hand over the Project site, the MRF and the IVC plant to CGN in the specified conditions.

7.5 Project consents and approvals - the Contractor shall have responsibility for obtaining and maintaining all relevant project consents and approvals. The Project Agreement may provide for CGN to support the Contractor for the timely obtaining of project consents and approvals where the Contractor can demonstrate that it has diligently applied for and been pursuing applications for such consents and approvals.

7.6 Site conditions and inspections - the Contractor shall carry out due diligence and take the site in its state and condition. The Contractor will be fully liable for the site conditions and site suitability for the Project. CGN does not give any warranties to the Contractor in respect of the same. The Contractor should examine the site in advance in order to satisfy itself as to the compatibility of the site and site conditions for the Project and its effects on design, specification, plans, other construction documents, scheduled works completion date, as well as the Services. CGN shall bear the risk of pre-existing contamination on the site as at the Signature Date only.

7.7 Latent defects - the Contractor shall take responsibility for any latent defects arising from the works.

7.8 Fossils, antiquities and minerals - mining, geological or archaeological rights do not form part of the Contractor's rights under the Project Agreement. Upon discovery, any fossils, antiquities and minerals shall be the property of CGN and will give rise to a Relief Event if the discovery impedes the Contractor in performing its obligations under the Project Agreement.

8. THE PROGRAMME AND LATE SERVICE COMMENCEMENT

8.1 Preparation of works Programme - the Parties shall agree the works Programme prior to financial close and the Contractor shall carry out the works in accordance with the Programme.

8.2 Remedies in the event of Contractor Default:

8.2.1 Liquidated damages - subject to agreed supervening events, the Contractor shall be liable to pay CGN liquidated damages in the event of completion of the works later than the agreed scheduled Service Commencement Date.

8.2.2 Performance security - the Contractor shall provide agreed security for the performance of its obligations in agreed form in favour of CGN. [Note: CGN to consider with its financial advisers the appropriate security in light of the value for money considerations and the identity of the Contractor. This can take the form of a performance bond, parent company guarantee, a letter of credit etc.]

8.2.3 Non-payment of Unitary Payment - the Contractor shall achieve Acceptance of the facilities and commence the service provision by the Service Commencement Date. The Contractor shall achieve the agreed service availability requirements. In the event the Contractor fails to commence the service provision on time, the Contractor would not be entitled to the Unitary Payment as provided under the Contractor's base case model.

8.2.4 Limits of Liability - no limits of liability shall be imposed on the Contractor.

8.2.5 Long-Stop Date - if the Contractor does not commence the Services provision by the Long-Stop Service Commencement Date, CGN may terminate the Project Agreement.

8.2.6 [Bonus payments for early service commencement] [Note: *the inclusion of a bonus payment for early service commencement to be considered by CGN together with its financial advisers in light of value for money considerations*.]

8.3 Delay/extension of time:

8.3.1 For delays caused by events that fall within CGN's assumed risks ("Compensation Events"), the Contractor may be entitled to both an extension of the Service Commencement Date and adequate compensation. The Compensation Events shall include: (i) CGN's breach of its obligations under the Project Agreement; (ii) CGN's request for changes to the Project terms; (iii) changes in the law and (iv) such other Compensation Events to which the Parties may have agreed. In case of the Compensation Events, the Contractor would be relieved of paying any liquidated damages to CGN.

8.3.2 The Contractor may be entitled to an extension of the Service Commencement Date if the Contractor does not commence the service provision by the Service Commencement Date due to a Relief Event. The Contractor shall be relieved of paying liquidated damages to CGN if the Relief Event occurs. Examples of Relief Events include:

8.3.2.1 fire or explosion or any unforeseeable extreme weather (having regard to the nature of the region and the prevailing climate conditions in the region), breakdowns and accidents on utility networks operated by a third party;

8.3.2.2 any blockade or embargo which does not constitute a Force Majeure Event;

8.3.2.3 any official or unofficial strike, lockout, go slow or other dispute to the extent that such events apply to the entire relevant sector or a significant part of it and not only to the Contractor; or

8.3.2.4 any picketing, demonstration, blockade, embargo, etc. (other than as a result of industrial action which affects only the employees of the Contractor or its sub-contractors) taking place on the Project site or directly affecting access to the Project site.

8.3.3 If a Force Majeure Event occurs, the affected Party would be released from liability for fulfilling the obligations under the Project Agreement. Once the Force Majeure Event occurs, the affected Party shall notify the other Party of the

Force Majeure Event and the Parties shall meet and negotiate to agree on the steps to be taken. The Force Majeure Events shall include:

8.3.3.1 war, civil war, armed conflict or terrorism; or

8.3.3.2 nuclear, chemical or biological contamination, unless the source or the cause of the contamination is the result of the actions of or breach by the Contractor or its subcontractors; or

8.3.3.3 pressure waves caused by devices travelling at supersonic speeds.

9. DESIGN AND CONSTRUCTION

9.1 Responsibility for design and construction - of all Project assets, including the MRF and the IVC plant, shall sit entirely with the Contractor. The Contractor shall be liable for all construction works, shall direct and supervise the construction works and provide all project management and construction management in compliance with good industry practice and required skills and standards for the construction of a Project of a similar nature.

9.2 Review procedure - the Contractor to provide CGN and the independent expert with all design, construction and ancillary documents. CGN and the independent expert will have a reasonable time to review and comment on the documents. The Contractor shall consider comments by CGN and the independent expert in good faith and shall remain fully liable for design, specification, plans, construction and commissioning of the Project and the Services, notwithstanding CGN's right to review, comment, agree, or disagree thereto.

9.3 Quality Assurance - the Contractor shall procure that all aspects of the works are the subject of and are conducted in accordance with the approved quality assurance systems. CGN may carry out periodic audits of the Contractor's quality assurance systems.

9.4 Sub-contractors - the Project Agreement shall set out any key sub-contractors the Contractor proposes to engage in the performance of its obligations. The Contractor shall be liable for all construction works carried out by its sub-contractors.

9.5 [Any works, including early works, to be conducted by CGN to be discussed and agreed in advance.]

10. INSPECTION AND COMPLETION

10.1 Notification by Contractor to CGN of completion of works - the Contractor to perform agreed tests, inspections and demonstrations to evidence that the works have been completed in accordance with the Project Agreement and that the Project assets, i.e. the IVC plant and the MRF, are available for commercial operations and may start the Services provision meeting the requirements of the output specification set out in the Project Agreement. The Contractor to notify CGN and the independent expert in advance of these tests. CGN's representative and the independent expert shall have the right to attend any such tests and witness the results. The Contractor will bear all cost associated with these tests.

10.2 Completion certificates - upon satisfactory completion of the above tests, the Contractor shall procure the independent expert to issue CGN with a certificate confirming (i) the results of the performed tests, inspections and demonstrations; (ii) that test results

match the Services performance levels required under the Project Agreement; and (iii) that the Project assets are available for commercial operations. The date of such certificate will be the Service Commencement Date.

10.3 Site meetings and CGN inspection - CGN and the independent expert shall have the right to attend all site meetings with the Contractor and its sub-contractors relating to the works. CGN and the independent expert shall also have the right to inspect the works and open up the works. The Contractor shall remedy at its own cost any non-compliance discovered as a result of the exercise by CGN and the independent expert of their right to open up the works. The Contractor shall provide CGN and the independent expert such information as they may reasonably require.

10.4 Testing - on completion of works, the Project assets shall be subject to a number of tests including [throughput tests, process performance tests, environmental performance tests, output specification tests and facility availability tests.] The tests shall be detailed and agreed prior to the Effective Date.

11. OPERATION AND MAINTENANCE

11.1 Operation and maintenance requirements of the MRF, the IVC plant and the landfill site - the Project Agreement to set out the detailed scope of Services to be provided by the Contractor, including as set out in CGN's output specification and service performance levels and standards. The Contractor shall ensure that from the Service Commencement Date, on a continuing basis, its operation and maintenance activities are sufficient to ensure that: (i) the service is continuously available; (ii) it can maintain the design intention of the Project assets to achieve their full working life; and (iii) the Project assets are transferred to CGN on the Expiry Date in a condition complying with the requirements of the Project Agreement and the landfill is handed back to CGN.

11.2 Access and Inspections by CGN representative - CGN shall have the right to access the site and Project assets as well as carry out monitoring and inspections of the Service performance by the Contractor. If CGN believes that the Contractor is in breach of its obligations related to the operation and maintenance then it may carry out a survey of the Project assets to assess whether the Project assets have been and are being maintained by the Contractor in accordance with its obligations under the Project Agreement.

11.3 Cost of utilities - the Contractor shall be liable for all costs of electricity, water, gas, telecommunications and other services consumed or used at or in connection with the Project. [Any communication campaigns requested by CGN would be undertaken bythe Contractor and the costs passed through to the CGN.]

11.4 Standard of performance by the Contractor - the Contractor shall receive, treat, recycle, transport and dispose of all Contract Waste in an environmentally and economically sustainable manner which is consistent with all applicable laws, National and County laws, CGN's policies, good industry practice, the output specification and agreed service delivery levels.

11.5 Quality Assurance - the Contractor shall procure that all aspects of the Services are the subject of and are conducted in accordance with the approved quality assurance systems. CGN may carry out periodic audits of the Contractor's quality assurance systems.

12. EMPLOYEES

12.1 Employees - if there will be a transfer of employees from CGN to the Contractor during the operation of the project and vice versa at the termination or expiry of the Project Agreement, the relevant employer to consult with the employees and to engage fair labour procedures including (i) providing individual notice to the affected employees; (ii) securing their consent; and (iii) clearly spelling out the manner in which termination benefits would be computed.

12.2 Control over employees - the Contractor shall be fully liable for all works and/or Services delivered by its employees and shall bear the risk of any acts and/or omissions of its employees. CGN shall have the right to veto or require the removal of the Contractor's employees subject to there being reasonable grounds.

13. INSURANCE

13.1 Requirements to maintain - the Contractor shall obtain and maintain throughout the Project term the required Project insurance policies with a reputable insurer of good standing in accordance with the good industry practice. CGN shall have the right to approve the selected insurers and insurance broker (such approval not to be unreasonably withheld or delayed).

[*Note: CGN, together with its insurance advisers, to compose a list of required insurances and related terms (*including *CGN's endorsements naming CGN as a co-insured, non-vitiations and waiver of subrogation) to be maintained by the Contractor to cover Project risks throughout the Project term*.]

13.2 Insurance review procedure - the insurance policies shall be periodically reviewed to ensure the insured amounts and deductibles reflect inflation. The Contractor shall bear the risk of insurance premium fluctuations over the Project term in accordance with the mechanism set out in the Project Agreement. The Contractor shall provide to CGN copies of all renewal certificates.

13.3 Maintenance of an insurance proceeds account - the Contractor to set up an insurance proceeds account into which all insurance proceeds will be paid. The Project Agreement to provide for modalities for operation of such an account, such as whether there will be need for CGN consent before any withdrawals can be made. [Note: *the lenders will require the Contractor to maintain such other accounts as they may deem appropriate*.]

13.4 Application of insurance proceeds - the Contractor shall apply all insurance proceeds to repair, reinstate and replace each part or parts of the Project assets.

13.5 Uninsurable risks and unavailability of insurance:

13.5.1 If a required risk becomes uninsurable, the Parties shall agree how to manage such risk. If the Parties fail to agree how they will manage the uninsurable risk, CGN may at its discretion opt to (i) terminate the Project Agreement or (ii) the Project Agreement will continue and CGN will bear such uninsurable risk but the Unitary Payment will be reduced by an amount equal to the premium which would have been paid by CGN had such uninsurable risk been insurable.

13.5.2 If insurance coverage for a required term or condition is no longer available and unavailability of such term and conditions is not attributable to the Contractor, the unavailability shall be treated as a Relief Event.

PART C: RELATIONSHIPS AND MONITORING

14. MEETINGS AND REPRESENTATIVES

14.1 Each of the Parties shall appoint a representative to undertake contract management on its behalf.

14.2 Regular meetings to be held between the Contractor and CGN.

15. INDEPENDENT EXPERT

15.1 The Parties to jointly appoint an independent expert to help in monitoring the implementation of the Project Agreement. Project Agreement to provide for issues such as: (i) term of the appointment; (ii) remuneration of the independent expert; (iii) termination, etc., all of which will be replicated in the independent expert agreement.

16. PROJECT LIAISON COMMITTEE

16.1 Parties to constitute a project liaison committee whose functions would include: (i) joint review of issues relating to the day to day aspects of the performance of the Project Agreement; (ii) acting as a forum for joint strategic discussion, considering actual and anticipated changes in the role or functions of CGN and possible variation of the Project Agreement to reflect those changes or for the more efficient performance of the Project Agreement; and (iii) dispute resolution in the first instance.

17. SERVICE PERFORMANCE MONITORING

17.1 Performance levels - the Project Agreement shall set out the agreed performance levels in respect of the Services.

17.2 Contractor monitoring and CGN monitoring:

17.2.1 CGN shall have the right to monitor the Contractor's performance of the Services in compliance with the Services performance levels. CGN shall have the right to issue warning notices to the Contractor in respect of under-performance, including persistent breaches.

17.2.2 The Contractor shall monitor its performance and issue periodic performance reports detailing its performance against performance standards and including any under-performance.

17.3 Consequences of poor performance - if the Contractor is delivering Services below the agreed performance levels, CGN shall have the right to:

17.3.1 impose deductions from the Unitary Payment;

17.3.2 impose performance points for under-performance reflecting the severity of the Contractor's failure and the importance of that failing service for CGN; [Note: *CGN to consider, together with its financial advisers, whether the performance points will be convertible to deductions from the Unitary Payment or lead to a termination trigger only*.] or

17.3.3 terminate the Project Agreement if the Services have been persistently under-performed by the Contractor. These termination rights will be triggered by (i) the Contractor exceeding a specified deductions threshold; (ii) the Contractor exceeding a specified performance points threshold; and/or (iii) a warning notice has been issued by CGN in respect of the Contractor exceeding a specified performance threshold.

Please also see CGN's Step-In Rights under section 18 below

[*Note: CGN to consider together with its financial advisers the level of financial deductions, performance points and termination thresholds applicable to the Project.*]

18. CGN STEP-IN RIGHTS

18.1 Step-in without Contractor breach - CGN shall have the right to step in to the position of the Contractor when CGN reasonably believes this it is necessary due to the existence of a serious risk to the health and safety of persons, property or the environment, or to discharge its statutory duties. The Contractor shall be relieved from performing its obligations but CGN shall continue paying the Unitary Payment and will indemnify the Contractor for its direct losses.

18.2 Step-in on Contractor breach - CGN shall have the right to step in to the position of the Contractor in the event of Contractor's default. The Contractor shall be relieved from performing its obligations but CGN shall set off all of its costs associated with stepping in and performing the Services against the Unitary Payment payable to the Contractor.

PART D: PAYMENT

19. PRICE AND PAYMENT MECHANISM

19.1 Price - the Project Agreement shall set out the price payable by CGN in accordance with and subject to the provisions of the payment mechanism.

19.2 Payment - the Unitary Payment shall be payable against the presentation by the Contractor of a valid invoice and related performance monitoring report, in accordance with and subject to the provisions of the payment mechanism.

19.3 Payment mechanism - the payment mechanism shall be based on the following key principles:

19.3.1 No payments shall be due from CGN until the Services are available, i.e. no service shall lead to no payment.

19.3.2 There shall be a single Unitary Payment for the Services which are not made up of separate independent elements relating to availability or performance.

19.3.3 The level of payment shall be directly linked to the level and quality of the Services that the Contractor provides. The payment mechanism shall be adjusted for under performance and a direct cash deduction will be made by CGN reflecting the severity of the Contractor's failure and the importance of that failing service for CGN. Each service failure must carry an appropriate deduction in the payment. [A deduction ratchet mechanism shall be included in the payment mechanism in respect of persistent failures.] [Note: *inclusion of a ratchet mechanism to be considered by CGN in conjunction with its financial advisors*.]

19.3.4 The Unitary Payment shall not be paid in advance of the period to which it relates.

19.3.5 The performance and payment regime shall be based on outputs (e.g. standard of services).

19.3.6 [The payment mechanism shall not contain a fixed element which the Contractor always receives irrespective of performance (e.g. which covers the

Contractor's debt service obligations).] [Note: *possible inclusion of a fixed "hell or high water" element to be discussed in light of possible Project funders' requirements and mitigating tariff risks*.]

[Transaction advisor to confirm that the above principles reflect the final understanding in respect of this Project.]

20. SET-OFF

CGN's right to set off - the Contractor shall not be entitled to retain or set off any amount due to CGN by it. CGN may retain or set off any amount owed to it by the Contractor under the Project Agreement that has fallen due and payable against any amount due to the Contractor under the Project Agreement.

21. PRICE VARIATIONS

21.1 Indexation - during the term of the Project Agreement, the Unitary Payment shall be adjusted by applying the agreed inflation index.

21.2 Benchmarking - certain specified services shall be periodically benchmarked, i.e. the Contractor shall compare its costs with the market price of equivalent services. Any increase or decrease in the cost of such service following benchmarking shall be reflected as an adjustment in the contract price, unless CGN chooses to proceed to market testing.

21.3 Market testing - certain specified services shall be periodically market tested, i.e. re-tendered by the Contractor to ascertain the market price of that service. This may lead to the replacement of the sub-contractor operating such service by the winning bidder. Any increase or decrease in the cost of such service following market testing shall be reflected as an adjustment in the contract price.

PART E: TERMINATION AND COMPENSATION ON TERMINATION

22. TERMINATION

22.1 The Project Agreement may be terminated prior to the expiry of the Project term in the circumstances set out below.

22.2 Voluntary termination by CGN - CGN may voluntarily terminate the Project Agreement at any time before the expiry of its term.

22.3 Termination on CGN default - the Contractor may terminate the Project Agreement on default by CGN (unless CGN has remedied the default within the specified time). Some of the CGN default events include:

22.3.1 an expropriation, sequestration or requisition of a material part of the Project assets and/or shares of the project company by CGN or other relevant authority;

22.3.2 a failure by CGN to pay any amount that is due and payable within an agreed period of time;

22.3.3 a material breach by CGN of its obligations which materially adversely affects the ability of the Contractor to perform its obligations under the Project Agreement for a continuous period of not less than [two] months.

[*Note: CGN to consider whether it wishes to grant the Contractor the right to terminate the Project Agreement in the event CGN no longer has legal capacity and power to enter into the Project Agreement or assigns its rights under the Project Agreement in breach of the assignment provisions.*]

22.4 Termination on Contractor default - CGN may terminate the Project Agreement on the grounds which include:

22.4.1 a breach by the Contractor of any of its obligations under the Project Agreement which materially and adversely affects the performance of the Service(s);

22.4.2 occurrence of a persistent breach or the Contractor ceasing to provide all or a material or substantial part of the Services in accordance with the Project Agreement;

22.4.3 liquidation, insolvency or a similar procedure is commenced with the respect to the Contractor;

22.4.4 a failure to achieve the Service Commencement Date by the Long-Stop Service Commencement Date;

22.4.5 abandonment of the works or Services;

22.4.6 the Contractor's failure to provide the Services at the performance level required under the Project Agreement (i.e. poor performance which exceeds agreed thresholds);

22.4.7 if the Contractor subcontracts, assigns or transfers the Project Agreement in breach of relevant provisions;

22.4.8 breach of anti-corruption, change of control, refinancing or insurance provisions or health and safety laws; and/or

22.4.9 failure to provide the required security (e.g. performance bond).

22.5 The Contractor shall be granted the first opportunity to remedy those defaults capable of being remedied.

22.6 Termination for force majeure - if a Force Majeure Event occurs and is continuing, each Party may unilaterally terminate the Project Agreement if the Parties have failed to agree on the steps to be implemented or if the Force Majeure Event continues for a period of [six] months. CGN may prevent the termination of the Project Agreement by electing to pay to the Contractor the Unitary Payment, as if the Services were being duly provided.

22.7 Termination on corrupt gifts and fraud - the Contractor shall warrant that in entering into the Project Agreement it has not committed any bribery, corruption or other such acts. The Contractor shall also be obliged to comply with any anti-bribery and anti-corruption laws. CGN may terminate the Agreement if the Contractor has breached such provisions.

23. COMPENSATION ON TERMINATION

23.1 Compensation on termination for CGN voluntary termination or CGN default - CGN shall pay the Contractor adequate compensation equal to the aggregate of (amongst other payments):

23.1.1 outstanding lender liabilities;

23.1.2 redundancy payments and/or other costs which the Contractor is required to pay its employees as a direct result of the termination pursuant to legal requirements (to the extent that such payments are reasonable and have been mitigated by the Contractor);

23.1.3 reasonably and properly incurred sub-contractor breakage costs (which are readily identifiable and disclosed in advance to CGN)

23.1.4 any amounts owing to the Contractor from CGN that is due and outstanding at the termination date;

23.1.5 outstanding shareholder loans; and

23.1.6 a return on equity component as set out in the audited financial model for a period of [♦].

23.2 Compensation on corrupt gifts, fraud and refinancing breaches - CGN shall pay the Contractor an amount required for the Contractor to settle the outstanding senior debt owed to the senior lenders.

23.3 Compensation on termination for Contractor default - CGN may retender the Project to determine the market value thereof (but shall have the right to deduct its costs of retendering and any losses). CGN shall pay the Contractor compensation reflecting the market value of the unexpired term of the Project Agreement. If the termination compensation determined in the retendering procedure is less than zero, then this amount shall be due and payable by the Contractor to CGN.

23.4 Compensation on termination for force majeure - CGN shall pay the Contractor compensation covering (i) the outstanding senior debt plus (ii) equity at par value less distributions made to the date of termination.

23.5 Gross-up of termination payments - all payments shall be subject to a standard gross up provision.

23.6 Set-off on termination - CGN shall have the right to set off any outstanding liabilities of the Contractor against the amounts due from CGN in compensation on a Contractor Default.

23.7 Exclusivity of remedy - the compensation on termination payment is the sole remedy of the Contractor in case of an early termination of the Project Agreement.

24. SURVEYS ON TERMINATION AND RETENTION FUND

24.1 Condition of Project assets on expiry or early termination - on expiry or early termination, the Contractor shall transfer the Project assets to CGN in the condition specified in the Project Agreement. CGN shall engage a third independent party to survey the Project assets. CGN shall bear the costs of this survey, unless the survey reveals that the Project assets are not in the condition stipulated under the Project Agreement, in which case the Contractor shall:

24.1.1 bear the costs of the survey; and

24.1.2 bear all cost of restoring the Project assets to the conditions stipulated in the Project Agreement.

24.2 Retention fund - during the last [four] years of the term of the Project Agreement, CGN shall pay a certain pre-agreed percentage of the Unitary Payment to the retention fund account. If the asset survey reveals that maintenance works are required on the Project assets then the retention fund will be used to perform those maintenance works and to bring the conditions of the Project assets to the standard stipulated in the Project Agreement. Any credit balance on the retention fund account that remains following any such maintenance works shall be paid by CGN to the Contractor.

25. TRANSITION TO ANOTHER CONTRACTOR

25.1 The Contractor shall be obliged to co-operate with CGN and any incoming contractor.

25.2 Termination sum - the compensation on termination amount shall be payable either (at CGN's discretion) as a lump sum or in instalments over a specified period. In the event CGN elects to pay the Contractor in instalments then nominal interest, at the rate agreed in the Project Agreement, shall also be payable.

26. TREATMENT OF ASSETS ON TERMINATION

26.1 Transfer at termination - transfer of MRF, IVC plant and Project equipment and any other facilities procured or developed by the Contractor to CGN at no cost in case of termination. [Note: *to be confirmed following finalisation of the preferred PPP option*.]

26.2 Handback:

26.2.1 the Project Agreement shall set out CGN's requirements in respect of the handback of the landfill site, MRF and IVC plant to CGN on termination or expiry of the Project Agreement. CGN shall have the right to inspect the landfill site, MRF and IVC plant throughout the Project term. CGN shall engage a third independent party to survey the landfill site. CGN shall bear the costs of this survey, unless the survey reveals that the landfill site is not in the condition stipulated under the Project Agreement, in which case the Contractor shall:

26.2.1.1 bear the costs of the survey; and

26.2.1.2 bear all cost of restoring the Project assets to the conditions stipulated in the Project Agreement.

26.2.2 The cost of all remedial measures, save for those occasioned by default of the Contractor, to be paid from the Retention Fund (see section 24 in respect of the Retention Fund).

PART F: GENERAL

27. ASSIGNMENT AND SUB-CONTRACTING

27.1 Restrictions on Contractor assignment - the Contractor may not assign, novate, dispose or transfer its rights under the Project Agreement except as part of the senior lenders' security package or with the prior written consent of CGN. The senior lenders may appoint a replacement Contractor in accordance with the Authority Direct Agreement(s).

27.2 Restrictions on CGN assignment - CGN may assign, novate, dispose or transfer its rights under the Project Agreement to any public body [whose obligations under the Project Agreement and the Authority Direct Agreement are covered by a Government Letter of Support] without the prior written consent of the Contractor or otherwise with the prior written consent of the Contractor.

27.3 Sub-contracting - the Contractor shall be fully liable for all works and/or services delivered by its sub-contractors and shall bear the risk of any acts and/or omissions of its subcontractors. CGN shall have the right to review and veto engagement by the Contractor of any particular sub-contractor on specified grounds set out in the Project Agreement (e.g. technical expertise, insufficient competence or financial strength of the subcontractors). The Contractor shall procure that its key sub-contractors enter into Collateral Warranties with CGN in specified form.

27.4 Replacement of sub-contractors - the Contractor shall bear the risk of its sub-contractor's poor performance. However, CGN shall have the right to request the Contractor to replace the relevant sub-contractor if the sub-contractor, subject to its sub-contract, is under-performing.

28. CHANGE OF OWNERSHIP OR CONTROL

28.1 A majority shareholder in the project company not to transfer any of their shares save with CGN’s consent.

28.2 A shareholder in the project company not to pledge their shares except for purposes of financing the Project.

28.3 Any transaction pursuant to which the project company ceases to be, directly or indirectly, a wholly owned subsidiary of its parent or an affiliate of its parent shall require CGN's prior written consent. However, the Contractor may effect a change in ownership or control in favour of senior lenders as envisaged under the Authority Direct Agreement.

28.4 The Contractor may not effect a change in ownership or control to an Unsuitable Third Party, e.g. persons involved in terrorism or convicted of corruption offences.

29. TAXATION

29.1 Amounts under the Project Agreement to be exclusive of VAT.

30. CHANGE PROCEDURE

30.1 All requests for variations to the Project Agreement to be submitted to the project liaison committee, which shall consider the same and give its recommendations to the Parties. The Parties may either adopt or reject the recommendations of the project liaison committee in their absolute discretion.

30.2 Variations to be effective once signed by duly authorised representatives of the Parties. The Party requesting a variation to bear any costs incurred to effect the same.

31. CHANGE IN LAW

31.1 Compliance with all laws - the Contractor must comply with all laws. A failure to comply may give rise to the termination of the Project Agreement on the grounds of Contractor's default.

31.2 Allocation of risk - the Contractor would factor into its tender the cost of compliance with all laws in effect at financial close. Risk relating to change in law shall be borne by CGN, except in the following instances:

31.2.1 where such change in law is foreseeable at the time of the submission of tender by the Contractor; or

31.2.2 where the effect of such change in law is below pre-agreed thresholds.

31.3 Mitigation - the Contractor shall mitigate the effects of any change in laws.

32. RECORDS AND CONFIDENTIALITY

32.1 Certain agreed Confidential Information, including the Contractor's commercially sensitive information, shall be held confidential by the Parties subject to pre-agreed permitted disclosures.

32.2 The Contractor shall maintain all records relating to the Project for a period of [6 (six)] years following expiry or earlier termination of the Project Agreement and shall provide CGN with a copy of such records on request on an open book basis.

32.3 The Contractor shall not communicate with the representatives of the press, television, radio, or other media on any matter related to the Project, without prior approval of CGN.

33. PROVISION OF INFORMATION

33.1 The Contractor shall provide CGN with conformed copies of all Project documents and financing agreements and all amendments thereto. CGN shall have the right to review all drafts of any amendment to the Project documents and financing agreements.

33.2 The Contractor shall not terminate, amend, and waive its rights or otherwise deal with the Project agreements and financing agreements without CGN's prior written consent, such consent not to be unreasonably withheld or delayed.

34. DATA PROTECTION

34.1 Disclosed data - CGN will not be liable to the Contractor for any damages, losses, costs, etc., which may arise from the adoption, use, application or as a result of any inaccuracy, incompleteness or unfitness of any data it may have disclosed.

34.2 Warranty - CGN will not issue any warranty in respect of any disclosed data. The Contractor will conduct an independent evaluation of any data disclosed for the purpose of performance of the Project Agreement and the nature of the risks which it will assume.

35. INTELLECTUAL PROPERTY

35.1 The Contractor shall obtain such intellectual property licences as may be required to operate any Project assets and any other intellectual property which is required to perform the works or the Services. The Contractor shall grant to CGN an unconditional and irrevocable perpetual licence to use, in whole or in part, all plans, specifications and other documents and all technology and models provided or used by the Contractor for any purpose related to the Project and to enable CGN to use Project assets following the expiry or termination of the Project term.

35.2 The Contractor will hold CGN harmless from and against all claims, demands, losses, costs, damages, actions, suits or proceedings arising out of the Contractor's infringement of any intellectual property rights.

36. REFINANCING

36.1 The Contractor shall have the right to re-finance the Project debt or equity subject to the following principles:

36.1.1 such refinancing is subject to CGN's consent unless the refinancing falls under the agreed parameters for exempt refinancing (e.g. envisaged in the financial model, interest rate hedging or a qualified bank transaction);

36.1.2 refinancing gain must be shared between the Parties as set out in the Project Agreement; [Note: *CGN to consider with its financial advisers the required gain share arrangements, e.g. a flat 50:50 sharing or a graduated increase in CGN's share depending on the amount of gain made*.]

36.1.3 CGN shall have full audit rights in respect of the refinancing and underlying documentation;

36.1.4 CGN may request that the Contractor re-finance the Project debt; and

36.1.5 the Contractor shall pay CGN's share in the refinancing gain as (a) a lump sum payment, or (b) by way of reduction in the Unitary Payment, or (iii) combination of (a) and (b).

37. DISPUTE RESOLUTION

37.1 The project liaison committee to resolve disputes in the first instance, and if unresolved, to be escalated to the Parties' executives followed by mediation and ultimately arbitration.

37.2 The Office of the Attorney General has issued an administrative directive that the seat and rules to be used for purposes of arbitration shall be Nairobi and UNCITRAL Rules, 2013 respectively.

[*Note: Any lenders funding the Project will have to be comfortable with the dispute resolution mechanism*.]

38. GOVERNING LAW AND JURISDICTION

The Project Agreement shall be subject to the laws of Kenya.

39. BOILERPLATE CLAUSES

The Project Agreement shall include a number of standard clauses, such as: (i) waiver clause, (ii) severability clause, (iii) counterparts, (iv) interest on late payments, (v) continuing obligations, (vi) no privity, (vii) service of notices.

SCHEDULES TO THE PROJECT AGREEMENT (INDICATIVE LIST)

Schedule 1 - Design Build Specifications

Schedule 2 - Services Output Specifications

Schedule 3 - Service Delivery Plan (Programme)

Schedule 4 - Facilities

Schedule 5 - Lease

Schedule 6- Key Sub-contractors

Schedule 7 - Payment Mechanism

Schedule 8 - Service Availability Requirements

Schedule 9 - Collateral Warranties

Schedule 10 - Liaison Procedure

Schedule 11 - Planning and Permitting Obligations

Schedule 12 - Insurance

Schedule 13 - Commercially Sensitive Information

Schedule 14 - Direct Agreement

Schedule 15 - Financial Model

Schedule 16 - Employee Information

Schedule 17 - Handback Requirements

Schedule 18 - Waste Acceptance Protocol

Schedule 19 - Change Procedure

Schedule 20 - Reporting Proformas

Outline Draft Schedule 2 – Services Output Specification

1. OVERVIEW OF SERVICE

1.1 Services Objectives

1.1.1 The Services shall be in compliance with Legislation, and with the aim of fulfilling the aspirations of the County Government of Nakuru (CGN).

1.1.2 The Services should:

comply with all applicable Legislation and World Bank Equator Principles;

deliver or exceed the Contract Targets detailed in this Output Specification;

minimise the landfilling of waste;

contribute to the aims of significantly increasing Recycling

develop a flexible and adaptable service that can accommodate changes in waste arisings and composition and cater for anticipated changes in waste practice and Legislation;

use the CGN's existing site, Kiamunyi Landfill for the provision of the Services, unless suitable and acceptable alternative Sites are procured by the CGN;

secure markets for the sale or disposal of Products and Recyclates;

seek to maximise the opportunities for progressive technological improvement and continuous improvement of the Services, including meeting emerging waste management Legislation;

support the and the CGN, in the provision of stakeholder and community liaison in the management of waste in the County.

1.1.3 The Contractor must:

i. ensure that the Services comply with Legislation, any planning, licensing, permitting, and all regulations and consent requirements;

ii. ensure that the Services protect the environment through the prevention of pollution and minimise environmental impact;

iii. ensure that the Services as far as reasonably practicable reduce risks to public health and any adverse impact on local communities;

iv. ensure that the Services are Available to Authorised Users during Opening Hours;

v. consult and seek to involve local communities and stakeholders in the provision of the Services.

1.2 Detailed Services Outputs

1.2.1 The Contractor shall design, build, finance and operate the Waste Management Facility/ies to deliver a safe, efficient, reliable and cost effective waste management service for Contract Waste, delivering the Performance Requirements described in this Output Specification in accordance with all applicable Legislation, the CGN's policies, and contributing towards the International Finance Corporation (IFC) EHS Guidelines.

1.2.2 The Contractor shall provide and operate Waste Management Facility/ies for the treatment, Recycling, and disposal of Contract Waste diversion targets.

1.3 Facilities Management

1.3.1 The Contractor shall manage the provision of the Services to ensure compliance with:

i. the terms of all consents and permits;

ii. all applicable Legislation; and

iii. the Service Delivery Plan.

Management of the Facilities shall include (without limitation):

iv. general landscaping and maintenance

1.4 Contract Waste

1.4.1 The Contractor shall be responsible for the receipt, acceptance, treatment, recycling/recovery and the disposal of all Contract Waste. Contract Waste will include all waste for which responsibility for collection lies with the CGN. The expected types of waste that may be required to be managed are: household, commercial, bulky and street cleaning waste.

1.5 Changes in Waste Quantity and Composition

1.5.1 The CGN gives no guarantee or undertaking as to the current or future composition of Contract Waste. The information the CGN has regarding the composition of existing waste arisings will be made available to the Contractor for information purposes only.

1.5.2 The CGN will guarantee to provide a minimum of [60,000]tpa and there must be capacity to treat [78,000]tpa. It is the responsibility of the Contractor to assess the amount of future arisings of Contract Waste requiring management, processing, treatment and disposal under the Project Agreement and to provide a system with sufficient capacity and flexibility to manage the Contract Waste and achieve the waste diversion targets throughout the Contract Period.

1.5.3 The Contractor shall be responsible for making all assessments of possible future trends in waste composition and shall make allowances for these factors in the Waste Management Facilities design.

2. WASTE TREATMENT REQUIREMENTS

2.1 General

2.1.1 The Contractor shall provide materials, equipment, plant, machinery and other goods of sound and satisfactory quality and fit for the purpose for which they will be used. All workmanship and manufacture of fabrication shall meet or surpass all relevant standards or equivalent.

2.1.2 The Contractor shall design and construct the Waste Management Facilities to include suitable storage for Contract Waste of a size and volume which is capable of storing up to [72 hours] average Contract Waste.

2.1.3 The Contractor shall design and construct the Waste Management Facilities to include suitable storage facilities for Residues and Products, of a size and volume to avoid detrimental impact on the environment or on the operational efficiency of the Waste Management Facilities.

2.1.4 The Contractor shall design and construct the Waste Management Facilities to include equipment capable of monitoring, weighing and electronically recording each load and vehicle bringing all input and output wastes, Products, Recyclates and/or Residues from the Waste Management Facilities. The Contractor shall, as a minimum, record the information required for the purpose of meeting their obligations under the Project Agreement.

2.1.5 The Contractor shall design and construct the Waste Management Facilities to include all necessary storage and material handling equipment to facilitate storage and/or removal of all Contract Waste from the Waste Management Facilities.

2.1.6 The Contractor is responsible for choosing the suitable technological treatment solution for the Contract Waste, which must comply with all applicable Legislation, with the all relevant consents required to build and operate the Waste Management Facility, and in accordance with Good Industry Practice that may apply to the design, construction, and operation of the Project.

2.1.7 The Contractor must implement all works and provide the Services in agreement with the Service Delivery Plan. The treatment technology chosen shall have the ability to deliver the following:

i. Recycle at least [40%(kg/kg)] of the Recyclable Content of the Contract Waste received

ii. Divert at least [40%kg/kg] of the Contract Waste received from landfill

iii. Wherever possible the Contractor should employ people who will be resettled from their current dwellings on Kiamunyi Landfill Site, this should amount to at least [50] of the site staff.

2.1.8 The Contractor will be required to sample the waste received every [1] month and carry out composition analysis. The Contractor shall provide a methodology for the analysis in the Waste Sampling Plan. The results of which must be reported to CGN within the month. The report shall include measurement of the moisture content of the waste detail of the composition mass of the following:

i. Putrescible Waste

ii. Paper & cardboard

iii. Dense plastics

iv. Light plastics

v. Glass

vi. Metals

vii. Textiles

viii. Other non-hazardous wastes

ix. Hazardous wastes

3. LANDFILL REQUIREMENTS

3.1 General

3.1.1 The Contractor will be required to remediate the existing Kiamunyi Landfill Site, and develop a lined landfill as part of the treatment solution.

3.1.2 The Contractor will design and construct a scheme that allows for the diversion of surface water so that landfill leachate or other effluents do not contaminate clean surface water. Any channels constructed should not allow significant seepage into the natural soils within the landfill boundary. Flows will be by gravity and should not cause down-gradient flooding.

3.1.3 The Contractor shall remediate the existing waste and form an even profile across the site. Any fires identified during the movement of wastes shall be extinguished.

3.1.4 Having developed an even platform, the Contractor shall place a geological layer of at least 1 metre thickness across the entire area for proposed waste deposits. This layer is to provide a barrier between the underlying wastes and the new containment measures and to provide a firm base on which to place the containment layer.

3.1.5 The Contractor shall then place a layer that provides effective containment of future waste deposits. This containment layer should be protected against puncturing from both the geological layer installed and any materials placed on top.

3.1.6 The Contractor shall design and install a leachate collection system to remove and allow for the recirculation of leachate.

3.1.7 The Contractor shall enclose an area that allows for the deposit of 4 years' waste with bunds to assist with the development of a surface water diversion scheme.

3.1.8 The Contractor shall operate the Kiamunyi Landfill Site to profiles that have been designed to remain stable, taking account of seismic conditions.

3.1.9 The Contractor shall develop the phasing so that disposal options are not interrupted.

3.1.10 On completion of each phase the Contractor shall provide capping to control rainwater infiltration and fugitive gas emissions.

3.1.11 The capping shall be covered with at least 1 metre depth of soils and a planting scheme will be proposed and implemented by the Contractor.

3.1.12 The Contractor shall develop a leachate recirculation scheme using pumps from sumps and discharge trenches under any capping provided.

3.1.13 The Contractor shall also develop a gas venting option to avoid pressure build up within the site.

3.1.14 The Contractor shall keep records of the quantity of all waste deposited.

3.1.15 The Contractor shall install monitoring installations to record the impact of gas and leachate migration on the surrounding environment. This will be

undertaken prior to the landfill development to ensure that the existing extent of contamination is known.

3.1.16 Two monitoring points will be installed in each phase of the new Kiamunyi Landfill Site.

3.1.17 The Contractor shall monitor all boreholes installed for bulk gas concentrations, gas flow rate, leachate/groundwater quality, leachate depth, depth to groundwater, and atmospheric pressure. This monitoring shall be undertaken at appropriate intervals.

3.1.18 The Kiamunyi Landfill Site will be surveyed on an annual basis to check future capacity and to determine the amount and impact of settlement.

4. COMMISSIONING

4.1 General

4.1.1 The Contractor shall develop a detailed Commissioning Plan for each Waste Management Facility and include these as part of the Works Delivery Plan.

4.1.2 The Contractor shall submit to the CGN the detailed Commissioning Plan as a minimum [6] months prior to the Planned Readiness Date for each Waste Management Facility. The Commissioning Plan shall include but not be limited to the Contractor's proposals for:

i. cold commissioning of the Waste Management Facilities and any Equipment;

ii. the process to achieve the Readiness Test;

iii. hot commissioning of the Waste Management Facilities including the incremental acceptance, processing and treatment of Contract Waste; and

iv. the [Acceptance Tests] and final certification.

4.1.3 The Contractor shall carry out the commissioning in accordance with the Commissioning Plan. The CGN, or their representatives, shall have the right to conduct inspections of the Waste Management Facilities, attend any commissioning and performance inspection, enquiry, test or investigation undertaken by or on behalf of the Contractor in accordance with the Contract.

4.1.4 The Contractor shall prior to the issuance of the Readiness Test Certificate, carry out cold commissioning of the Works to demonstrate that the design construction, installation and plant performance:

i. comply with health and safety Legislation and all other applicable Legislation;

ii. comply with manufacturers requirements;

iii. are fit for their intended purpose; and

iv. are capable of meeting the Contract Targets.

4.1.5 After the issuance of the Readiness Test Certificate, the Contractor shall carry out hot commissioning of the Works to demonstrate that their design, construction, installation and plant performance:

i. comply with health and safety Legislation and guidance;

ii. comply with all other applicable Legislation;

iii. shows satisfactory functional operation of the relevant Waste Management Facilities on completion of construction;

iv. are fit for their intended purpose; and

v. are capable of meeting the Service Requirements.

4.1.6 The Contractor shall submit to the CGN within [5] Business Days following the end of each Contract Month during the commissioning phase for each Waste Management Facility, a Monthly Commissioning Progress Report covering all the commissioning and testing activities carried out in the preceding Contract Month. The Monthly Commissioning Progress Report shall include as a minimum a description of the following:

i. assessment of actual progress by comparison to the submitted commissioning programme;

ii. summary of the commissioning tasks in the following monthly period;

iii. a summary identifying any aspect of the commissioning and testing that may result in a delay to the delivery of the Waste Management Facilities and the Contractor's proposal for minimising the impact of such delays; and

iv. arrangements for providing details to the CGN on waste treated during the commissioning phase and those inputs not treated and subsequently delivered to landfill.

5. OPERATION

5.1.1 The Contractor shall accept Contract Waste delivered by Authorised Vehicles during the Opening Hours as noted below.

Waste Treatment Facilities:
Mon – Fri [7am – 6pm]
Saturday-Sunday [7am – 3pm]

5.1.2 These Opening Hours will be subject to obtaining the necessary planning consents for operating within these hours.

5.1.3 The Waste Acceptance Plan shall set out waste acceptance criteria for all materials and the Contractor shall ensure that all waste is handled in accordance with the requirements of the Project Agreement, the consents in place and relevant Legislation.

5.1.4 As part of the Waste Acceptance Plan, the Contractor shall detail procedures for the management of Unauthorised Waste that is delivered to the Site(s). This must include a procedure for hazardous waste acceptance. Where waste is accepted on-site and subsequently found to be outside the acceptance criteria, the Unauthorised Waste will be immediately isolated and stored separately and the Contractor shall notify the CGN. Where waste is identified as unauthorised prior to it being discharged, procedures must be in place to ensure that the Unauthorised Waste is sent to another disposal point that is licensed to accept such waste in line with current regulations. If the Contractor fails to isolate and separately store Unauthorised Waste within [1] hour of being identified as such on delivery, then financial deductions will apply as laid down in the performance framework.

5.1.5 Where waste is delivered to a Site in a vehicle not previously notified in advance to the Contractor as an Authorised Vehicle or without the correct written or electronic authorisation, the Contractor will be expected to implement procedures as set out in the Waste Acceptance Plan and to include details in the monthly reports.

5.1.6 The Contractor shall ensure a maximum turnaround time of no more than [20] minutes per Authorised Vehicle delivering Contract Waste from entering a Site, being weighed, unloading and leaving the Site.

5.1.7 The Contractor shall provide such assistance as is reasonably required in the unloading of Contract Waste commensurate with the design and operation of the Waste Management Facilities and as specified within the Waste Acceptance Plan.

5.1.8 The Contractor shall ensure that all waste reception and handling areas shall provide and operate, as minimum requirements, adequate:

v. traffic control and safety barrier systems;

vi. lighting;

vii. drainage and;

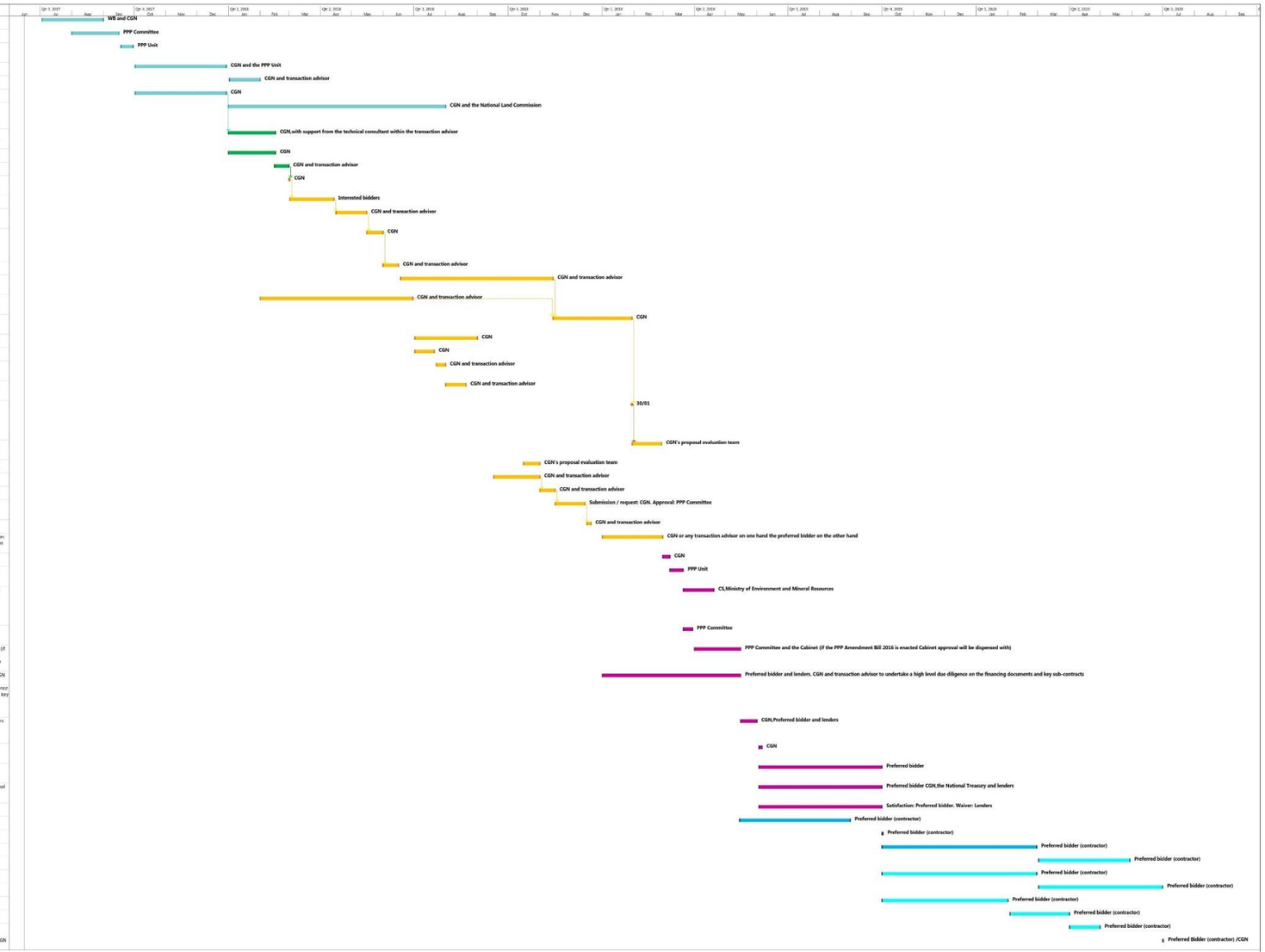
viii. ventilation.

5.1.9 The Contractor shall take full account in the Services Delivery Plan of the variable waste collection delivery patterns that will arise daily and periodically. The Contractor shall take all steps to determine the likely extent of these abnormal waste delivery patterns and make due allowances for them while preserving the standards that apply to ‘normal’ waste delivery periods.

12 Project Implementation Schedule

Figure 5: Implementation Plan

ID	Task Name	Duration	Start	Finish	Responsibility
1	Approval of feasibility study report by World Bank and CGN	44 days	Mon 03/07/17	Thu 31/08/17	WB and CGN
2	Approval of Feasibility Study Report	34 days	Tue 01/08/17	Fri 15/09/17	PPP Committee
3	Approval for the appointment of a transaction advisor to assist the CGN to procure the project	10 days	Mon 18/09/17	Fri 29/09/17	PPP Unit
4	Procurement of transaction advisor to assist CGN to procure the project	65 days	Mon 02/10/17	Fri 29/12/17	CGN and the PPP Unit
5	Execution of contract for transaction advisor	22 days	Tue 02/01/18	Wed 31/01/18	CGN and transaction advisor
6	Funding obtained for project preparation, transaction advisory and land acquisition	65 days	Mon 02/10/17	Fri 29/12/17	CGN
7	Land acquisition - for resettlement of families living on the current dumpsite (estimated end date - assuming no litigation)	152 days	Mon 01/01/18	Tue 31/07/18	CGN and the National Land Commission
8	Scope development	34 days	Mon 01/01/18	Thu 15/02/18	CGN,with support from the technical consultant within the transaction advisor
9	Constitution of a prequalification committee	34 days	Mon 01/01/18	Thu 15/03/18	CGN
10	Preparation of Requests for Qualification (RFQ) and the eligibility criteria	10 days	Thu 15/02/18	Wed 28/02/18	CGN and transaction advisor
11	Publish RFQs in at least two newspapers of nationwide circulation and on electronic media	1 day	Thu 01/03/18	Thu 01/03/18	CGN
12	RFQ responses submitted	31 days	Fri 02/03/18	Fri 13/04/18	Interested bidders
13	Evaluation of RFQs, preparation of pre-qualification evaluation report and development of a shortlist of bidders	22 days	Mon 16/04/18	Tue 15/05/18	CGN and transaction advisor
14	Notification to each applicant who participated in the RFQ and publishing the pre-qualified bidders in the Kenya Gazette and in two newspapers of nationwide circulation	12 days	Wed 16/05/18	Thu 31/05/18	CGN
15	Preliminary meeting with shortlisted bidders	11 days	Fri 01/06/18	Fri 15/06/18	CGN and transaction advisor
16	Preparation of the Requests for Proposals (RFP) including the evaluation criteria and the draft Project Agreement	107 days	Mon 18/09/18	Tue 13/11/18	CGN and transaction advisor
17	If a GOK Letter of support will be issued, include the the key risks expected to be covered thereunder in the RFP	107 days	Thu 01/03/18	Fri 29/06/18	CGN and transaction advisor
18	Issue RFP (including the evaluation criteria and the draft Project Agreement) to shortlisted bidders	55 days	Wed 14/11/18	Tue 29/01/19	CGN
19	Constitute a RFP evaluation team	45 days	Mon 02/07/18	Fri 31/08/18	CGN
20	Receive tender clarification requests from bidders	15 days	Mon 02/07/18	Fri 20/07/18	CGN
21	Convene pre-bid conferences with the shortlisted bidders to discuss the key issues	7 days	Mon 23/07/18	Tue 31/07/18	CGN and transaction advisor
22	Issue tender clarification responses. This may include amendments to the RFP arising from the pre-bid conference	14 days	Wed 01/08/18	Mon 20/08/18	CGN and transaction advisor
23	Shortlisted bidders to submit their final technical and financial proposals (to include a funding solution, term sheet and lenders' comments and any assumptions the bidders have made in preparing their response)	0 days	Wed 30/01/19	Wed 30/01/19	Shortlisted bidders
24	Evaluation of technical proposals (including bidder comments on the draft Project Agreement)	21 days	Wed 30/01/19	Wed 27/02/19	CGN's proposal evaluation team
25	Evaluation of financial proposals	12 days	Tue 16/10/18	Wed 31/10/18	CGN's proposal evaluation team
26	Preparation of an evaluation report	33 days	Mon 17/09/18	Wed 31/10/18	CGN and transaction advisor
27	Approval of the evaluation report	11 days	Thu 01/11/18	Thu 15/11/18	CGN and transaction advisor
28	Submit evaluation to PPP Committee for approval and request commencement of negotiations with the preferred bidder	21 days	Fri 16/11/18	Fri 14/12/18	Submission / request: CGN. Approval: PPP Committee
29	Announce preferred bidder and notify unsuccessful bidders	4 days	Mon 17/12/18	Thu 20/12/18	CGN and transaction advisor
30	Negotiations with the preferred bidder	43 days	Tue 01/01/19	Thu 28/02/19	CGN or any transaction advisor on one hand the preferred bidder on the other hand
31	Submission of project report on the negotiated terms to the PPP Unit	5 days	Fri 01/03/19	Thu 07/03/19	CGN
32	Submission of the project and risk assessment report on the negotiated terms to the PPP Committee	9 days	Fri 08/03/19	Wed 20/03/19	PPP Unit
33	CS, Ministry of Environment and Mineral Resources, to prepare a joint Cabinet memorandum for approval. (If the PPP Amendment Bill, 2016, is enacted before the project gets to this stage, this requirement will fall away)	22 days	Thu 21/03/19	Fri 19/04/19	CS,Ministry of Environment and Mineral Resources
34	Approval of the project and risk assessment report on the negotiated terms	7 days	Thu 21/03/19	Fri 29/03/19	PPP Committee
35	Approval to proceed with the Project	33 days	Mon 01/04/19	Wed 15/05/19	PPP Committee and the Cabinet (if the PPP Amendmnent Bill 2016 is enacted Cabinet approval will be dispensed with)
36	Secure financing and conclude all financing agreements (the preferred bidder should have been engaging with its funders up to this point; and should therefore only require final DD and reports to be carried out, as well as credit committee approvals)	97 days	Tue 01/01/19	Wed 15/05/19	Preferred bidder and lenders. CGN and transaction advisor to undertake a high level due diligence on the financing documents and key sub-contracts
37	Simultaneous commercial and financial close of the project by having the Project Agreement and sub-contracts executed, as well as financing documents	12 days	Thu 16/05/19	Fri 31/05/19	CGN,Preferred bidder and lenders
38	Publish the results of the tender in at least 2 newspapers of national circulation and in electronic media	3 days	Mon 03/06/19	Wed 05/06/19	CGN
39	Preferred bidder to initiate the permitting process and any necessary site investigations	86 days	Mon 03/09/19	Mon 30/09/19	Preferred bidder
40	If applicable, conclude GOK letter of support	86 days	Mon 03/06/19	Mon 30/09/19	Preferred bidder CGN,the National Treasury and lenders
41	Satisfaction or waiver of all conditions precedent to drawn down of debt	86 days	Mon 03/06/19	Mon 30/09/19	Satisfaction: Preferred bidder. Waiver: Lenders
42	Detailed design	78 days	Wed 15/05/19	Fri 30/08/19	Preferred bidder (contractor)
43	Contractor mobilises to site (To be based on the Project Agreement)	1 day	Tue 01/10/19	Tue 01/10/19	Preferred bidder (contractor)
44	Landfill remediation works (To be based on the Project Agreement)	109 days	Tue 01/10/19	Fri 28/02/20	Preferred bidder (contractor)
45	Landfill Phase 1 preparation	65 days	Mon 02/03/20	Fri 29/05/20	Preferred bidder (contractor)
46	IVC - civil works	109 days	Tue 01/10/19	Fri 28/02/20	Preferred bidder (contractor)
47	Commissioning IVC	87 days	Mon 02/03/20	Tue 30/06/20	Preferred bidder (contractor)
48	MRF - civil works	89 days	Tue 01/10/19	Fri 31/01/20	Preferred bidder (contractor)
49	MRF - mechanical works	42 days	Mon 03/02/20	Tue 31/03/20	Preferred bidder (contractor)
50	Commissioning MRF	22 days	Wed 01/04/20	Thu 30/04/20	Preferred bidder (contractor)
51	Receive first formal contract waste	1 day	Wed 01/07/20	Wed 01/07/20	Preferred Bidder (contractor) /CGN



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Appendices

A. Appendix A: World Bank Briefing Note

Revision D (09/06/17).

B. Appendix B: Inception Report

Revision C (06/03/17).

C. Appendix C: Waste Composition Report

Revision A (20/02/17).

D. Appendix D: Waste Flow Model and Waste Flow Model Report

Revision C (13/04/17) for Waste Flow Model Report.

Revision A Version 14 (13/04/17) for Waste Flow Model.

E. Appendix E: Technology Optioneering Evaluation Report

Revision C (09/06/17).

F. Appendix F: Preferred Option Report

Revision B (09/06/17).

G. Appendix G: Task 1 Legal Due Diligence Report

Revision D (7/07/17).

H. Appendix H: Task 1 Financial Reports

Financial reports and models for Task 1:

- H1 Economic and Social Cost Benefit Analysis Rev A (13/04/17);
- H2 Financial Viability Assessment Update Rev A (09/05/17);
- H3 Task 1.2.2 Financial Viability Assessment Rev A (13/04/17);
- H4 Public Sector Comparator Financial Model Manual Rev A (13/04/17);
- H5 Tasks 1.1 Support – Financial Response Rev C (10/07/17);
- PSC Financial Model (12/04/17).

I. Appendix I: Preliminary Environmental and Social Impact Assessment

Revision C (13/07/17).

J. Appendix J: Resettlement Action Plan

Revisions C (03/11/2017).

K. Appendix K: Waste Collection Report

Revision D (10/07/17).

L. Appendix L: Task 2 Procurement Optioneering Report

Revision C (3/11/2017).

M. Appendix M: Financial Model and Financial Model Report

PPP Financial Model Manual Rev B (03/11/2017)

PPP Model (03/11/17).

N. Appendix N: Market Sounding Report

Revision A (09/06/17).

O. Appendix O: Project Risk Matrix

Revision B (07/07/2017).