



SIMBA CEMENT
NATIONAL CEMENT COMPANY LIMITED

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

SUPPLEMENTAL ENVIRONMENTAL IMPACT ASSESSMENT GREENFIELD CLINKER MANUFACTURE AND LIMESTONE MINING OPERATIONS, MERRUESHI, KAJIADO COUNTY, AND CEMENT GRINDING & CABRO MANUFACTURING OPERATIONS, LUKENYA, MACHAKOS COUNTY KENYA



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*Development of Clinker Production Plant and Associated Quarrying Activities, Kenya
Environmental & Social Management Plan Impact (ESMP), NCCL*

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PROJECT BACKGROUND

The International Finance Corporation (IFC) proposes to invest in National Cement Company Limited (“NCCL” or the “Company”) to support: 1) the completion of the Company’s cement manufacturing plant near Nairobi; and 2) the construction and operation of a greenfield clinker manufacturing unit near Merrueshi in southeastern Kenya. NCCL trades under the brand “Simba Cement” and currently produces 0.60 million tons per annum (mpta) of blended Portland cement at its Lukenya plant using clinker imported from abroad. NCCL has completed two additional cement-manufacturing lines on the same site, which will increase Company’s installed capacity to 1.65 mpta (the “Project”).

The existing cement manufacturing plant located in Lukenya, is a facility comprised of 3 cement mills (lines) with a production capacity of 4,400tonnes per day and is operated by NCCL.

The proposed clinker production facility and associated quarries described in this statement will be owned and operated by NCCL, part of the Devki Group of Companies.

Devki is a large, Kenyan owned company that produces, delivers and trades in cement, aggregate, concrete for mixture and similar products for the construction industry. It is also engaged in the steel and iron industry. Devki has an excellent reputation for upholding the laws of the countries within which it operates and where possible extends its environmental performance beyond the requirements of those laws. Devki wishes to grow its business in Kenya in the cement industry and has created NCCL to operate the proposed facility.

National Cement Company Limited has been duly established and organized according to Kenyan Legislation. The registered address of the company is Ruiru Town.

The existing cement manufacturing plant facility includes;

1. 3 Cement Mills
2. 1 Crushing Plant (gypsum)
3. 1 Crushing Plant (Pozzolana)
4. 3 Packaging Plants
5. A Cabro Manufacturing Plant

The proposed green-field facility and limestone mining in Merrushi includes:

- The opening of a limestone quarry to supply the major raw materials for the production process.
- An integrated 3, 300 tpd clinker production line to be located in Merrueshi Area in Kajiado County
- The clinker will be used for the manufacture of cement, according to Kenyan and international norms;

- Coal will be used as the main fuel in clinker production.

The limestone quarry including the clinker plant site area will cover approximately 2,200 acres. The total land area leased by NCCL from the Imbirikani Group Ranch is 1,600 acres and total area purchased from private land is 600 acres. Thus, the total area available to NCCL for the development of the project is 2,200 acres. The clinker plant will cover approximately 207 acres.

Justification for Cement Grinding and Clinker Manufacture Plant

The Kenyan economy is growing and it is predicted that there will be an increase in the national building and infrastructure programme. NCCL wish to develop a new clinker manufacture facility to help meet the expected demand for cement. The preferred plant location is rich in the raw materials necessary for the production of clinker.

Project Objective

The objective of the proposed plant is to produce clinker by using available limestone and clay resources, whilst achieving a balance between impacts on the local environment, community needs and economic viability.

Cement manufacturing consists of raw meal, grinding, blending, calcining to form clinker and cement grinding. In short, limestone and other materials containing calcium, silica, aluminum and iron oxides are crushed and milled into the raw meal.

This raw meal is blended and heated in the pre-heater to initiate the dissociation of carbonate to calcium oxide and carbon dioxide. The meal then proceeds to the kiln for heating and reaction between calcium oxide and other elements to form calcium silicates and aluminates at a temperature up to 1450C. The products leave the kiln as a nodular material called clinker. The clinker is inter-ground with the gypsum and other additives like slag to a fine product called cement.

Main Parts of the Development

The main characteristics of the project are:

- The opening of a limestone quarry to supply the major raw materials for the production process.
- Transport of large volumes of materials along these routes as well as using the established transport infrastructure. Transport will be along roads, using heavy goods vehicles.
- Associated with the development will be the construction of a power line to connect the quarry site with the main existing power line importing energy into the region. The details of the power line, in particular potential routes are being considered at the time of writing this report. NCCL has proposed to avail power supply for the clinker manufacturing facility and the clinker grinding facility from the Kenya Power and Lighting Company (KPLC) grid through dedicated feeders.

- As regards clinker manufacturing facility, there is an existing 132 kV busbar at Kiboko Sub-station of KPLC situated approximately 32 kms from the proposed site. The dedicated connectivity will be obtained from existing KPLC grid. The application for temporary power of 1 Mega Volt Ampere for construction requirements has already been made to KPLC. For operation of the facility a quote has already been obtained from KPLC for construction of the dedicated line. Based on the progress of the project, application for the total requirement of 12 to 13 MVA will be made to KPLC.

This report includes the ESMP for the clinker manufacture and limestone mining as well as that of the cement grinding and clinker manufacturing plants, which are already on going.

A ***Stakeholder Consultation Report*** for the proposed clinker manufacture and limestone mining in Merrueshi has also been prepared and describes in form of Comments and Response the open house meetings held on the 12th February 2014 and 14th March 2014 at the project site as part of the stakeholder consultation process. Individual targeted interviews with other stakeholders who were not part of the open house consultation are also part of this report.

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN –CLINKER MANUFACTURE & LIMESTONE QUARRYING

Construction Phase

Section 1. Ambient Air Quality (AAQ):

Impact	Proposed Mitigation	Residual Impact	Residual Impact Rating	Monitoring	Schedule	Responsibility
1.1 Air quality - dust emissions during construction and ground works	Development of procedures for: Water spraying roads and dusty materials stockpiles Sheeting vehicles carrying dusty materials on leaving the site to prevent materials being blown from the vehicles Speed limits on unmade surfaces on site to limit dust	Dust propagation will be limited to construction area and will not influence local community. However workers should be supplied with dust masks especially in dry days.	Minor adverse	Daily monitoring and observations to determine the level of observable dust from construction activities	Throughout the construction phase	NCCL and Contractor
1.2 Emissions from Motorized Construction Machinery (trucks, tippers, excavators)	Regular Service and Maintenance of construction equipment and machinery Purchase of machinery that have low emission levels	Air quality deterioration from motorized machinery will proceed beyond construction phase	Moderate adverse	Daily monitoring and observations to determine the level of observable dust from construction activities	Throughout the construction phase	NCCL and Contractor

Section 2. Terrestrial Ecology

Impact	Proposed Mitigation	Residual Impact	Residual Impact Rating	Monitoring	Schedule	Responsibility
2.1 Dust deposition on leaves leading to loss of vegetation productivity and health Productivity and quality of vegetation for herbivores reduced	Belts of trees to provide local screening Reduce dust emissions at source Asphalt quarry access roads	Some dust emissions at the quarry sites, associated with blasting etc., are inevitable, but emissions and impacts can be kept to an acceptable level by use of latest technologies and best working practices	Minor adverse	Monthly monitoring and observations to determine the level of observable dust from construction	Through out the construction phase	NCCL and Contractor
2.2 Disturbance of wildlife by noise especially construction related noise from machinery	Reduce at source and use machinery with noise mufflers	There should be some habituation to lower reduced noise levels by some wildlife, but more sensitive species may avoid the project areas	Minor adverse	Daily monitoring of noise emission to ensure that the permissible level are maintained	Through out the construction phase	NCCL and Contractor
2.3 Disturbance of wildlife by human presence including hunting and construction activities	Environmental educational programme for construction workers and local community on penalties associated with wildlife hunting	Full compliance is unlikely and some illegal hunting and gathering can be expected.	Minor to Moderate Adverse	Daily monitoring to ensure that wildlife are not disturbed by human activities including poaching	Through out the construction phase	NCCL and Contractor
2.4 Wildlife "Road-Kills" along main road and access roads during construction	Ecological Survey Ecological Method Statement Road Warning Signs Driver Briefings	With compliance, road-kills should be reduced but some are still inevitable	Minor to Moderate Adverse	Daily monitoring	Through out the construction phase	NCCL and Contractor
2.5 Further land take (habitat loss) for Construction Camp	Conduct RAP studies and Specialist studies on ecological impact and select appropriate sites that would lead to limited	No additional impact since land take would occur anyway at quarry site	Negligible/Nil	N/A	Through out the construction phase	NCCL and Contractor

Impact	Proposed Mitigation	Residual Impact	Residual Impact Rating	Monitoring	Schedule	Responsibility
	habitat loss Rehabilitate areas where vegetation is lost after construction					
2.6 Destruction of fauna and habitat for fauna (mammals, birds, reptiles, amphibians, invertebrates) as a result of construction activities	Further ecological/fauna survey at appropriate seasons and translocations monitored by the company specialist	In long-term populations may recover on restored sites	Minor adverse	Monthly monitoring of flora and fauna to determine impacts	Through out the construction phase	NCCL and Contractor
2.7 Increase in exploitative pressures on habitats neighbouring the sites	Conduct and implement "Habitat Survey and Management Study", in close consultation with local communities	With co-operation of local community and project providing alternative source of income, habitats should be improved.	Minor to moderate adverse (depending on implementation)	Monthly monitoring of resources exploited by local communities	Through out the construction phase	NCCL and Contractor
Section 3. Workers Accommodation						
3.1 Foreign worker health problems may impact on work and wage payment	Specification by contractor of reasonable sickness benefits and sick leave with pay	Sickness over specified period will affect earnings. Early return to work may damage health	Minor to moderate adverse	Monthly health checks of all workers	Through out the construction phase	NCCL and Contractor
3.2 Worker Industrial Emergency	Contracted quality curative treatment in Nairobi for all emergencies. 24 Hour Hospital on site.	Depends on nature of emergency	Minor to moderate adverse	Case by case and depending on emergencies	Through out the construction phase	NCCL and Contractor
3.3 Foreign worker living conditions and quality of life.	Contractor to provide NCCL with detailed specification of camp layout	Depends on individual worker susceptibility.	Minor to moderate adverse	One off	Through out the construction phase	NCCL and Contractor
3.4 Utility and service provision impacts on local	Facilities, and utility provision (and disposal) in	If conditions are poor multitude of issues could arise in camp and spill into	Minor	Monthly	Through out the construction phase	NCCL and Contractor

Impact	Proposed Mitigation	Residual Impact	Residual Impact Rating	Monitoring	Schedule	Responsibility
villages	accordance with identified national international standards. NCCL to monitor health and safety and terms and conditions of employment.	local communities.				
3.5 Disturbance and conflict in camp	In- camp codes of conduct and enforcement of key behaviours	None identified	Minor/moderate adverse	Preparation of code of conduct is one off; conflict handled on a case by case basis	Through out the construction phase	NCCL and Contractor
3.6 Disturbance and/or conflict with local population during camp construction	Camp code of conduct upheld by workers and enforced by camp Provision of employment and opportunities to local population to minimize hostility. Liaison committee to identify early issues and their resolution	Some residual impact expected but scale limited by worker free time, and local interaction with camp	Minor/ Moderate adverse	Every month meetings on community relations to be held and to review any aspects likely to spark tension and conflict	Through out the construction phase	NCCL and Contractor
3.7 Opportunities for local procurement during camp construction	NCCL to arrange initial contacts and encourage contractor to maximise local procurement NCCL should provide a trained facilitator to examine business opportunities and issues from	Unless NCCL provide financial incentives or contractual requirements to contractor this may be unlikely to happen Poor community relations if community see no commercial benefits from the camp	May vary from negligible to moderate beneficial depending on the effort and incentives provided by all parties	Monthly evaluation of all procurement contracts to review how much has been allocated to communities	Through out the construction phase	NCCL and Contractor

Impact	Proposed Mitigation	Residual Impact	Residual Impact Rating	Monitoring	Schedule	Responsibility
	contractor and local provider points of view.					
	NCCL should provide consultant to support business development initiatives and ensure projects are financially sustainable Provision of support by NCCL and /or concessionary terms (not subsidies) by contractor to assist new supply businesses.					NCCL and Contractor
3.8 Potential for increased incidence of sexually transferable disease (STD) in local populations and amongst workers during construction	Preventative health awareness campaigns for STDs provided to foreign workers and targeted at key urban locations/ groups. Provision of free condoms in pharmacies and toilets or similar common access facility.	Difficult to identify cause or source of such diseases as this is commonly hidden and poorly reported. However some disease may be spread and curative treatment may be required for the different diseases, in case of HIV this would be of a long term nature	Moderate (possibly severe) adverse	Monthly medical assessment of all workers; Monthly monitoring of and evaluation of the provision of STD control devices e.g. condoms	Through out the construction phase	NCCL and Contractor
Section 4. WATER BALANCE						
4.1 Importation of pollutants already present within the materials to be used for filling and site	Ensure that pollutants are not present in materials imported onto the site by appropriate	Potential for importation of pollutants in the material will be minimized	Minor adverse	Daily monitoring	Through out the construction phase	NCCL and Contractor

Impact	Proposed Mitigation	Residual Impact	Residual Impact Rating	Monitoring	Schedule	Responsibility
levelling operations	selection of source material and chemical analysis if required					
4.2 Accidental release of fuels, oils, chemicals, hazardous materials, etc., to the ground, especially in the construction lay-down area, during deliver to the site	Appropriate procedures and protocols to be established and monitored for materials delivery and handling	Potential for accidental release during delivery of materials to the site will be minimized	Minor adverse	Daily monitoring	Through out the construction phase	NCCL and Contractor
4.3 Accidental release of fuels, oils, chemicals, liquid waste, hazardous materials, etc., to the ground, especially in the construction lay-down area, during storage	All storage areas will have appropriate environmental security measures to prevent accidental release to ground	Potential for accidental release of materials during storage on the site will be minimized	Minor adverse	Daily monitoring	Through out the construction phase	NCCL and Contractor
4.4 Accidental release of fuels, oils, chemicals, hazardous materials, etc, to the ground, especially in the construction lay-down area, during transport to the area of use	Appropriate procedures and protocols to be established and monitored for materials transport and handling whilst on the site	Potential for accidental release of materials during transport within and handling on the site will be minimized	Minor adverse	Daily monitoring to ensure accidental releases are managed	Through out the construction phase	NCCL and Contractor
Section 5. WASTE MANAGEMENT						
5.1 Accidental release of fuels, oils, chemicals, hazardous materials, etc., to	Appropriate procedures and protocols to be established and monitored for	Potential for accidental release during delivery of materials to the site will be minimized	Minor adverse	Daily monitoring to ensure accidental releases are managed	Through out the construction phase	NCCL and Contractor

Impact	Proposed Mitigation	Residual Impact	Residual Impact Rating	Monitoring	Schedule	Responsibility
the ground during deliver to the construction site	materials delivery and handling					
5.2 Accidental release of fuels, oils, chemicals, liquid waste, hazardous materials, etc, to the ground during storage at construction site	All storage areas will have appropriate environmental security measures to prevent accidental release to ground	Potential for accidental release of materials during storage on the site will be minimized	Minor adverse	Daily monitoring to ensure accidental releases are managed	Through out the construction phase	NCCL and Contractor
5.3 Accidental release of fuels, oils, chemicals, hazardous materials, etc, to the ground during transport to the area of use	Appropriate procedures and protocols to be established and monitored for materials transport and handling whilst on the site	Potential for accidental release of materials during transport within and handling on the site will be minimized	Minor adverse	Daily monitoring to ensure accidental releases are managed	Through out the construction phase	NCCL and Contractor
5.4 Accidental release of fuels, oils, chemicals, hazardous materials, etc, to the ground, during use, for example, re-fuelling, maintenance, etc. during construction	Appropriate procedures and protocols to be established and monitored for materials handling and use. Where possible, re-fuelling and maintenance areas will include some form of secondary containment	Potential for accidental release of materials during use will be minimized	Minor adverse	Daily monitoring to ensure accidental releases are managed	Through out the construction phase	NCCL and Contractor
5.5 Accidental release of liquid wastes during removal from site	Appropriate procedures and protocols to be established and monitored for waste materials removal	Potential for accidental release of waste during removal from the site will be minimized	Minor adverse	Daily monitoring to ensure accidental releases are managed	Through out the construction phase	NCCL and Contractor
5.6 Discharge of pollutants in water used for plant, equipment and	Washing activities will take place on areas with appropriate	Potential for accidental release of pollutants to the ground during washing activities will be minimized	Minor adverse	Daily monitoring to ensure accidental releases are managed	Through out the construction phase	NCCL and Contractor

Impact	Proposed Mitigation	Residual Impact	Residual Impact Rating	Monitoring	Schedule	Responsibility
vehicle washing to ground during the construction	containment and procedures and protocols will be established and monitored to ensure that the preventative measures are efficient					
Section 6. TRANSPORT PLANNING						
6.1 Noise from construction of new plant/quarry	Good site management; Appropriate choice of machinery; Methods of working; Hours of working; Efficient material handling;	Until further details are known, it is not possible to predict whether there may be noise increases at nearby residential properties.	Negligible	Monthly monitoring of noise levels	Through out the construction phase	NCCL and Contractor
6.2 Noise from traffic relating to construction using existing roads through local residential areas	Define access routes to the site with the smallest number of properties in proximity to it. Keep vehicle movements to a minimum.	There may be noise increases at residential properties in proximity to the chosen access route.	Minor Adverse	Monthly monitoring of noise levels in residential areas	Through out the construction phase	NCCL and Contractor
6.3 Increased heavy vehicles traffic both locally and nationally	Unavoidable; prescribe measures and durations for traffic	The traffic has the potential to contribute to congestion and lead to complaints due to noise/vibration	Minor Adverse	The noise levels are not expected to be above the WHO limits	Through out the construction phase	
6.4 Increased Road Accidents along the Emali-Oloitoktok Road	Install speed bumps, additional traffic signs, increase road safety awareness, enforce speed limits	There may be increased accidents as a result of the project	Minor Adverse	Daily monitoring	Through out the construction phase	NCCL and Contractor
6.5 Destruction of road pavements especially at the	Re-design the entry to the quarry plant to accommodate	This will be felt during the construction and operation phase hence requires	Minor Adverse	Monthly monitoring of the road pavements to determine condition	Through out the construction phase	NCCL and Contractor/KenHA

Impact	Proposed Mitigation	Residual Impact	Residual Impact Rating	Monitoring	Schedule	Responsibility
point of entry/turn off to quarry plant	trucks and minimize wear and tear	permanent solution				
6.6 Dust from camp and accommodation construction traffic	Constant visual vigilance of dust issues throughout the construction phase is necessary. All activities should be assessed for the potential for dust creation prior to their undertaking. Observation of the weather conditions is particularly important. Ensure all the roads within the quarry areas and workers camp are paved Routine sprinkling of water (browsers) on roads within the quarry during construction All trucks transporting coal or limestone and other materials should be covered to reduce dust emission impacts	This will be felt during the construction phase only thus limited to this phase only	Minor Adverse	Daily monitoring of dust to determine if levels	Through out the construction phase	NCCL and Contractor

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Operation Phase:

Section 7. Ambient Air Quality (AAQ)

Impact	Proposed Mitigation	Residual Impact	Residual Impact Rating	Monitoring	Schedule	Responsibility
7.1 Release of combustion gas emissions from the kiln stack	Primary operational management control techniques.	Local air quality will be well within the WHO guidelines specified for the protection of human health at all relevant locations. On that basis, it is concluded that there will be no adverse health effects in the local population due to the operation of the clinker plant.	Minor adverse	Constant monitoring of the key parameters and spot sampling of secondary parameters. Monitoring equipment and methods shall be in accordance with: The guidelines set out in the IFC's EHS Guidelines for Cement and Limestone Manufacturing. The daily averaged air emissions from the main stack shall not exceed the following primary limits (mg/Nm³): Particulate Matter: 30	Throughout project life	NCCL and Contractor

Impact	Proposed Mitigation	Residual Impact	Residual Impact Rating	Monitoring	Schedule	Responsibility
8.7 Increase in exploitative pressures on habitats neighbouring the sites	Conduct and implement "Habitat Survey and Management Study", in close consultation with local communities	With co-operation of local community and project providing alternative source of income, habitats should be improved.	Minor to moderate adverse (depending on implementation)	Constant vigilance to ensure that road kills are prevented	Throughout project life	NCCL and Contractor
Section 9. Workers Accommodation						
9.1 Increased Employment (positive change)	Measures to maximise local employment and improve local skill base recommended. Local recruitment of young people currently being trained outside the area Enhanced apprenticeship/ training for some local people whose skills could be improved Positive selection and prioritisation of employment of PAP's Identification of targets of local people to be employed by skills level Publication of local employment targets in local newsletter. Recruitment policy to extend in future to limited sponsorship BSc (or equivalent) for workers /local people children	This depends on skills of the young people and interest to return to home area, and on the opportunity offered by NCCL and targets set.	Major beneficial	Monthly monitoring to evaluate the number of locals employed	Throughout project life	NCCL and Contractor
9.2 Increased tax and	Assistance to villages to	Increased budget for Kajiado	Major beneficial		Throughout the project lifespan	NCCL and Contractor

Impact	Proposed Mitigation	Residual Impact	Residual Impact Rating	Monitoring	Schedule	Responsibility
	sensitive arrangements (e.g. for child care arrangements). Annual monitoring of change in activities and incomes related to lime burning and grazing herds as well as other dynamic changes in activities and incomes from employment by NCCL cement to be monitored annually during construction and in the first years of operation. Reporting to investors and via CSR report and Liaison forum. Specific attention to be given to vulnerable households.					
9.5 Extended and Improved Road and implications for local economy (minor/moderate beneficial)	Regulations relating to roadside and commercial activities to be adhered to by business persons and enforced. Monitoring of health, road safety issues. Curative and preventive action to be taken if issues identified by monitoring.	Improved opportunities should be seen in increased opportunities and wealth of village. It may be difficult to apportion this only to the new road or cement works given the current increasingly dynamic economic environment. Residual impacts of noise and dust for local residents near the road and indirectly affected.	Minor to moderate adverse		Throughout the project lifespan	NCCL and Contractor
9.6 Loss of land and property for households and compensation (minor beneficial / minor adverse)	An appropriate compensation plan should be developed and agreed. See separate compensation plan framework document.	PAP's should incur no negative residual impact. The assessment should include <u>all</u> applicable entitlements Monitoring process to review and report.	Negligible/ minor beneficial		Throughout the project lifespan	NCCL and Contractor

Impact	Proposed Mitigation	Residual Impact	Residual Impact Rating	Monitoring	Schedule	Responsibility
9.7 Hazards associated with roads from main intersection to the quarry plant.	With regards to identified 'high' risk - Design measures to ensure landslips/falling rocks do not cause accidents - Inclusions of pedestrian walkways and crossings - Planned access and parking. In addition measures to manage cyclists and equestrians shall be incorporated. Risk of accident shall be reduced by implementation of education (road safety awareness) programmes and liaison with the local communities as well as driver training programmes and implementation of near-miss/accident reporting procedures. As part of the exercise proposed closed silo lorry lease agreements and contractual terms should be reviewed.	Some residual impact is expected but should be limited by implementation of aforementioned mitigation measures.	Moderate adverse – possibly severe adverse if there is disregarded for safety issues by the road users.	Constant vigilance to ensure that road accidents are minimised	Throughout the project lifespan	NCCL and Contractor
9.8 Roadside residents health and quality of life	Risk assessment to cover these aspects and identify	Depends on both cases a) Effectiveness of monitoring undertaken	Minor/moderate adverse	Monthly monitoring of health records to	Throughout the project life span	NCCL and Contractor

[illegible]

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[illegible]

[illegible]

Impact	Proposed Mitigation	Residual Impact	Residual Impact Rating	Monitoring	Schedule	Responsibility
		concluded that there will be no adverse health effects in the local population due to the operation of the plant.		and spot sampling of secondary parameters. Monitoring equipment and methods shall be in accordance with: The guidelines set out in the IFC's EHS Guidelines for Cement and Limestone Manufacturing. The daily averaged air emissions from the main stack shall not exceed the following primary limits (mg/Nm³): Particulate Matter: 30 SO₂: 400 NO_x: 600 The operator shall also observe the limits for secondary parameters (HCl, hydrogen fluoride, dioxins-		

Impact	Proposed Mitigation	Residual Impact	Residual Impact Rating	Monitoring	Schedule	Responsibility
				furans etc) as stated in the IFC's EHS Guidelines.		
11.2 Release of particulate emissions from the kiln, the clinker cooler and the coal mill.	Bag filters and electro precipitator – dust abatement.	Local air quality will be within the WHO limits and specified guidelines for the protection of human health.	Negligible	Constant monitoring of the key parameters and spot sampling of secondary parameters. Monitoring equipment and methods shall be in accordance with: The guidelines set out in the IFC's EHS Guidelines for Cement and Limestone Manufacturing. The daily averaged air emissions from the main stack shall not exceed the following primary limits (mg/Nm³): Particulate Matter: 30 SO₂: 400 NO_x: 600	Throughout project life	Contractor/NCCL

Impact	Proposed Mitigation	Residual Impact	Residual Impact Rating	Monitoring	Schedule	Responsibility
waters quality due to process water direct disposal or leakage of polluting materials.	water circulation is closed circuit including settlement tank for treatment. Storage of fuels for clinker production in enclosed storage area. Tidying the plant on regular basis with mechanical sweepers removing dust collected on the streets and gutters. Thorough washing of surfaces in case of polluting materials spillages and further processing of collected washings as special waste. For quarries: Appropriate collection and transportation of potential polluting materials (e.g. spent oils, lubricants, etc.)			vigilance and regular assessment of effluent releases.	project life	
11.7 Pollution of surface water due to release of harmful/untreated sewage.	The septic tank treatment system will be peak for peak demand during construction phase and therefore will cope with the demands Contractor/NCCL during operational phase. No hazardous liquids will be released in to the septic tank treatment system.	None	Negligible	Constant vigilance and regular visual assessment of releases into natural water bodies.	Throughout project life	NCCL
11.8 Soil Erosion	For quarries: Gradual rehabilitation of locations where extraction works have been completed.	Soil erosion will be limited on-site the quarries.	Minor adverse		Throughout project life	Contractor/NCCL
11.9 Ground and Groundwater contamination.	For quarries: Secondary containment for potential polluting materials. Any contaminated land removal and disposal to appropriate	Potential contamination will be limited on-site.	Minor adverse	Constant vigilance and regular visual assessment of releases into natural water	Throughout project life	Contractor/NCCL

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Impact	Proposed Mitigation	Residual Impact	Residual Impact Rating	Monitoring	Schedule	Responsibility
12.6 HIV/AIDS and communicable disease spread as a result of truckers waiting to load goods over a period of time	Initiate HIV/AIDS education and awareness and provide for example condoms	There may be increase in prostitution in the area targeting truck drivers hence becoming a hotspot	Moderate adverse	Monthly monitoring of health records to evaluate incidences and regular VCT for workers	Throughout project life	Contractor/NCCL /MoH

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN –LUKENYA CEMENT GRINDING PLANT

Section 13. Noise Emissions

Activity/Emission Source	Impact (s)	Mitigation Measure (s)	Residual Impact	Residual Impact Rating	Monitoring	Schedule	Responsibility/
13.1 Truck traffic carrying raw materials and finished products in and out of the plant	Truck Traffic Noise within the plant and surrounding environment	Noise Emission Measurements within the IFC Limits for Noise	Noise emission quality well within the WHO guidelines specified for the protection of human health at all relevant locations. On that basis, it is concluded that there will be no adverse health effects in the local population due to the operation of the plant.	Negligible	Periodic monitoring of noise levels	Throughout plant operation until decommissioning	NCCL;
	Occupation Health Impacts to workers within the plant especially hearing related problems	Provide ear muffs to all workers on site Replace ear muff and goggles frequently as prescribed and whenever they are damaged Conduct frequent health check ups for all workers especially for hearing related problems	Noise emission quality well within the WHO guidelines specified for the protection of human health at all relevant locations. On that basis, it is concluded that there will be no adverse health effects in the local population due to the operation of the plant.		Limited occurrence of hearing related problems from workers Availability of workers using ear muff via observation	Throughout plant operation until decommissioning	NCCL;
13.2 Crushing mills for gypsum and pozzolana	Noise emissions from crushing mills	Partially enclose the mills to reduce the noise emitted to the external environment Provide ear muffs to all workers on site	Noise emission quality well within the WHO guidelines specified for the protection of human health at all relevant locations. On that basis, it is concluded that there	Minor adverse	Periodic (Quarterly) monitoring of the emissions (undertake noise emission measurements) at each mill Limited occurrence of	Through out plant operation until decommissioning	NCCL;

Activity/Emission Source	Impact (s)	Mitigation Measure (s)	Residual Impact	Residual Impact Rating	Monitoring	Schedule	Responsibility/
					Availability of workers using ear muff via observation		
13.4 Packaging of Cement (3 Packaging Plants)	Noise Emission during dumping of clinker	Provide ear muffs to all workers on site Replace ear muff and goggles frequently as prescribed and whenever they are damaged Conduct frequent health check ups for all workers especially for hearing related problems Limit the duration of workers exposure to the mills to 8 hours Staff working in areas of high noise levels should undergo training and regular hearing checks.	Noise emission quality well within the WHO guidelines specified for the protection of human health at all relevant locations. On that basis, it is concluded that there will be no adverse health effects in the local population due to the operation of the plant.	Minor Adverse	Noise Monitoring programme. Noise levels in operational areas of the plant should be measured, and the risk of damage to hearing arising from high noise levels. Periodic (Quarterly) monitoring of the emissions (undertake noise emission measurements) at each mill Limited occurrence of hearing related problems from workers Availability of workers using ear muff via observation	Throughout plant operation until decommissioning	NCCL;

Section 14. Ambient Air Emissions

Activity/Emission Source	Impact (s)	Mitigation Measure (s)	RI	RII	Monitoring	Schedule	Responsibility
14.1 Truck traffic carrying raw materials and finished products in and out of the plant	Fugitive dust emissions – Particulate Matter within the plant and surrounding environment	Pave the entire plant site Water spraying of roads and dusty materials stockpiles All trucks carrying products/materials into and out of the plant must be containerized/covered Speed limits on unmade surfaces on site to limit dust Landscape the site-planting trees	Local air quality will be well within the WHO guidelines specified for the protection of human health at all relevant locations. On that basis, it is concluded that there will be no adverse health effects in the local population due to the operation of the clinker plant.	Negligible	Concentration and intensity of observable fugitive dust Extent to which the plant is paved Constant vigilance and visual assessment of dust emissions Evidence of frequent water spraying of stockpiles Evidence of containerized trucks within the plant Availability of speed limit signs within the plant site	Throughout plant operation until decommissioning	NCCL;
	Occupation Health Impacts to workers within the plant (respiratory and eye related diseases and infections)	Provide dust masks and goggles to all workers on site Replace dust masks and goggles frequently as prescribed and whenever they are damaged Conduct frequent health check ups for all workers especially for respiratory and eye related infections	Air quality within the plant will vary with intensity in certain areas high and not safe for direct human	Minor Adverse	Limited occurrence of respiratory and eye health related infections from workers Availability of workers using dust masks and goggles via observation	Throughout plant operation until decommissioning	NCCL; NCCL;

Activity/Emission Source	Impact (s)	Mitigation Measure (s)	RI	RII	Monitoring	Schedule	Responsibility
			exposure				
14.2 Crushing mills for gypsum and pozzolana	Fugitive dust emissions – Particulate Matter within the plant and surrounding environment	2 Bag Filters installed in each of the crushing areas Landscape the site-planting trees	Air quality within the plant will vary with intensity in certain areas high and not safe for direct human exposure	Minor Adverse	Periodic (Quarterly) monitoring of the air emissions (undertake air emission measurements) at each bag filter installed to determine if they are functioning effectively Install real time air emission monitoring equipment (long run) to detect degree of emissions from each source in relation to the WHO/IFC standards	Throughout plant operation until decommissioning	NCCL;
	Occupation Health Impacts to workers within the plant (respiratory and eye related diseases and infections	Provide dust masks and goggles to all workers on site Replace dust masks and goggles frequently as prescribed and whenever they are damaged Conduct frequent health check ups for all workers especially for respiratory and eye related infections	Air quality within the plant will vary with intensity in certain areas high and not safe for direct human exposure	Minor Adverse	Limited occurrence of respiratory and eye health related infections from workers Availability of workers using dust masks and goggles via observation	Throughout plant operation until decommissioning	NCCL:
14.3 Storage of Clinker (Clinker Dump Hopper)	Fugitive dust emissions during dumping of clinker	Bag Filter installed Landscape the site-planting trees	Air quality within the plant will vary with intensity in certain areas high	Minor Adverse	Periodic (Quarterly) monitoring of the air emissions (undertake air emission measurements) at each bag filter	Throughout plant operation until decommissioning	NCCL

Activity/Emission Source	Impact (s)	Mitigation Measure (s)	RI	RII	Monitoring	Schedule	Responsibility
					equipment (long run) to detect degree of emissions from each source in relation to the WHO/IFC standards		
	Occupation Health Impacts to workers within the plant (respiratory and eye related diseases and infections)	Provide dust masks and goggles to all workers on site Replace dust masks and goggles frequently as prescribed and whenever they are damaged Conduct frequent health check ups for all workers especially for respiratory and eye related infections	Air quality within the plant will vary with intensity in certain areas high and not safe for direct human exposure	Minor Adverse	Limited occurrence of respiratory and eye health related infections from workers Availability of workers using dust masks and goggles via observation	Throughout plant operation until decommissioning	NCCL;
14.5 Packaging of Cement (3 Packaging Plants)	Fugitive dust emissions during packing of cement products	Bag Filters installed (centralized) in each packing plant Landscape the site-planting trees	Air quality within the plant will vary with intensity in certain areas high and not safe for direct human exposure	Minor Adverse	Periodic (Quarterly) monitoring of the air emissions (undertake air emission measurements) at each bag filter installed to determine if they are functioning effectively Install real time air emission monitoring equipment (long run) to detect degree of emissions from each source in relation to the WHO/IFC standards	Throughout plant operation until decommissioning	NCCL;

Activity/Emission Source	Impact (s)	Mitigation Measure (s)	RI	RII	Monitoring	Schedule	Responsibility
	Occupation Health Impacts to workers within the plant (respiratory and eye related diseases and infections)	Provide dust masks and goggles to all workers on site Replace dust masks and goggles frequently as prescribed and whenever they are damaged Conduct frequent health check ups for all workers especially for respiratory and eye related infections	Air quality within the plant will vary with intensity in certain areas high and not safe for direct human exposure	Minor Adverse	Limited occurrence of respiratory and eye health related infections from workers Availability of workers using dust masks and goggles via observation	Throughout plant operation until decommissioning	NCCL;
14.6 Manufacture of Cabro Blocks	Fugitive dust emissions during construction of plant	Ensure all trucks in and out of plant construction area are covered Ensure all stock piles are covered Provide construction workers with PPE including dust masks and goggles	Air quality within the plant will vary with intensity in certain areas high and not safe for direct human exposure	Minor Adverse	Observable trucks in and out of plant – containerized Observable watering/spraying to reduce dust in construction site Observable workers with adequate PPE for mitigating dust emission impacts Limited observable dust emission in the site	Throughout plant operation until decommissioning	NCCL;