

Republic of Kenya Coast Water Works Development Agency



IMPROVEMENT OF DRINKING WATER AND SANITATION SYSTEMS IN MOMBASA : MWACHE CKE 1103

**Detailed Designs, Tender Documents, Safeguard Reports
and Construction Supervision of Mwache Water
Transmission Pipelines and Terminal Reservoirs**

Contract No : CWSB/AFD/MWCE/C/3/2017

ESIA STUDY REPORT

JULY 2025



Error! Use the Home tab to apply PdG_Nom_projet to the text that you want to appear here.

REPUBLIC OF KENYA - COAST WATER WORKS DEVELOPMENT AGENCY

Error! Use the Home tab to apply PdG_Nature_document to the text that you want to appear here.

VERSION	DESCRIPTION	PREPARED BY	APPROVED BY	DATE
01	Environmental and Social Impact Assessment (ESIA) Study Report for Proposed Mwache Trunk Main and South Mainland Water Transmission Pipeline.	Godwin L Sakwa, Ranjit S. Rupra	Bernard Danthon	25.01.2022
02	Environmental and Social Impact Assessment (ESIA) Study Report for Proposed Mwache Trunk Main and South Mainland Water Transmission Pipeline.	Godwin L Sakwa, Ranjit S. Rupra	Bernard Danthon	13.09.2024
03	Environmental and Social Impact Assessment (ESIA) Study Report for Proposed Mwache Trunk Main and South Mainland Water Transmission Pipeline.	Godwin L Sakwa, Ranjit S. Rupra	Bernard Danthon	07.07.2025
ARTELIA - Water, Climate and Solid Waste 6 rue de Lorraine – 38130 Echirolles – FRANCE – TEL : +33 (0)4 76 33 40 00 MANGAT, I.B.PATEL LIMITED – Consulting Engineers P.O. Box 48674, 00100 - GPO - Nairobi, KENYA – TEL : +254 20 2710500				

CERTIFICATION

Compiled By:

Signed Date.....

Godwin Lidahuli Sakwa
NEMA Registered Lead Expert NEMA Reg No. 2492

Checked By:

Authorized Representative:

Signed Date.....

Eng Ranjit S. Rupra

ARTELJA - Water, Climate and Solid Waste
6 rue de Lorraine – 38130 Echirolles – FRANCE – TEL : +33 (0)4 76 33 40 00

MANGAT, I.B.PATEL LIMITED – Consulting Engineers
P.O. Box 48674, 00100 - GPO - Nairobi, KENYA – TEL : +254 20 2710500

1

Proponent

Signed Date.....

Chief Executive Officer (CEO)
Coast Water Works Development Agency
Mikindani Street, Off Nkurumah Road, P.O. Box 90417-80100, Mombasa, Kenya. Tel: +254 041 231 5230

TABLE OF CONTENTS

ABBREVIATIONS AND ACRONYMS	G
EXECUTIVE SUMMARY	1
E.1 BACKGROUND	2
E.2 OBJECTIVES OF ENVIRONMENTAL IMPACT ASSESSMENT	5
E.3 LEGAL AND POLICY REGULATORY INSTRUMENTS	6
E.4 PUBLIC AND STAKEHOLDER PARTICIPATION	7
E.6 PROJECT IMPACTS.....	18
E.6 ASSESSMENT OF IMPACTS.....	27
E.7 FINDINGS	40
E.8 PROVISIONS	41
MAIN REPORT	1
1. INTRODUCTION	0
1.1. GENERAL	0
1.2. PROJECT BACKGROUND	1
2 PROJECT DESCRIPTION.....	5
2.1 TRUNK MAIN ROUTE BASELINE CHARACTERISTICS.....	5
2.2 TOPOGRAPHY, LAND-USE AND PIPELINE WAYLEAVES FOR THE TRUNK MAIN ROUTE	7
2.3 SOUTH MAINLAND TRANSMISSION MAIN PIPELINE ROUTE BASELINE CHARACTERISTICS	8
2.4 TOPOGRAPHY, LAND-USE AND PIPELINE WAYLEAVES FOR THE SOUTH MAINLAND TRANSMISSION PIPELINE ROUTE.....	10
2.5 PIPELINE ROUTE ALTERNATIVES.....	11
2.5.1 Options for the South Mainland Pipeline	11
2.5.2 Conclusion on the Design and Size of the South Mainland Water Transmission Main	13
3 ENVIRONMENTAL BASELINE INFORMATION.....	18
3.1 CLIMATE.....	18
3.2 DRAINAGE AND HYDROLOGY	18
3.3 GEOLOGY AND SOILS	19
3.4 TOPOGRAPHY	22
3.5 AIR QUALITY.....	24
3.6 BIODIVERSITY.....	24
3.7 ENVIRONMENTAL RECEPTORS WITHIN PROJECT AREA	32
4 SOCIO ECONOMIC BASELINE INFORMATION	33

4.1	LOCATION AND ADMINISTRATION	33
4.2	LAND OWNERSHIP AND SETTLEMENT PATTERNS	33
4.3	EDUCATIONAL INSTITUTIONS.....	33
4.4	HEALTH INSTITUTIONS.....	34
4.5	INCOME STREAMS	35
4.6	ACCESS TO DRINKING WATER	35
4.7	SANITATION AND HYGIENE	36
4.8	SOURCES OF ENERGY.....	36
4.9	SOCIAL RECEPTORS WITHIN PROJECT AREA.....	37
5	APPROACH AND METHODOLOGY	39
5.1	SCREENING ASSESSMENT	39
5.2	FULL STUDY TERMS OF REFERENCE (TOR) PREPARATION	39
5.3	BASELINE CONDITIONS	40
5.4	STAKEHOLDER ENGAGEMENT	40
5.5	IMPACT ASSESSMENT METHODOLOGY.....	41
5.6	MITIGATION AND ENHANCEMENT MEASURES	43
5.7	RESIDUAL IMPACT	44
5.8	MANAGEMENT AND MONITORING AND AUDIT	44
6	POLICY AND LEGAL FRAMEWORK	45
6.1	POLICY PROVISIONS.....	45
6.2	LEGAL FRAMEWORK	48
6.3	REGULATIONS AND RULES.....	53
6.4	ENVIRONMENT AND SOCIAL STANDARDS.....	55
6.5	ENVIRONMENTAL AND SOCIAL RISK MANAGEMENT POLICY FOR AFD-FUNDED OPERATIONS ..	57
7	STAKEHOLDER CONSULTATION.....	61
7.1	STAKEHOLDER CONSULTATIONS	61
7.2	STAKEHOLDER MAPPING AND IDENTIFICATION	61
7.3	STAKEHOLDER AND PUBLIC PARTICIPATION SCHEDULE	62
7.4	GRIEVANCE REDRESS MECHANISM	66
8	ASSESSMENT OF ENVIRONMENTAL AND SOCIAL IMPACTS	70
8.1	INTRODUCTION	70
8.2	CONSTRUCTION PHASE POSITIVE IMPACTS	70
8.3	OPERATION PHASE POSITIVE IMPACTS	70
8.4	CONSTRUCTION PHASE NEGATIVE IMPACTS	71
8.4.1	Impact on Physical Resources and Receptors	71
8.4.2	Impact on Biological Resources and Receptors	78
9	ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMP).....	98
9.1	PURPOSE AND OBJECTIVES OF ESMP	98
10	FINDINGS AND PROVISIONS.....	115

10.1 FINDINGS 115

10.2 PROVISIONS 116

APPENDIX 1 120

TABLES

Table E.1 – Pipeline to the South Mainland	5
Table E.1: Applicable Policy and Legal Statutes	6
Table E.2: Schedule of Public Participation	8
Table E.3: Stakeholders Concerns and Responses	9
Table E.5: :Trees Composition within Pipeline Alignment within Mwache forest.....	Error! Bookmark not defined.
Table E.6: Biophysical Receptors	18
Table E.7: Social Receptors.....	19
Table E.8: Impact Significance	27
Table E.9: Impact Significance Assessment	27
Table E.10: Summary of Resettlement Impact (Pipeline and Dongo Kundu Reservoir Site)	28
Table E.10 RAP Budget (Bonje Mazeras Reservoir)	28
Table E.11: Environment and Social Impacts and Mitigation – Construction Stage	29
Table 2.1: Brief Description of the Mwache Trunk Main Pipeline Route	7
Table 2.2: – Brief Description of the South Mainland Transmission Main Route	11
Table 2.3: – Pipeline to the South Mainland	12
Table 3.1: Mwache River Water Quality Parameters	19
Table 3.2: Mteza stream Water Quality Parameters	19
Table 3.3:Trees Composition within Pipeline Alignment within Mwache forest	Error! Bookmark not defined.
Table 3.2: Environmental Receptors	32
Table 4.1: Educational Institutions Project Area	34
Table 4.2: Social Receptors within Pipeline Corridor	37
Table 5.1: Schedule of Public Participation	40
Table 5.2: Impact characteristics.....	41
Table 5.3: Impact characteristics.....	41
Table 5-4: Definition of Likelihood	42
Table 5-5: Impact Significance.....	43
Table 6.1: Policy Framework Relevant to Water Infrastructure	45
Table 6.2: Legal Framework Relevant to Water Infrastructure.....	48
Table 6.3: Regulations and Polices	53
Table 6-5: World Bank Environment and Social Standards.....	55
Table 7-1: Inventory of the Project Stakeholder	62
Table 7-2: Schedule of Stakeholder Public Participation	62
Table 7-3: Stakeholders Concerns and Responses	64
Table 7.4: Stakeholders Concerns and Response in Gandini Location.....	64
Table 7.5: Stakeholders Concerns and Response in Mbuguni Location.....	65
Table 7.6: Stakeholders Concerns and Response in Kiteje Sub Location	65
Table 7.7: Grievance Redress Steps.....	68
Table 8.1: Pre-Mitigation Impact Assessment.....	71
Table 8.2: Residual Impact Significance	72
Table 8.3: Mitigation Impact Assessment	73
Table 8.4: Residual Impact Significance	74
Table 8.5: Pre-Mitigation Impact Assessment.....	75
Table 8.6: Residual Impact Significance	76
Table 8.7: World Bank Group Noise Level Guidelines.....	77
Table 8-8: NEMA Noise Level Guidelines	77
Table 8.9: Pre-Mitigation Impact Assessment.....	77
Table 8.10: Residual Impact Significance	78
Table 8.11: Pre-Mitigation Impact Assessment.....	79

Table 8.12: Pre-Mitigation Impact Assessment.....	84
Table 8.13: Residual Impact Significance	85
Table 8.14: Potential Impacts on Occupational Health and Safety and Worker Management	86
Table 8.15: Pre-Mitigation Impact Assessment.....	86
Table 8.16: Residual Impact Significance	88
Table 8.17: Summary of Resettlement Impact (Pipeline and Dongo Kundu Reservoir Site)	90
Table 8.18: RAP Budget (Pipeline)	91
Table 8.19: RAP Budget (Dongo Kundu Reservoir).....	91
Table 8.20: RAP Budget (Bonje Mazeras Reservoir).....	91
Table 8.21: RAP Budget (Bonje Mazeras Reservoir).....	91
Table 9.1: Environment and Social Management Monitoring Plan	99

Figures

Figure 1.1: Map of Proposed South Mainland Route	4
Figure 1.2: Map of Receptors Chainage 0+000 to 1+067	20
Figure 1.3: Map of Receptors Chainage 1+402 to 1+524	21
Figure 1.4: Map of Receptors Chainage 2+499 to 3+353	22
Figure 1.5: Map of Receptors Chainage 3+353 to 3+627	23
Figure 1.6: Map of Receptors Chainage 4+877 to 5+395	24
Figure 1.7: Map of Receptors Chainage 6+005 to 6+767	25
Figure 1.8: Map of Receptors Chainage 7+599 to 8+458	26
Figure 1.1: Location Plan of the Project Area.....	0
Figure 1.2 - Components of the Mwache Dam Project and respective Financing Agencies.....	2
Figure 1.3: Layout of the proposed Mwache Water Transmission Pipelines Project	4
Figure 2.1: – Schematic Layout of the proposed Trunk Main	5
Figure 2.2: Layout Plan of the Trunk Main section of the Mwache Transmission Pipelines.....	6
Figure 2.3: Alignment of the Kaya Bombo Water Transmission Pipeline	9
Figure 3.1: Soil Map of the pipeline Route	21
Figure 3.2: Elevation Map of the pipeline Route.....	23
Figure 3.3: Layout map of pipeline section through Mwache forest	30
Figure 3.4: Map of vegetation map	31
Figure 4.1: Education level of Residents within the Project Area	34
Figure 4.2: Income Streams of People along the Pipeline Corridor	35
Figure 4.3: Source of Water to Residents.....	36
Figure 4.4: Access to Sanitation Services	36
Figure 4.5: Sources of Energy for Residents.....	37
Figure 7.1. Grievance Redress Procedure	69

ABBREVIATIONS AND ACRONYMS

AFD	Agence Francaise de Développement
ASALs	Arid and Semi-Arid Lands
AoI	Area of Influence
BoD	Biological Oxygen Demand
BMU	Beach Management Unit
CFA	Community Forest Association
CWWDA	Coast Water Works Development Agency
C-ESMP-	Construction – Environment and Social management Plan
CoC	Code of Conduct
CHSMP	Construction Health and Safety Management Plan
DMP	Dust Management Plan
ESAAP	Environment and Social Audit Action Plan
EHS	Environment Health and Safety
EA	Environmental Assessment
EIA	Environment Impact Assessment
EMCA	Environment Management & Coordination Act
ESMP	Environment and Social Management Plan
IFC	International Finance Cooperation
ILO	International Labour Organization
IUCN	International Union for Conservation of Nature
KFS	Kenya Forest Service
H&S	Health and Safety
NEMA	National Environment Management Authority
NOx	Nitrogen Oxides
Sox	Sulphur Oxides
SGR	Standard Gauge Railway
SML	South Mainland
OSHA	Occupational Safety and Heal Act
Pm	Particulate Matter
PPE	Personal Protective Equipment
MOWASSCO	Mombasa Water and Sanitation Services Company
NMP	North Mainland
RoW	Right of Way
TMP	Traffic Management Plan
VOC	Volatile Organic Compounds
WML	West Mainland
WTP	Water Treatment Plant
WBG	World Bank Group
WRA	Water Resources Authority
WMP	Waste Management Plan

EXECUTIVE SUMMARY

E.1 BACKGROUND

Trunk Water Main

The scope of works under Mwache Trunk Main will entail construction of Twin DN1000 Trunk Main Pipeline from the proposed Mwache Water Treatment Plant to the proposed West Mainland Reservoir Site located within Kasemeni Location of Kinango Sub County in Kwale County. Total length of the Trunk Main is 5.1km. The start point elevation of the Trunk Main at the WTP is 115 masl, which is the adopted clear water tank outlet level. From the WTP, the Mwache Trunk Main traverses south-east, through undeveloped land and small scale cultivated lands to the Mwache Forest. Within the Mwache Forest, the trunk main is proposed to be laid between the newly constructed Standard Gauge Railway (SGR) and the Mwache River. The section of the trunk main within the forest is approx. 1.5km in length. This section of the trunk main has a high cross-fall slope between the SGR and the Mwache River.

After the forest, the trunk main continues generally along the standard gauge railway for approx. 250m up to Ch. 2+930, where the Transmission Main to the South Mainland (Kaya Bombo Transmission Main) branches off. At this point, the trunk main, transmitting flow allocations for West Mainland, Changamwe and Nguu Tatu turns to the N.E, crossing the SGR at Ch. 3+155 then continues further to the N.E for 300m before turning North, traversing through undeveloped land to the old Meter Gauge Railway at Ch. 4+725. Upon crossing the old meter gauge railway, the proposed North Mainland Pipeline branches off at Ch. 4+850, with the Trunk Main continuing North East for 250m to the proposed West Mainland Reservoir Site.

South Mainland Transmission Main

The Mwache South Mainland Transmission Main (Kaya Bombo Pipeline) which is 27.7km of a single DN 1000 Pipeline branches off from the Mwache trunk main at Ch. 2+900 of the Trunk Main and traverses in the S.W direction, joining the existing wayleave of Marere Water Transmission pipeline, then runs along the Marere Pipeline to the Creek where it is proposed to cross beside the existing creek Crossing. The transmission line traverses Kasemeni and Gandini Locations in Kinango Sub County and N'gombeni Location of Matuga Sub County in Kwale County.

The length of the crossing from the high tide level on the LHS bank to the high tide level on the RHS bank is approx. 700m.

The Mwache South Mainland Transmission Pipeline then follows the alignment of the existing Marere Pipeline for approx. 6.4km up to Ch. 9+586 at Lutsangani. At this location, the proposed pipeline turns S.W. to join the existing DN 200 Kaya Bombo Pipeline wayleave for 12.2km up to the existing Kaya Bombo reservoir site at Ch. 21+744.

The Pipeline on this section will cross the Pemba River at Ch. 11+090. It will then traverse through Mteza, Mbuguni, Majera and Kaya Bombo villages to the existing Kaya Bombo reservoir site.

At the existing Kaya Bombo Reservoir Site, an offtake from the transmission pipeline will deliver the 4,000m³/day allocation to Kwale County, to the existing reservoirs then the main pipeline will continue S.E along the alignment of the existing DN 350 Tiwi Pipelines for approx. 1.1km to the Kiteje - Kaya Bombo road at Ch. 22+824. At this point, the pipeline will turn N.E, along the Kiteje-Kaya Bombo road for approx. 4.6km to Ch. 27+370 where it will traverse through private parcels for approx. 250m to the proposed reservoir site at Ch. 27+625. Figure 1-1 below presents proposed route for South Mainland Pipeline while map of main features affected along the line are illustrated under section E.5 below.

Trunk Section Through Mwache Forest

The trunk main section 1.5km will traverse through Mwache forest which is Mwache is a gazetted forest reserve located in Kwale County, and covers approximately 417 hectares. The pipeline alignment was adopted after analysis of 3Nr. different Pipeline route options as discussed in sub section (1.5) of this report.

From the analysis, route Option 2 where the Pipeline within 4m wide corridor of the Mwache forest adjacent to the SGR Reserve involves:

- **Section 1:** Initial 400m section of the pipeline within the forest to be laid fully within the forest due to hydraulic considerations. The width of forest affected under this option will be 8m. The area of forest land affected on this 400m long section is 0.33Ha. - Section 2: 1.1km section of the pipeline along the alignment of the SGR. The pipeline on this section will be laid within a 4m wide corridor adjacent to the existing SGR reserve, hence affecting only a 4m wide section of the forest for the 1.1km section of pipeline along the railway. The area of forest land affected on this 1.1km long section is 0.44Ha. (See Figure 2.1)

The Critical Habitat Assessment (CHA) was carried between the Month of April to May 2025 as provided by the International Finance Corporation (IFC) Performance Standards PS6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources (IFC 2012, 2019). Finding of the CHA have been integrated in this report under **Sub Sections 2.6, 2.7, 3.6, 6.7, 7.4, 8.2.4, table 8.12, ESMP Table 9.1** and provisions section **E-8 and 10.2**

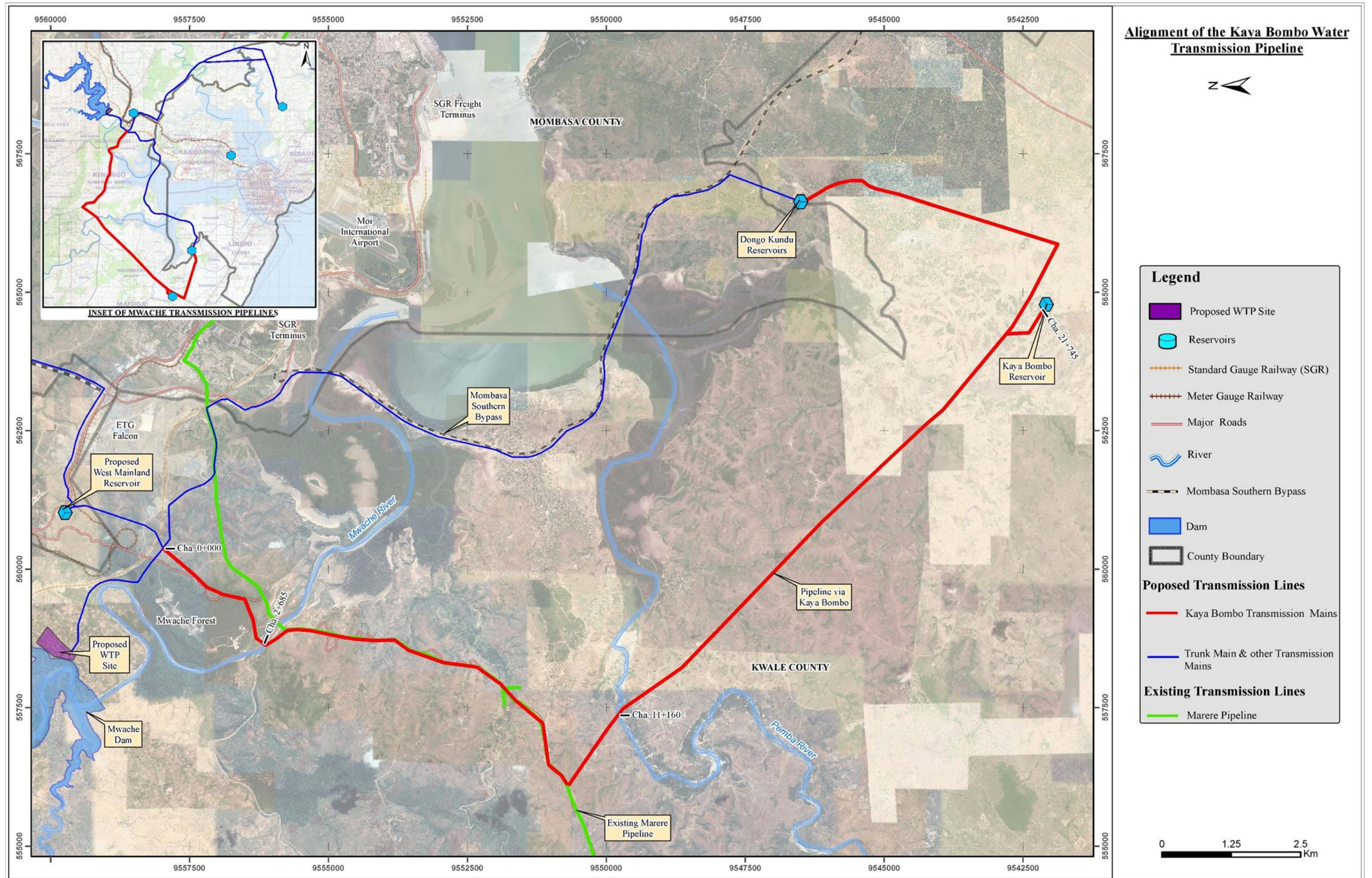


Figure 1.1: Map of Proposed South Mainland Route

E.2 OBJECTIVES OF ENVIRONMENTAL IMPACT ASSESSMENT

The assessment was undertaken in line with the requirements of the Environmental Management and Coordination Act (EMCA) 1999 cap 387 section (58). The main objective of the assessment was to identify and assess Social and Environmental Impacts resulting from the Proposed Mwache Trunk Main and South Mainland Water Transmission Pipeline. The main focus was on impacts of the water pipeline construction to biophysical social and economic environmen. Also, the assessment provides appropriate mitigation measures to be implemented at Project construction and operation stages for adopted pipeline route as discussed in sub section below.

Analysis of Pipeline Alternatives

The following two options have therefore been considered for Water Transmission to the South Mainland:

- The first option, denoted as Option I below, entails the installation of a single transmission pipeline through Kwale County to supply both the existing Kaya Bombo reservoirs and the proposed new Dongo Kundu reservoir.
- The second one, denoted as Option II below, consists of two pipelines transmitting equal flows to the South Mainland, one along the Mombasa South Mainland and via the bridges and the second via the Kwale route, both pipes with much more balanced flowrates in order to be compatible with the piping system on the bridges as proposed by Roadworks Consultant.

Hydraulic calculations for the above two options are presented in the design report while their characteristics and cost estimates are summarized in Table 16 below.

Table E.1 – Pipeline to the South Mainland

OPTION	LENGTH km	DIA. mm	DAILY VOL. m ³	UNIT COST ¹ USD/m	TOTAL COST 1000 USD
Option I : one pipeline in Kwale County, extended to Dongo Kundu					
Pipeline to Kaya Bombo, through Kwale County	21.7	1000	71,900	775	16,818
Extension from Kaya Bombo to Dongo Kundu	5.9	900	67,900	690	4,071
Total cost estimate (rounded)					20,900
Option II : one pipeline along the Southern Bypass Road & one pipeline in Kwale County, extended to Dongo Kundu					
Pipeline to D. Kundu along the Southern Bypass Road	14.9	800	35,950	555	8,270
Outside bridges and viaduct	12 x 2.8	250	35,950	155	5,208
Pipeline in Kwale County					
Pipeline to Kaya Bombo	21.7	800	35,950	555	12,044
Extension to Dongo Kundu	5.9	700	31,950	500	2,950
Total cost estimate (rounded)					28,500

¹ Pipeline costs based on Ex-Mombasa Steel Pipeline quotes as received from local manufacturer

Study Duration and Team

The study was undertaken for a period of 3 month from October 2021 to January 2022, and reviewed in January 2024, the study team comprised of below listed experts

#	Name	Qualifications	Profession
1	Godwin Lidahuli Sakwa	MA Environmental Planning and Management	Lead Environmentalist – NEMA License NO 2492
2	Dr Adimo Aggrey	PHD Philosophy Landscape Planning and Conservation	Lead Environmentalist – NEMA License NO 2074
3	Dorothy Mbuvi	MA Sociology	N/A
4	Obra Mmaisti	Research Assistant	N/A
5	Eng Eric Muriithi	Civil Engineer	MIBP
6	Eng James Kilonzo	Civil Engineer	MIBP

E.3 LEGAL AND POLICY REGULATORY INSTRUMENTS

The project is listed under the Second Schedule of the EMCA 1999 cap 387 (and 2015 Amendments) Section 4 (a) and (c), and Section 7 (b), (d) and (e) all of which require that an EIA be carried out to identify the environmental impacts, their significance and mitigation measures be proposed. Also, World Bank OP 4.01 on Environmental Assessment requires that such projects be subjected to an environment impact assessment. Further, Environmental and Social Risk Management Policy for AFD-funded Operations was also reviewed. **Table E.1** provide a summary of Policy and Legal Statutes that were reviewed in this assessment.

Table E.2: Applicable Policy and Legal Statutes

NO	POLICY
Government Policies	- National Environment Policy (NEP) 2013 - The National Water Policy 2012 (Draft) - The National Environmental Sanitation and Hygiene Policy-July 2007: - National Policy on Water Resources Management and Development (Sessional Paper No.1 of 1999) - Kenya Vision 2030 - National Climate Change Response Strategy, 2010 - Climate Change Policy Framework 2016 - Economic Recovery for Wealth and Employment Creation Strategy 2006 - Big 4 Agenda - Kenya National Youth Policy 2006 - National Gender and Development Policy, 2019 - National policy for prevention and response to gender based violence, 2014 - The National Occupational Safety and Health Policy, 2012
Acts of Parliament	- Constitution of Kenya (CoK) 2010 - EMCA 1999 Cap 387 - Land Act, 2012 - Environment and Land Court Act, 2011 - Water Act, 2016 - County Government Act No. 17 of 2012 - Physical and Land Use Development Plan Act 2019 - Occupational Health and Safety Act (OSHA 2007) - HIV and AIDS Prevention and Control Act 2011 - Sexual Offences Act 2006

NO	POLICY
	• Child Rights Act (Amendment Bill) 2014 • Labour Relations Act 2012 • National Gender and Equality Commission Act 2011 • The National Museums and Heritage Act 2006 • Energy Act 2019 • Traffic Act 2015 • Public health act, cap 242 • Climate change act 2016 • Penal code CAP 63 • The Standards Act Cap 496 • The National Construction Authority Act, 2011 • Malaria Prevention Act (CAP 246)
Rules and Regulations	• The Environmental (Impact Assessment and Audit) Regulations, 2003 • Environmental Management and Coordination (Water Quality) Regulations, 2006 • (Waste Management Regulations, 2006 • Noise and Excessive Vibration Pollution (Control) Regulations, 2009 • The Environmental Management and Coordination (Air Quality Regulations 2014) • Fire Risk Reduction Rules, 2007 • Medical Examination Rules, 2005 • Safety and Health Committee Rules of 2004 • First-Aid Rules, 1977
World Bank Environment and Social Standards (ESS)	• (ESS1) Assessment and Management of Environmental and Social Risks and Impacts • (ESS2) Labor and Working Conditions • (ESS3) Resource Efficiency Pollution prevention and Management • (ESS4) Community Health and Safety • (ESS5) Land Acquisition, Restrictions on land Use and Involuntary Resettlement • (ESS6) Biodiversity Conservation and Sustainable Management of Living Natural Resources • (ESS7) Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities • (ESS8) Cultural Heritage • (ESS10) Stakeholder Engagement and Information Disclosure
AFD Safeguards Policy	Environmental and Social Risk Management Policy for AFD-funded Operations

E.4 PUBLIC AND STAKEHOLDER PARTICIPATION

Kenya's Environmental Impact Assessment / Audit Regulations of 2003 require that in the process of Environmental Impact Assessment (EIA), the proponent shall in consultation with the National Environment Management Authority (NEMA); seek the views of persons who may be affected by the Project.

Stakeholder mapping was done by the help of local administration headed by area Deputy County Commissioner who provided the list of key stakeholders to be included in the assessment, section being revised appropriately to reflect consultations with, Kenya Forest Services, Beach Management Unity and Community Forest Association and Local Administration. The schedule of public barazas within the Gandini, Mbuguni Location and Kiteje Sub Locations is summarized **Table E.2**.

Table E.3: Schedule of Public Participation

Local Administration Meeting

MEETING	VENUE	DATE
Meeting with Kasemeni Sub County DCC	DCC office in Mazeras	20 th October 2021
Meeting with Gandini Location Chief	Chiefs Office in Gandini	22 nd October 2021
Meeting with Mbuguni Location Chief	Chiefs Office in Mbuguni	23 rd October 2021
Meeting with Kiteje Sub Location	Chiefs Office in Kiteje Sub Location	24 th October 2021

Kenya Forest Services Consultation

STAKEHOLDER	VENUE	DATE
Kenya Forest Services (KFS)	Kenya Forest Services (KFS) offices – Kwale Offices	24 th October 2021

BMU / CFA Proposals to be Supported under the Project

#	BMU/ CFA	Proposals to be supported by the Project
1	Tsunza, Mwache and Bonje	- Tree planting and re- afforestation Programs - Stakeholder Sensitisation (Community) programs on conservation - Stakeholder Sensitisation programs (Kenya Ports Authority KPA) on conservation - Restoration Programs of Mangroves in Degraded areas - Beach Clean-up and Waste Management Programs - Bee Keeping Activities - Fish Ponds and fishing sites including; Kwasoa, Toneza, Maguzoni, Dongo Kundu, Chuyu, Ngare, Mkupe, Mbagani, Gutu, Mwinjala, Mshame, Mwekerwe Nyanje, Chiweni, Manzazani, Mwangowa, Mwishomo, Fungu ya Kati, Chilomoni, Hodi - Nursery Establishment within Kaya Chonyi, Kaya Mrera, Kaya Bombo, Kaya Mbuguni and Kaya Teleza

Stakeholder Workshop with Beach Management Units (BMU) and Community Forest Association (CFA)

BMU / CFA	VENUE	DATE
Tsunza BMU and CFA	Royal Star Resort Mazeras	14 th June 2023
Mwache BMU and CFA	Royal Star Resort Mazeras	14 th June 2023
Bonje BMU and CFA	Royal Star Resort Mazeras	14 th June 2023

Public Meetings

LOCATION/ SUB LOCATION	VENUE	DATE	ATTENDEES
Gandini Location	Gandini Chiefs Camp office	21st October 2021	38 Male 29 females
MBuguni Location	Gandini Chiefs Camp office	22 nd October 2021	33 males 19 females
Kiteje Sub Location	Kiteje Sub Location Office	23 rd October 2021	26 males 17 females

Tables E.3 presents summary of concerns raised by stakeholders during the consultations.

Table E.4: Stakeholders Concerns and Responses

Kenya Forest Services (KFS)

STAKEHOLDER	RESOLUTIONS
Kenya Forest Services (KFS)	- CWWDA to formally apply for approval to lay the pipeline within Mwache Forest. Application to be addressed to the Chief Conservator of Forest (CCF) – Kwale County. - The application should clearly indicate the Scope of Works planned to be undertaken within the forest. - The application should include a clear Layout Plan and indicate the proposed pipeline route - The CCF will review the application and communicate the decision of KFS officially to CWWDA. - After approval is granted by KFS, CWWDA will undertake survey of the pipeline route. - After Survey works is completed, CWWDA will further apply through the CCF for approval or authority to commence pipeline construction. - This application will be reviewed and approval granted to CWWDA by KFS for construction works. This will be through a lease permit that will be renewed on an annual basis. - CWWDA will ensure that the proposed pipeline is restricted within existing track and the existing water pipeline easement, this approach will ensure that no tree is cleared along the easement. However, at the truncation, any trees that will be affected will be valued and cost included in the permit fees - KFS also will supply the project with required samplings for compensatory trees that shall be required to be planted along the pipeline alignment.
Local Administration	- The office of Sub County Commissioner supports CWWDA initiative of expanding water distribution networks within Mombasa and Kwale Counties - The office of Sub County Commissioner is ready to assist CWWDA to mobilise any stakeholder consultations that might be required through project implementation stage - Local administration would ask to be involved in any stakeholder workshops that might be organized by CWWDA with regards to the Project - The DCC office advises consultations with Kenya Forest Services (KFS) given that the pipeline section traverses through Mwache forest.

Local Barasa

SUGGESTION / QUESTION	RESPONSE
Residents wanted to know how cases of disputed land will be handled.	The meeting was informed that the consultant in liaison with CWWDA will establish a grievance Redress Committee that will look into disputes locally. Residents were encouraged to use the GRC to solve disputes instead of court process that might be lengthy and expensive.
Residents wanted to know if during compensation there will be any discussion between property owner and the client about the rates.	The meeting was informed that compensation rates will be provided by a registered government value to ensure accuracy. During RAP report disclosure, residents will be given a chance to adjust if need be.
Residents wanted to know what will happen to residents who have bought parcels of land but the subdivision process is yet to be completed.	The meeting was informed that the National Land Commission will follow up and authenticate the land documents to ensure compensation is done to the right owner.
Residents Wanted to be informed on how damages to private property outside the acquired project wayleave will be handled.	The meeting was informed that the wayleave will include extra working space. Any property that falls within the wayleave corridor will be compensated. In the event that the contractor damages property outside the wayleave, they will have to be reinstated on fresh compensation done by the contractor.
Residents wanted to be informed on when the project will commence.	The meeting was informed that funding for the project which include construction of Mwache dam and the transmission line is available. The project will commence immediately after all the pre requisite reports including ESIA report and NEMA licence has been issued and also a resettlement action plan has been prepared for the affected persons. Specific timelines to be communicated through the local administration.
Residents wanted to know what will happen in the event that the pipeline passes were graves are.	Residents were informed that the contractor will try as much as possible to avoid graves, in areas where it is not possible to avoid, the community will be allowed to use their cultural procedures of relocating graves. The project client will facilitate the process.
Residents wanted to know if the contractor will source for workforce within the community where the works will be implemented.	Residents were informed that both unskilled labour and some skilled (if available) will be sourced from the local community. Youths were encouraged to organize themselves into groups and avail themselves for consideration.

Stakeholder Consultations during critical habitat assessment within mwache forest

The assessment made use of traditional knowledge through engagement of local community elder from the local Dururma Community. The elder was in charge of interpreting biological resources that were observed by the assessment team including assistance in identifying local names and value of such resources. Additionally, stakeholder consultations were undertaken with relevant Beach Management Unit (BMU) and Community Forest Association (CFA). The forums were held as per indicated schedule as indicated in Table E.5 below.

Table E.5:: Schedule of Stakeholder Consultations

#	Meeting Detail	Date and Venue
<u>1</u>	<u>Bonje Beach Management Unit (BMU) Meeting</u>	<u>13th March 2025 at Bonje</u>
<u>2</u>	<u>Mkupe Beach Management Unit (BMU) Meeting</u>	<u>14th March 2025 at Mkupe</u>

The community recognizes critical role that Mwache forest plays including habitats for diverse species, and contributes to the local economy through eco-tourism and sustainable resource management. The forest also provides materials like timber, fuel, local vegetables and other resources for the local population. Table E.6 below presents a summary of discussions held with the community.

Table E.6:: Stakeholder Consultations Issues

#	Topic	Discussion
<u>1</u>	<u>Importance of Mwache Forest</u>	It plays a crucial role in coastal protection, provides habitats for diverse species, and contributes to the local economy through eco-tourism and sustainable resource management They provide materials like timber, fuel, local vegetables and other resources for the local population.
<u>2</u>	<u>Importance of Creek / Mangroves</u>	Mangroves provide traditional ropes used in fishing sector Vegetation within mangrove provide medicinal value Provide breeding ground for fish, crabs, prawns, oysters, snails, Mollusca. Mangrove provide timber to the local for construction sector (residential structures and boat making) Tourist attracting Creek help in control of storm and ocean wave surge Provision of clean air
<u>3</u>	<u>Threats to the Creeks / Mangroves and Forest Ecosystem</u>	Charcoal burning Over collection of firewood Clearing for farming Over fishing and bait collection Oil spills Sedimentation / erosion Human settlement Drought Plastic and other solid Wastes
<u>4</u>	<u>Hot Spots</u>	Gami Quarries Ltd is a locally incorporated Kenyan Company has continuously opened an active quarry within the forest for mining ballast, concrete blocks to pre-cast products. <i>Mbele, Goro, Darajani, Difu, Mwanzenge, Maweni, Ngondi, Nianze, Mbagani</i>, all affected by charcoal burning and deforestation
<u>5</u>	<u>Suggested Mitigations Measures to Threats</u>	Tree planting and re- afforestation Programs Stakeholder Sensitisation (Community) programs on conservation Restoration Programs of Mangroves in Degraded areas Beach Clean-up and Waste Management Programs Bee Keeping Activities Termination of quarrying activities within Mwache Forest

Minutes and the attendance list of the public barazas are presented as **Appendix 3** to this Report.

E.5 BIOPHYSICAL AND SOCIAL ENVIRONMENT

Climate²

Annual Average precipitation of Kinango Sub County is 852mm. The precipitation is highest in the months of April and May while no or little precipitation occurs from December to March. 75% Dependable Annual rainfall is 610 mm. The annual minimum temperatures in the area range between 22.5°C and 24.5°C while the maximum temperatures vary between 27°C and 32°C along the coastal belt. The sub county is generally hot and humid all the year round, with a relative humidity of about 60% along the coastal belt due to the high evaporation rate and availability of surface water.

The precipitation is highest in the months of April and May while no or little precipitation occurs from December to March. Annual Average precipitation is about 900mm against an average 1,860mm evapo-transpiration in the region, with 75% Dependable Annual rainfall equivalent to 610 mm. Evaporation rates recorded at the Moi International Airport in Mombasa provide

Drainage and Hydrology

The drainage of Kasemeni, Gandini, Mbuguni and Ng'ombeni Locations within Kinanango and Matuga Sub Counties of Kwale County is influenced by the ocean, which determines the easterly surface slope. While there are no permanent rivers and streams, the pipeline alignment is characterized with notable dry streams and seasonal rivers, among them Mwache river, Gandini and Ng'ombeni streams as well as the Pemba river.

The dry streams collect surface runoff discharging from numerous drains from the immediate catchment and watershed resulting into soil erosion that has left notable gullies, especially on steep sloppy areas. Additionally, apart from some sections of the larger riverbeds that tend to retain water after floods, there are no possibilities of flooding around the project areas. This implies a well-drained area in both surface as well as the largely porous geological formations.

Mwache River is the main water body (though it is seasonal by nature) in the project area with its source in the Taita hills. The main tributaries (also seasonal) discharging into the river include Bome river from the south immediately downstream of the proposed dam axis lines and Mnyenzi river also from the southwest immediately upstream of the dam axis. There are also numerous dry surface drains into Mwache River that seemingly flows with water only during rainy seasons. The water resources along the proposed pipeline route have varying Water quality from one water body to the other, with a particular difference between the fresh water and the brackish water from the Mwache Creek.

Geology and Soils

The pipeline corridor from Gandini to Ng'ombeni falls within the Cainozoic rocks that occur on the coastal strip of land bordering Indian Ocean and include stratigraphic units belonging to Pliocene, Pleistocene and Recent periods. These are composed of sands, dune sands, raised coral reef, crags, red wind-blown sands and raised alluvial deposits.

Topography

The topography of the pipeline corridor gently rises from Mombasa Island near Indian Ocean coast of Kenya and from EL 0.0m (mean sea level), rising steadily towards Kinango and Matuga Sub Counties. The topography of the trunk main route is generally characterized by a hilly terrain, with steep slopes along and across the alignment, with numerous seasonal water courses including streams and gulleys, and a seasonal river at Ch. 1+000.

² <https://www.worlddata.info/africa/kenya/climate-coast.php>

The topography of the South Mainland Transmission Pipeline (Kaya Bombo Pipeline) route is characterized by a generally hilly terrain, with predominantly steep slopes on the entire section from the start point to the Kaya Bombo reservoir site. The

Biodiversity

Vegetation impacted within Mwache Forest Section

The Critical Habitat Assessment was carried between the Month of April to May 2025 as provided by the International Finance Corporation (IFC) Performance Standards PS6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources (IFC 2012, 2019).

IFC Guidance Note (GN) 6 paragraphs GN70–83 provides that biodiversity values should be screened using critical habitat criteria and thresholds including (i). Criterion 1: Critically Endangered (CR) and Endangered Species (EN) applicable thresholds being areas that support globally important concentrations of an IUCN Red-listed EN or CR species ($\geq 0.5\%$ of the global population and ≥ 5 reproductive units GN16 of a CR or EN species). (ii) Criterion 2: Endemic and Restricted-range Species for terrestrial vertebrates and plants, restricted-range species are defined as those species that have an Extend of Occurrence (EOO) less than 50,000 square kilometres (km²) and (iii) Criterion 3: Migratory and Congregatory Species, being areas known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle and areas that predictably support ≥ 10 percent of the global population of a species during periods of environmental stress.

Trees and Shrubs

The tree and shrub diversity of the forest patch is dominated by *Obetia radula*, a tree and grows primarily in the seasonally dry tropical forests of eastern Africa and western Indian Ocean islands. It has the highest importance value (56.102) of all the species encountered (Table 1). Thirty-four of these were trees or small shrubs with the potential of developing into full-grown trees. The second most noticeable is *Encephalartos hildebrandtii*, a cycad native to eastern African coasts at elevations up to 600m asl. The IVIs for the 12 most abundant species are Table E-7 below presents Trees and Shrubs Abundance and Cover.

Table E.7: Trees and Shrubs Abundance and Cover

#	Species	Rel. dens	Rel. freq	Rel. dom / basal area	Imp value
<u>1</u>	<u><i>Obetia radula</i></u>	<u>9.15</u>	<u>3.09</u>	<u>43.86</u>	<u>56.10</u>
<u>2</u>	<u><i>Encephalartos hildebrandtii</i></u>	<u>1.72</u>	<u>4.12</u>	<u>17.65</u>	<u>23.49</u>
<u>3</u>	<u><i>Grewia plagiophylla</i></u>	<u>3.92</u>	<u>7.22</u>	<u>6.12</u>	<u>17.26</u>
<u>4</u>	<u><i>Millettia usaramensis</i></u>	<u>1.96</u>	<u>2.06</u>	<u>9.18</u>	<u>13.20</u>
<u>5</u>	<u><i>Bullockia mombazensis</i></u>	<u>1.57</u>	<u>5.15</u>	<u>3.59</u>	<u>10.31</u>
<u>6</u>	<u><i>Canthium mombazense</i></u>	<u>1.57</u>	<u>5.15</u>	<u>3.59</u>	<u>10.31</u>
<u>7</u>	<u><i>Markhamia zanzibarica</i></u>	<u>4.66</u>	<u>4.12</u>	<u>1.35</u>	<u>10.13</u>
<u>8</u>	<u><i>Terminalia obicularis</i></u>	<u>5.39</u>	<u>2.06</u>	<u>1.76</u>	<u>9.22</u>
<u>9</u>	<u><i>Chrysophyllum viridifolium</i></u>	<u>5.39</u>	<u>2.06</u>	<u>0.45</u>	<u>7.90</u>
<u>10</u>	<u><i>Donella viridifolia</i></u>	<u>5.39</u>	<u>2.06</u>	<u>0.45</u>	<u>7.90</u>
<u>11</u>	<u><i>Maytenus heterophylla</i></u>	<u>3.59</u>	<u>3.09</u>	<u>0.95</u>	<u>7.63</u>
<u>12</u>	<u><i>Garcinia livingstonei</i></u>	<u>2.45</u>	<u>4.12</u>	<u>0.47</u>	<u>7.04</u>

#	Species	Rel. dens	Rel. freq	Rel. dom / basal area	Imp value
<u>13</u>	<u>Zanthoxylum chalybeum</u>	<u>0.98</u>	<u>1.03</u>	<u>4.90</u>	<u>6.91</u>
<u>14</u>	<u>Psydrax parviflora</u>	<u>2.61</u>	<u>3.09</u>	<u>1.19</u>	<u>6.90</u>
<u>15</u>	<u>Atrabotrys modestus</u>	<u>2.45</u>	<u>4.12</u>	<u>0.30</u>	<u>6.87</u>
<u>16</u>	<u>Croton dichogamus</u>	<u>4.41</u>	<u>2.06</u>	<u>0.38</u>	<u>6.85</u>
<u>17</u>	<u>Lonchocarpus bussei</u>	<u>1.23</u>	<u>4.12</u>	<u>0.90</u>	<u>6.25</u>
<u>18</u>	<u>Vachelia zanzibarica</u>	<u>2.45</u>	<u>2.06</u>	<u>1.73</u>	<u>6.24</u>
<u>19</u>	<u>Grewia forbesii</u>	<u>1.72</u>	<u>4.12</u>	<u>0.31</u>	<u>6.15</u>
<u>20</u>	<u>Terminalia spinosa</u>	<u>3.43</u>	<u>2.06</u>	<u>0.59</u>	<u>6.08</u>
<u>21</u>	<u>Asteranthes asterias</u>	<u>4.90</u>	<u>1.03</u>	<u>0.13</u>	<u>6.06</u>
<u>22</u>	<u>Phyllanthus reticulata</u>	<u>2.29</u>	<u>3.09</u>	<u>0.21</u>	<u>5.59</u>
<u>23</u>	<u>Ormocarpum trichiocarpum</u>	<u>1.23</u>	<u>4.12</u>	<u>0.15</u>	<u>5.50</u>
<u>24</u>	<u>Vepris trichocarpa</u>	<u>2.94</u>	<u>2.06</u>	<u>0.24</u>	<u>5.24</u>
<u>25</u>	<u>Senegalia mellifera</u>	<u>1.96</u>	<u>2.06</u>	<u>1.08</u>	<u>5.11</u>
<u>26</u>	<u>Capparis tomentosa</u>	<u>1.63</u>	<u>3.09</u>	<u>0.16</u>	<u>4.88</u>
<u>26</u>	<u>Rinorea spp</u>	<u>2.94</u>	<u>1.03</u>	<u>0.10</u>	<u>4.07</u>
<u>28</u>	<u>Uvaria acuminata</u>	<u>2.94</u>	<u>1.03</u>	<u>0.04</u>	<u>4.02</u>
<u>29</u>	<u>Strychnos spinosa</u>	<u>1.47</u>	<u>2.06</u>	<u>0.19</u>	<u>3.73</u>
<u>30</u>	<u>Rhus natalensis</u>	<u>0.98</u>	<u>2.06</u>	<u>0.12</u>	<u>3.17</u>
<u>31</u>	<u>Combretum spp</u>	<u>1.96</u>	<u>1.03</u>	<u>0.16</u>	<u>3.15</u>
<u>32</u>	<u>Rhoicissus revoilii</u>	<u>1.96</u>	<u>1.03</u>	<u>0.13</u>	<u>3.12</u>
<u>33</u>	<u>Senna siamea</u>	<u>1.96</u>	<u>1.03</u>	<u>0.10</u>	<u>3.09</u>
<u>34</u>	<u>Lantana camara</u>	<u>0.98</u>	<u>2.06</u>	<u>0.04</u>	<u>3.08</u>
<u>35</u>	<u>Caturagerum nilotica</u>	<u>0.98</u>	<u>2.06</u>	<u>0.03</u>	<u>3.07</u>
<u>36</u>	<u>Hemenodictylon parvifolium</u>	<u>0.98</u>	<u>2.06</u>	<u>0.02</u>	<u>3.07</u>
<u>37</u>	<u>Ozoroa insignis</u>	<u>0.98</u>	<u>1.03</u>	<u>0.70</u>	<u>2.72</u>
<u>38</u>	<u>Vachelia tortilis</u>	<u>0.98</u>	<u>1.03</u>	<u>0.17</u>	<u>2.18</u>
<u>39</u>	<u>Commiphora edulis ssp shimperiana</u>	<u>0.98</u>	<u>1.03</u>	<u>0.16</u>	<u>2.17</u>
<u>40</u>	<u>Vepris uquinifolia</u>	<u>0.98</u>	<u>1.03</u>	<u>0.15</u>	<u>2.16</u>
<u>41</u>	<u>Calliandra calothyssus</u>	<u>0.98</u>	<u>1.03</u>	<u>0.12</u>	<u>2.13</u>
<u>42</u>	<u>Commiphora shimperi</u>	<u>0.98</u>	<u>1.03</u>	<u>0.05</u>	<u>2.06</u>
<u>43</u>	<u>Polysphaeria parvifolia</u>	<u>0.98</u>	<u>1.03</u>	<u>0.03</u>	<u>2.04</u>
<u>44</u>	<u>Acalypha fruticosa</u>	<u>0.98</u>	<u>1.03</u>	<u>0.02</u>	<u>2.03</u>
<u>45</u>	<u>Tinnaea aethiopica</u>	<u>0.98</u>	<u>1.03</u>	<u>0.01</u>	<u>2.02</u>

Herbs and Grasses

The most common herbs and grasses were *Periploca linearifolia*, a twining climber or liane with milky latex and known for its traditional values, and *Panicum maximum*, a densely clumping perennial grass. Other common grasses were *Chloris roxburghiana* and *Cynodon dactylon*, both important pasture species sensitive to land degradation and overgrazing as detailed in **Table E-8** below.

Table E.8. Common herbs and Grasses

<u>Species</u>	<u>H/G</u>	<u>Maximum % cover</u>
<i>Periploca linearifolia</i>	<u>H</u>	<u>40%</u>
<i>Panicum maximum</i>	<u>G</u>	<u>30%</u>
<i>Chloris roxburghiana</i>	<u>G</u>	<u>20%</u>
<i>Cynodon dactylon</i>	<u>G</u>	<u>10%</u>
<i>Asystasia gangetica</i>	<u>H</u>	<u><10%</u>
<i>Cenchrus ciliaris</i>	<u>G</u>	<u><10%</u>
<i>Cissampelos pareri</i>	<u>H</u>	<u><10%</u>
<i>Crotolaria spp</i>	<u>H</u>	<u><10%</u>
<i>Cynanchum spp</i>	<u>H</u>	<u><10%</u>
<i>Gnidia spp</i>	<u>H</u>	<u><10%</u>
<i>Heteropogon contortus</i>	<u>G</u>	<u><10%</u>
<i>Melhania velutina</i>	<u>H</u>	<u><10%</u>
<i>Sida ovata</i>	<u>H</u>	<u><10%</u>
<i>Solanum incanum</i>	<u>H</u>	<u><10%</u>
<i>Tephrosia villosa</i>	<u>H</u>	<u><10%</u>

Avian Species

Birdlife was profiled all along the transect alignment within forest, notable species encountered during a cursory survey and during TSC were the African or fork-tailed drongo (*Dicrurus adsimilis* LC), black swift (*Apus barbatus* LC), black kite (*Milvus migrans* LC), paradise fly-catcher (*Terpsiphone viridis* LC), ring-necked dove (*Streptopelia capicola* LC), pied crow (*Corvus albus* LC), pied wagtail (*Motacilla alba* LC), speckled mousebird (*Colius striatus* LC), village or spot-backed weaver (*Ploceus cucullatus* spilonotus NE) and an unidentified hornbill. The scientific names used here follow <https://ebird.org/explore>.

Mammals

Among the mammals identified were the African civet (*Civettictis civetta*), vervet monkey (*Cercopithecus aethiops*), Kenya coast galago or dwarf bushbaby (*Paragalago cocos*), Kirk's dik-dik (*Madoqua kirkii*), duiker (*Cephalophus silvicultor*), Clawless Otter (*Aonyx capensis*), squirrels, rabbit, rats and mice.

From the flora and fauna species analysis undertaken in this assessment, none of the species collected along the sampling polygon along the pipeline corridor met the thresholds detailed by the IFC PS 6 Guidance Note GN70–83. Further, assessment of species listed under IBAT was undertaken applying the thresholds provided under GN6.1 (criteria 1–5) that assessed presence or absence of the species, habitat suitability, observation status and threshold status (Appendix 3 of Critical Habitat Assessment Report), similarly, no species met the thresholds of triggering either of the criterion detailed in para above.

Flora within the Larger Pipeline Alignment

Other species will include in local languages Mwawa, Mwanga, Mkanju (Cashew nuts), Mpororo, Kikwata, Mkone, Mnyubu, Mkilifi (neem tree), Mbuyu (Boobab), Mfunu, Mchonge Mahana and Mkwakwa. In liaison with KFS, Planting of compensatory trees, approximately 500 different species within listed in column (2), a budget is Kshs 1,500,000 is provided for purchase, planting and naturing of the trees for 6months from the time of planting

The pipeline traverses through Kasemeni, Gandini, Mbuguni and Ng'ombeni Locations which exhibit ASAL characteristics. In terms of Agro-ecological zone classification the entire pipeline corridor lies within Agro Ecological Zones (AEZ) three. The zone comprises of Mangrove Swamps Zone that covers only a small portion of Kinango Sub County area mainly on the sides of the Mwache creek. There are only a few species, which form dense mangrove forest that border Mwache Forest that is composed of *Manilkara-Acacia Savannah* and *Acacia Euphorbia bush* land. Mangroove species include³; *Rhizophora mucronata*, *Avicennia marina*, *Ceriops tagal*, *Lumnitzera racemosa*, *Bruguiera gymnorrhiza*, *Sonneratia alba*, *Xylocarpus granatum*, *Xylocarpus moluccensis* and *Heritiera littoralis*. *R. mucronata*, *C. tagal* and *A. marina* are the dominant species within forest.

Fauna within the Larger Pipeline Alignment

Avian population recorded in Mwache forest and adjoining ecosystem like Shimba hills⁴, etc. can be listed as: Southern Banded Snake-eagle *Circaetus fasciolatus* (Near Threatened); Brown-headed Parrot *Poicephalus cryptoxanthus* (least concern), Fischer's *TuracoTauraco fischeri* (Near Threatened), African Green-tinkerbird *Pogoniulus simplex* (Least Concern), Mombasa *Woodpecker Campethera mombassica* (Least Concern), Chestnut-fronted *Helmet-shrike Prionops scopifrons* (Least Concern), Black-bellied *Glossy-starling Lamprotornis corruscus* (Least Concern), Spotted Ground-thrush *Zoothera quttata* (threatened), Plain-backed Sunbird *Anthreptes reichenowi* (Near Threatened) *Sokoike Pipit Anthus sokokensis* (Endangered).

An inventory of fish species within Mwache River and seasonal streams along the Water transmission line show that there are 4 common fish species in the main river trunk, 5 prawn species and 1 crab species. These species are distributed in various ecological habitats that include brackish water, riverine and tributaries. The main commercial species are the prawn species. Other species are *tilapia*, *catfish* and *barbus*. The proposed Mwache Dam Reservoir will help establish a vibrant fishery because water temperature ranges are conducive from a minimum of 25⁰ C in the morning to a maximum of 35⁰ C at 3.00 p.m.

Mangroves, intertidal mudflats and shallow brackish water creeks are well known feeding and nursery areas not only for fish but also for crustaceans (crabs and prawns) on which many fish species in the coastal area are found. The fishery in brackish water environment is dominated by Prawns (Kamba). Occasional catches are realized from Rabbit fish (Tafi), Redfin robber (English), Nkwakwa (Pokomo), Milkfish (English), scavengers (Tangu), Mulllets (Mkizi), Sardines (Simu), Snappers (Pali). Artisanal fishers use crafts consisting of Dug out (Mtumbwi), Foot fishers, Pointed crafts (Mashua) and Hori with gears such as gillnets, seine nets, hand lines, beach seines, traps and fences. Trawling also takes place in the deep areas (> 5 m) also targeting prawns. The main prawn species targeted are *Penaeus indicus*, *Metapeneaus monoceros*, *P. semisulcatus*, *P. monodon* and *P. japonicas*. Images of Redfin robber (English), Nkwakwa (Pokomo), Milkfish (English) found within Mwache creek. The pipeline traverser's settlement villages and therefore the impact to animal will be limited to domestic animals grazing on free range,

Detailed Critical Habitat Assessment is Presented Separately as Appendix 5

^{3 3} https://www.biodev2030.org/wp-content/uploads/2021/07/Annexe-33_Rapport-Final_National-Biodiversity-Threat-Assessment_Kenya.pdf

⁴ https://wedocs.unep.org/bitstream/handle/20.500.11822/25890/Kenya_MEDA.pdf?sequence=1&isAllowed=y

Detailed Critical Habitat Assessment is Presented Separately as Appendix 5

Social Setup

The Trunk Main section of the Mwache Water Transmission Pipelines covers the 5.1km long pipeline section from the WTP to the West Mainland Reservoir located within Kasemeni Location of Kinango Sub-County in Kwale County. The South Mainland Transmission Main (Kaya Bombo Pipeline) branches off from the Mwache trunk main at Ch. 2+900 of the Trunk Main and traverses in the S.W direction, through the Mwache Forest to the Mwache Creek. The Pipeline section within the Mwache Forest is 1.9km from Ch. 0+740 to Ch. 2+640 where it crosses the Mwache Creek. The transmission line traverses Kasemeni, Gandini and Mbuguni Locations in Kinango Sub County and N'gombeni Location of Matuga Sub County of Kwale County.

Land ownership along the pipeline alignment is a mix of registered subdivided parcels and clan based communal land. This influences the settlement trends. The process of adjudicating land rights for individual ownership is in progress under Mwache Dam Compensation program by National Lands Commission (NLC), in liason with Kinango Land Adjudication office. Land use is subsistence farming with very low land productivity value due to poor rainfall, poor soil quality and the people's culture.

The settlement pattern in the Coastal Kenya is influenced by infrastructure network such as roads, water, electricity, availability and accessibility of areas of gainful employment, availability of cheap housing, security and land tenure. Along the pipeline corridor, settlement villages were observed along the murram road connecting Mwache Creek to Kaya Bombo to Dongo Kundu and exits to Mtongwe within the South Mainland. The villages include; Mteza market, Dzivani, Mwandegwa, Lutsangani, Tsunza, Mbuguni, Ningawa and Kiteje villages. Photographs below illustrate nature of houses within the Project area.

There are five educational institutions in Gandini location which include; 1Nr. Secondary School, 2Nr. Primary Schools and 2Nr. Early Childhood Development Centres(ECD). In Mbuguni Location there are three educational institutions which include; 2Nr. Primary Schools and 1Nr. Secondary School while in Kiteje Sub location there are two educational institutions which include; 1 Nr. Primary School and 1Nr. Secondary School. School enrolment levels is generally low, attributed to unemployment and lack of household financial capacity, this contributes to high illiteracy levels in the area. Marriage at young age and premature pregnancies are also indicators of poor school enrolment levels.

Healthcare facilities within the project area include; Maami Home Care Dispensary and Lutsangani Dispensary in Gandini Location, Mbuguni Dispensary and Mteza Dispensary in Mbuguni location. Others include; Mwache and Mnyenzi. Mazeras dispensary. There are also numerous private health facilities in Mazeras town while major services are offered in Kinango Sub-County Hospital. Coast County Hospital is located in Mombasa, some 20km from the project area. There are several pharmacies and drug shops in Mazeras, Mombasa and almost all the shopping centres in the area

The overall average monthly cash income for households in the project-affected area is estimated to be Kshs. 13,000 to Kshs 30,000 on average per household, varying significantly from household to household. Crop production, including vegetables, tubers, fruits and cereals is the major economic activity contributing to annual cash income for the households. The second most important economic activity is nonfarm activities (casual laborers in private sector, masonry, quarrying, livestock selling).

Kasemeni, Gandini, Mbuguni, and Ng'ombeni locations are not endowed with adequate surface water sources since all streams and rivers are seasonal. Flash floods originating from the highlands flow into the area during the rains (though the project area also receives limited rainfall). It has not been possible to quantify how much water is effectively drawn from the rivers for social and economic use. The seasonal Mwache River, the main

stream in the area, is characterized with stagnant pools in most sections, which most of the residents rely on for washing, watering livestock and limited farming along the river flood plain.

The absolute poverty of the people in the area has had a direct link to lack of basic sanitation facilities. Without improved sanitation, people continue to suffer from ill health, lost incomes, inconveniences and indignity. The socio-economic survey undertaken during the ESIA study indicated that 88.4% of residents of Gandini, 75.7% Ng'ombeni, 83.3 Mbuguni and 88.2% in kasemeni have constructed and use pit latrines as the main means of excreta disposal

E.6 PROJECT IMPACTS

Receptors Along the Water Pipeline

The assessment identified several receptors located within proximity of 30m along the proposed Water pipeline alignment. The receptors might suffer damage associated with the Project activities, for instance, if the receptor is a school or market, the impact could be related to Health and Safety of pupils or community at large. If the receptor is a river, the associated impact could be siltation or river pollution from plant and equipment on site.

Tables E.9 and **E.10** give Biophysical and Social receptors identified along the South Mainland Water Transmission pipeline. **Figures 1.1 to 1.8** provide map of identified receptors

Table E.9: Biophysical Receptors

NAME	LOCATION	GPS CORDINATE	NATURE OF RISK
Mwache Creek	Gandini	0558734 9555844	The pipeline will not directly interphase with the creek, but rather the creek might be affected from cumulative nature of impacts associated with the project, these activities might involve wastes solid and liquid wastes which require to be disposed off appropriately. This implies that the aquatic fauna and flora within the creek and mteza rivers will be safeguarded from potential eutrophication of the water resources because of both organic and inorganic wastes.
Pemba River	Mbuguni	Pemba River at Ch. 11+090.	Site activities such as trench excavations could result to loosening of soils that could result to sedimentation and siltation of storm water drainage channels and eventually into the water resources. Also, un-serviced plant and equipment on site could result to oils and fuels leaks that could contaminate water resources rising the Biological Oxygen Demand (BoD) and affecting aquatic organism in the river.
Mwache Forest	Kasemeni	'0560398 9558200	the pipeline result to stripping a 15m corridor comprising of assorted tree species including; coconut trees, Tamarind tree, Neem tree, Flame Tree, Acacia ssp, Diospyros ssp, Cynometra-Manilkara type. For the section close to Mwache creek impact will be on mangrove species namely; Aricennia marina, Bruguera gymnorohiza, Rhizophora mucronata, Ceriops tagal and Sonnerata alba. Rhizophora mucronata, Ceriops taga. Other species will includein local languages Mwawa, Mwanga, Mkanju (Cashew nuts), Mporajo, Kikwata, Mkone, Mnyubu,

NAME	LOCATION	GPS CORDINATE	NATURE OF RISK
			Mkilifi (neem tree), Mbuyu (Boabab), Mfunne, Mchonge Mahana and Mkwakwa.
Degraded Area	Gandini	'0559021 9555350	Such areas are susceptible to erosions and would require specific method statement on how excavations will be undertaken in a precautionary manner
Mteza River	Mteza	'0559033 9555366	Risk of pollution, siltation and risk of unauthorised abstraction of water for works

Table E.10: Social Receptors

RECEPTOR	LOCATION	GPS COORDINATES	NATURE OF RISK
Amani Nursery School Dzivani	Gandini	'0559016 9555207	Accidents to general public who visiting the markets and shopping centers on their daily activities. The risk is associated with plant and equipment movement within the market or open unbarricaded trenches or without warning tapes.
Dzivani B Mosque	Gandini	'0559012 9555105	
Dzivani Primary School	Gandini	0558807 9553827	Accidents to pupils and teachers movement in and out of the school, worshippers and patients, the risk is associated with plant and equipment movement within the market or open un barricaded trenches or without warning tapes.
Mwandegwa Gospel Church	Gandini	0558806 9553626	
Grave site	Gandini	0556217 9550383	
Lutsangani Primary	Gandini	0556861 9550774	
Lutsangani Dispensary	Gandini	0557004 9550782	
Tsunza Shopping Centre	Gandini	0557044 9550799	
Mbuguni Mosque	Mbuguni	0567099 9545087	
Ningawa Primary School	Ng'ombeni	0566689 95328013	
Mteza Dispensary	Ng'ombeni	0566689 95328013	
Mteza ECDE	Mteza	0566668 95328044	
Mteza Market	Mteza	0566645 95328043	
Masjid Mteza	Mteza	0566658 95328078	
Kiteje Shopping Center	Ng'ombeni	0562789 95228045	

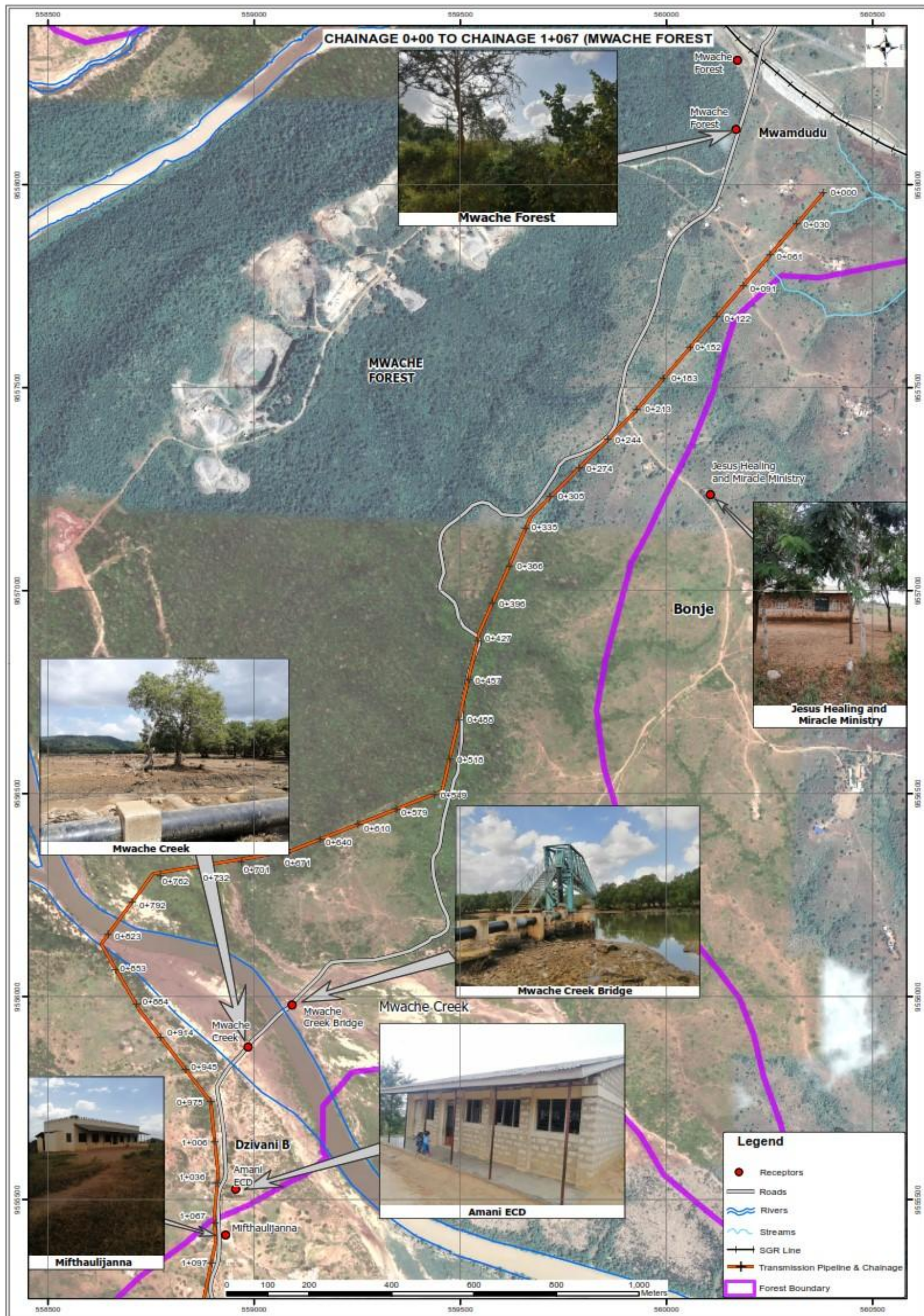


Figure 1.2: Map of Receptors Chainage 0+000 to 1+067

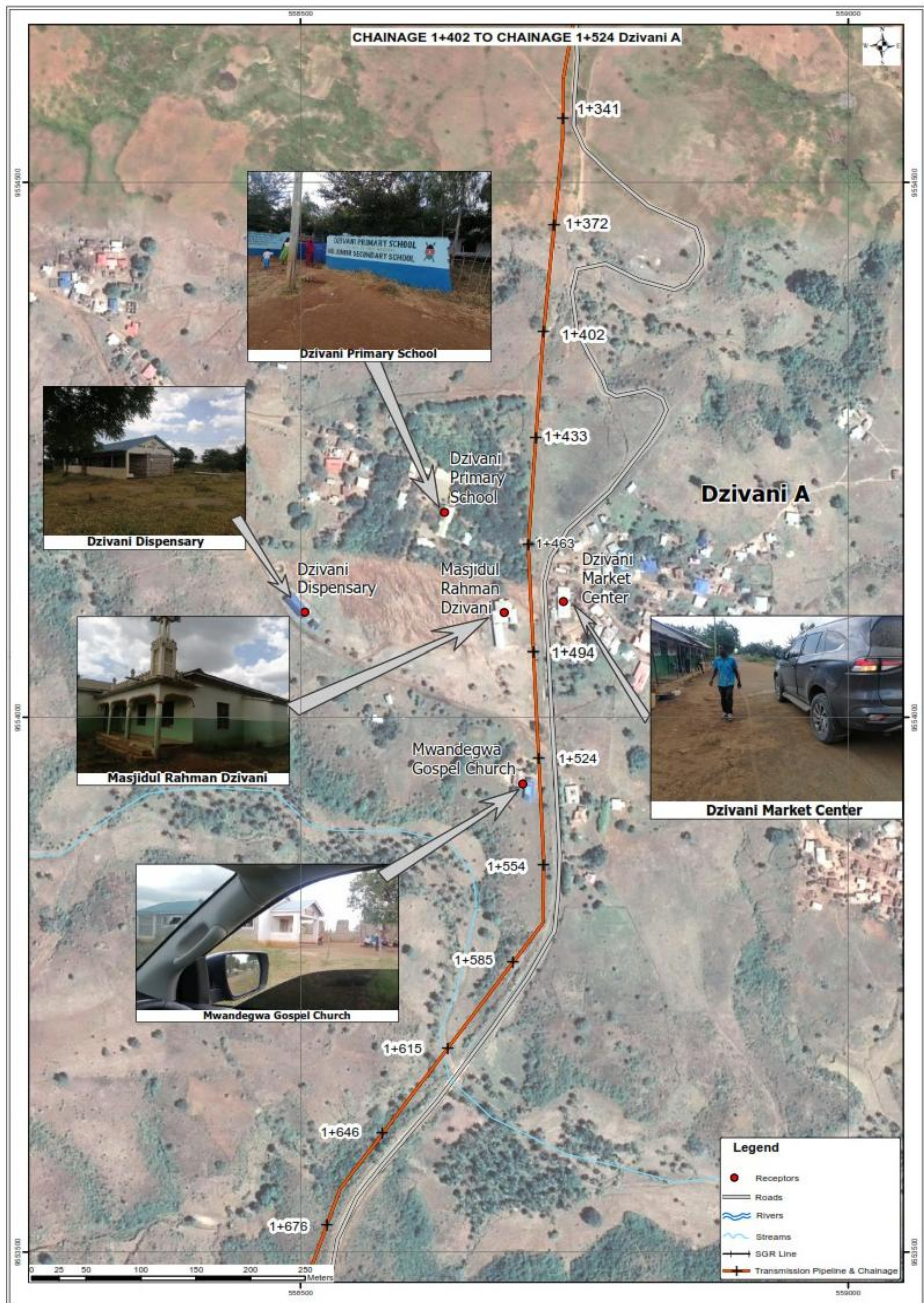


Figure 1.3: Map of Receptors Chainage 1+402 to 1+524

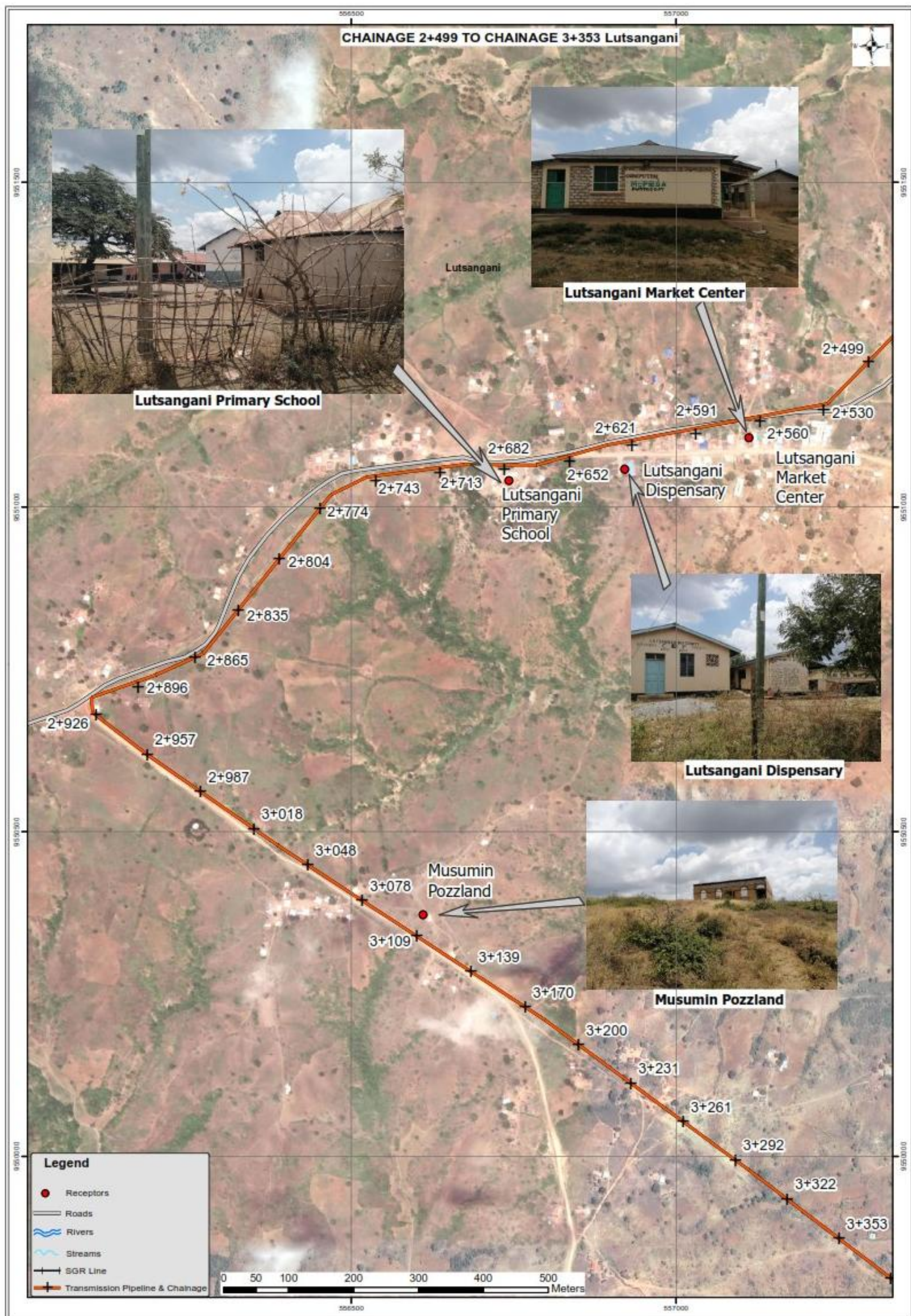


Figure 1.4: Map of Receptors Chainage 2+499 to 3+353

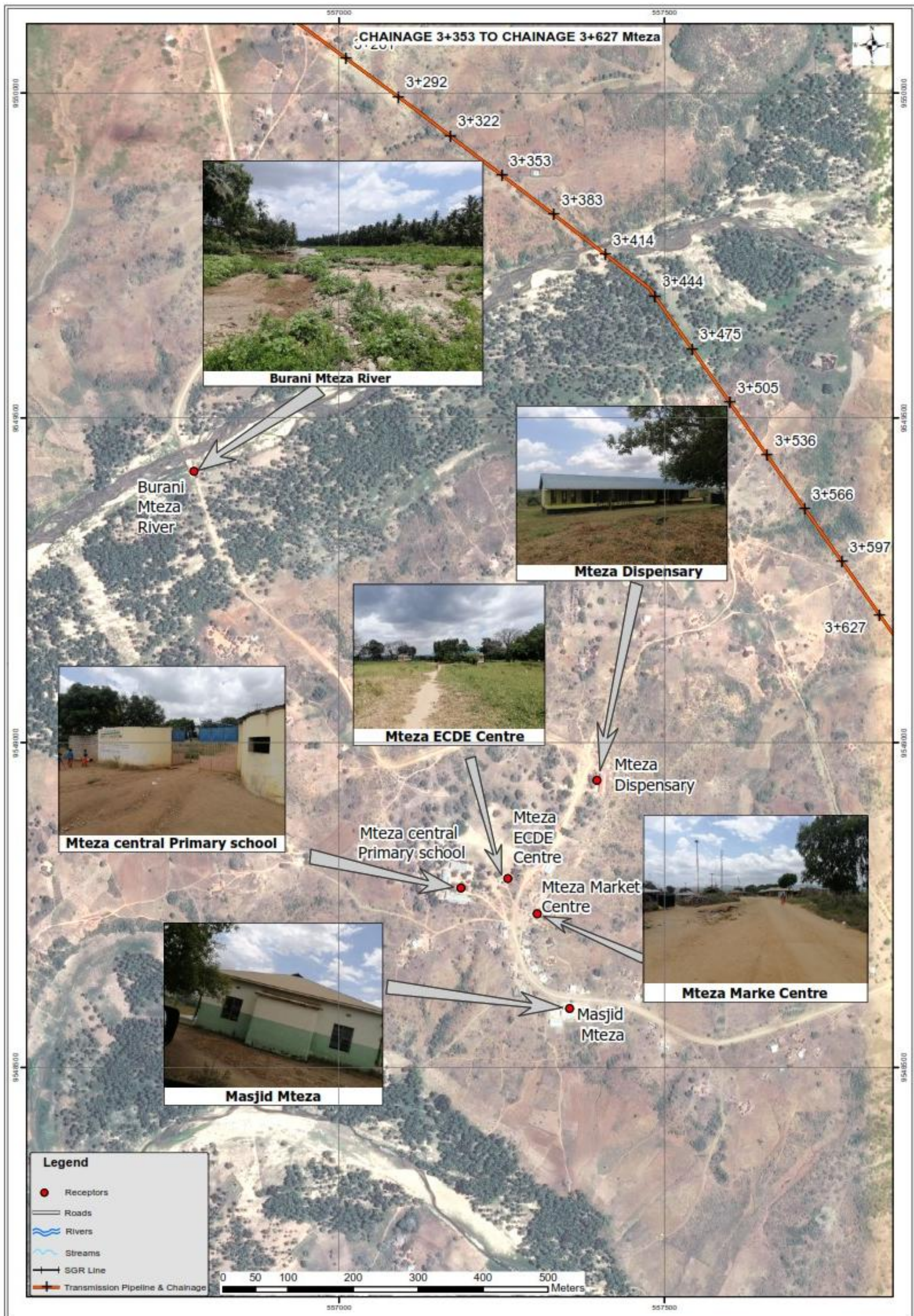


Figure 1.5: Map of Receptors Chainage 3+353 to 3+627

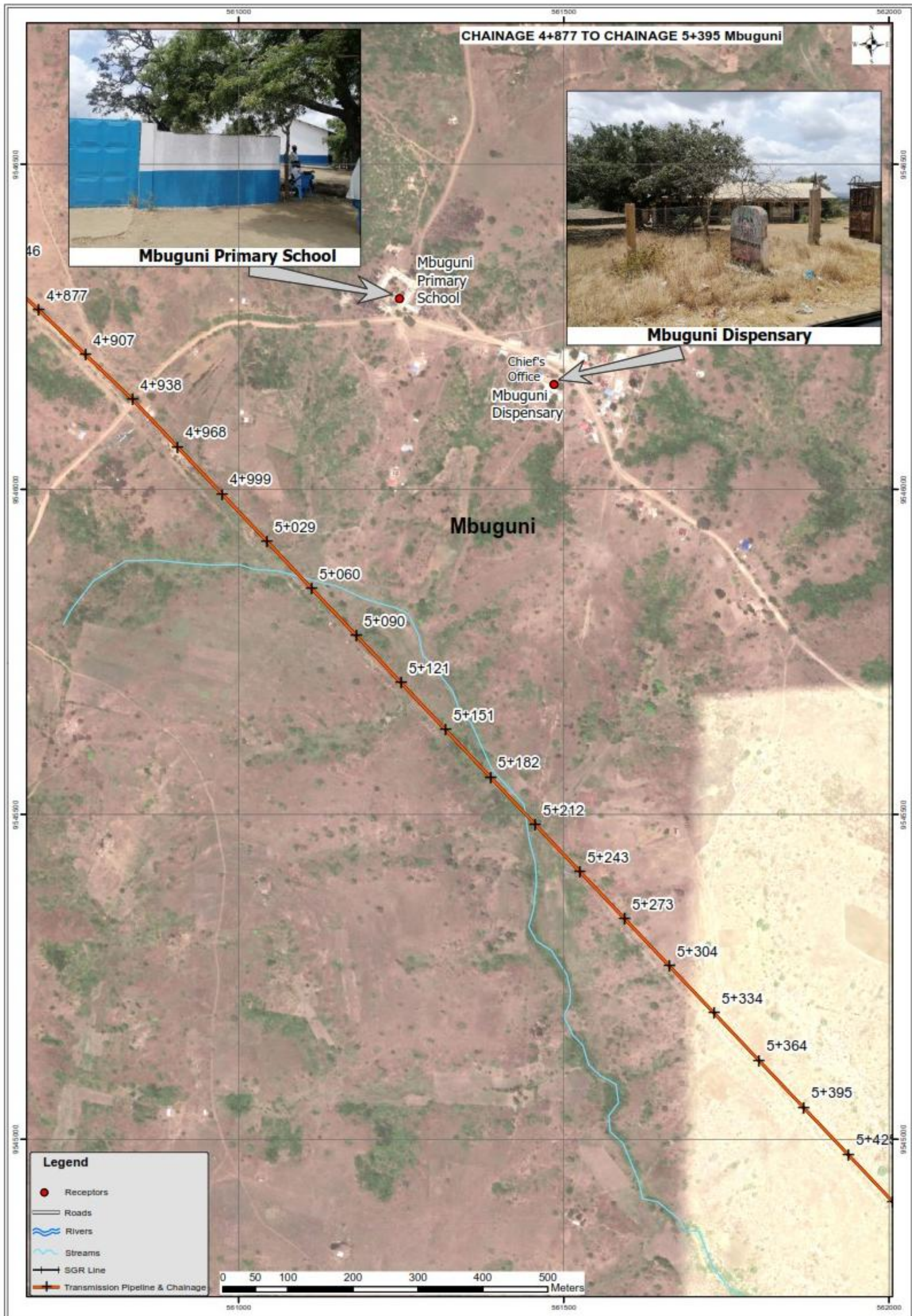


Figure 1.6: Map of Receptors Chainage 4+877 to 5+395

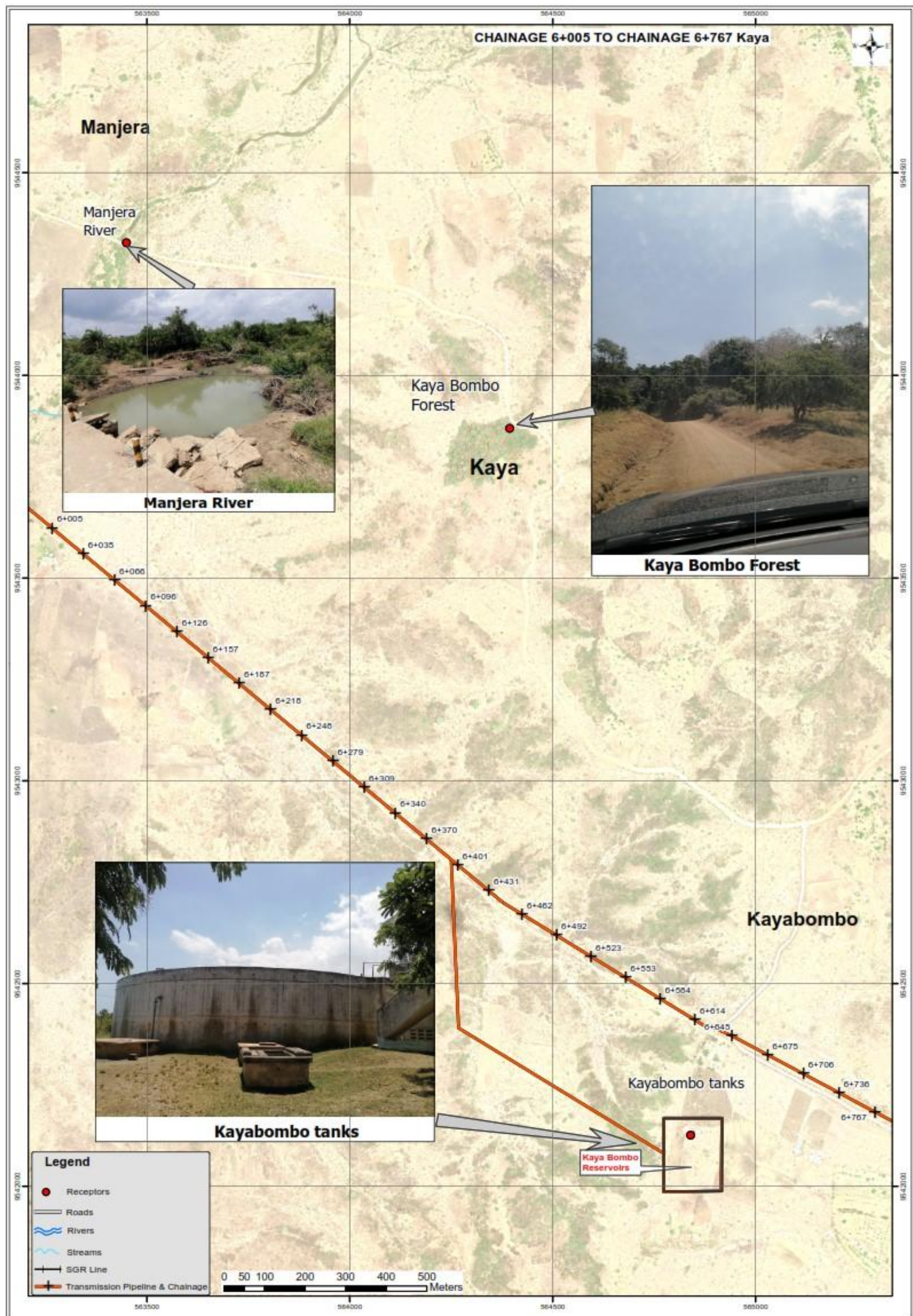


Figure 1.7: Map of Receptors Chainage 6+005 to 6+767



Figure 1.8: Map of Receptors Chainage 7+599 to 8+458

E.7 ASSESSMENT OF IMPACTS

The assessment characterized magnitude of impact and sensitivity of receptors. A summary of significance of each impact was designated using the matrix given in **Table E.11**.

Table E.11: Impact Significance

Magnitude of Impact	SENSITIVITY OF THE RECEPTOR			
		Low	Medium	High
	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major

The matrix applies universally to all receptors, and all impacts to these receptors, as the receptor-specific considerations are factored into the assignment of magnitude and sensitivity of the receptor. A summary of impact significance discussed in this addendum is presented in **Table E.12**.

Table E.12: Impact Significance Assessment

ENVIRONMENTAL / SOCIAL RECEPTOR	PHASE	IMPACT TYPE	SEVERITY RATING	
			BEFORE MITIGATION	AFTER MITIGATION
Impact on Water Resources (Bonje Creek, Pemba river and other seasonal streams)	Construction	Direct	Minor	Negligible
Impacts on Soil Resources along the water pipeline route including degraded area in Gandini GPS '0559021 and 9555350	Construction	Direct	Minor	Negligible
Impact on Air Quality within the target locations listed above	Construction	Direct	Moderate	Negligible
Noise and Vibration Impacts within the target locations listed above	Construction	Direct	Minor	Negligible
Impacts on Flora and Vegetation Cover	Construction	Direct	Moderate	Minor
Community Health and Safety	Construction	Direct	Moderate	Minor
Workers Health and Safety	Operation	Direct	Moderate	Minor
Land Acquisition and Resettlement Impacts	Operation	Direct	Moderate	Minor

A summary of Environment and Social Impacts discussed under **Table E.15 on Page.29**

Resettlement Impacts

Construction of the Proposed Mwache Trunk Main and South Mainland Water Transmission Pipeline will in some instances result to negative impacts on Project Affected Persons (PAPs) own private land and residential or none residential structures, crops and trees, as well as graves along the pipeline route from Mwache Creek to proposed Dongo Kundu Tank.

The impact of construction of the water Transmission Pipelines and Dongo Kundu Reservoir will include both physical and economic displacement of **343 Project Affected Persons (PAPs)** who include **191 Male PAPs and 152 Female PAPs** and **1 community Church**. The total number of PAPs include; **4Nr. vulnerable PAPS** who are 1Nr. disabled male PAP located in Gandini, 1Nr. Elderly female PAP in Gandini, 1Nr. Elderly female PAP in Ng'ombeni and 1Nr. Elderly female PAP in Mbuguni. Further. A summary of Impacts is documented in **Table E.13**.

Table E.13: Summary of Resettlement Impact (Pipeline and Dongo Kundu Reservoir Site)

TYPE OF LOSS	NO.
PAPs losing more than 20% of Land (pipeline)	Nil
PAPs losing more than 20% of Land (Dongo Kundu Reservoir)	8
PAPs losing Primary Residential structures on their land (Pipeline)	59
PAPs losing Primary Residential structures on their land (Dongo Kundu Reservoir)	10
Sub-Total Fully affected	77
Less than 20% of land (Pipeline)	186
Less than 20% of land (Dongo Kundu Reservoir)	2
PAPs losing trees and crops on their land (Pipeline)	67
PAPs losing trees and crops on their land (Dongo Kundu Reservoir)	10
PAPs losing graves	1
Sub-Total Partially Affected PAPs	266
Total Impact on PAPs	343
Public Infrastructure Fully Impacted	Nil
Community Infrastructure (Church)	1
Sub-Total Community Institutions to be affected	1
Total Number of PAPs and Institutions affected	344

Grand RAP Budget

Table E.14 below provides a grand budget for compensation of Project impact along the pipeline, Dongo Kundu and Bonje reservoir sites. Additional costs including; Livelihood Restoration Programs, facilitation of Grievance, Redress and Resettlement Committees, Monitoring and Evaluation and Contingency Costs are also provide.

Table E.14 RAP Budget (Bonje Mazeras Reservoir)

TOTAL RAP COST	AMOUNT (KSH)
Pipeline	32,062,608.00
Dongo Kundu Reservoir	8,864,000.00
Mazeras reservoir (Bonje)	17,975,000.00
Sub Total 1	40,926,608.00
Livelihood Restoration Programs (Lump sum)	5,000,000.00
Facilitation of Grievance Redress and Resettlement Committees (5%)	1,557,630.40
Monitoring and Evaluation 5%	1,557,630.40
Contingency Costs (15%) to deal with unforeseen costs.	4,672,891.20
Sub Total 2	9,788,152.00
Grand Total (1+2)	50,714,760.00

A summary of Environment and Social Impacts discussed in this report summarized in **Table E.15**.

Table E.15: Environment and Social Impacts and Mitigation – Construction Stage

RISK	ANTICIPATED IMPACT	MITIGATION
Impacts on Water Resources	- Site activities such as excavations and levelling could result to loosening of soils that could result to sedimentation and siltation of storm water drainage channels and eventually into seasonal Streams along the water pipeline. - Un-serviced plant and equipment on site could result to oil and fuel leaks that could contaminate water resources rising the BoD and adversely affecting aquatic organism in seasonal Streams along the water pipeline.	- All wastewater which may be contaminated with oily substances must be managed in accordance with an appropriate Waste Management Plan (WMP). - Water containing pollutants such as concrete or chemicals should be directed to a conservancy tank for removal from the site where applicable - prevent leakages Interceptors such as sand can be used to prevent pollutants from reaching water resources - Ensure proper handling of lubricants, fuels and solvents while maintaining the equipment on site - Any chemical or fuel spills shall be cleaned up immediately. The spilt liquid and clean-up material shall be removed, treated and transported to an appropriate site licensed for its disposal. - No hydrocarbon-contaminated water may be discharged to the environment. - At construction stage, the contractor will prepare Specific Construction Environment and Social Management Plan (C-ESMP) which included among other; Soil and Sedimentation Control Plan, Spoil Management Control Plan and Waste Management Plan.
Impacts on Soil Resources	- Soil include erosion resulting from activities such as excavation and levelling, clearing of vegetation for infrastructure such as access roads, laydown areas and construction zones - Soil contamination as a result of possible oil and fuel leaks from unserviced plant and equipment on site.	- Vegetation clearing and topsoil disturbance will be minimized. - Contour temporary and permanent access roads / laydown areas so as to minimize surface water runoff and erosion. - Sheet and rill erosion of soil shall be prevented where necessary through the use of sand bags, diversion berms, culverts, or other physical means. - Topsoil shall be stockpiled separate from subsoil. Stockpiles shall not exceed 2 m height, shall be located away from drainage lines, shall be protected from rain and wind erosion, and shall not be contaminated. - Wherever possible construction work will take place during the dry season. - Topsoil shall be evenly spread across the cleared areas when reinstated. - Accelerated erosion from storm events during construction shall be minimized through managing storm water runoff (e.g., velocity control measures). - Soil backfilled into excavations shall be replaced in the order of removal in order to preserve the soil profile. - Spread mulch generated from indigenous cleared vegetation across exposed soils after construction - At construction stage, contractor will prepare Specific Construction Environment and Social Management Plan (C-ESMP) which included among other; Soil and Sedimentation Control Plan, Spoil Management

RISK	ANTICIPATED IMPACT	MITIGATION
		Control Plan and Waste Management Plan.
Impacts on Air Quality	- Emissions of oxides of nitrogen (NO₂ in particular) mainly from construction-related vehicles (and to a lesser degree from construction generators and other hydrocarbon powered equipment); and - Dust and particulate matter (as PM₁₀) created by construction-related vehicle traffic on unpaved roads.	As general measures for all locations: - Develop a Dust Management Plan (DMP); - Record all dust and air quality complaints, identify cause(s), take appropriate measures; - Liaise with local communities to forewarn of potentially dusty activities; - Undertake monitoring close to dusty activities, noting that this may be daily visual inspections, or passive/active monitoring as parameter - Undertake inspections to ensure compliance with the Dust Management Plan; - Plan potentially dusty activities so that these are located as far from receptors as feasible; - Erect solid screens if feasible around stockpiles and concrete batching; - Avoid runoff of mud and water and maintain drains in a clean state; - Remove dusty materials from site as soon as possible if not being re-used. If being re-used, cover or vegetate if possible; - Impose speed limits on haul routes and in construction compounds to reduce dust generation; - Minimize drop heights when loading stockpiles or transferring materials; and - Avoid waste or vegetation burning. For traffic on unpaved roads: - Undertake watering to attenuate dust near sensitive receptors. The duration and frequency of this should be set out in the Dust Management Plan and will consider water availability and any stakeholder grievances; and - On unpaved roads in use for more than 1 month, consider use of surface sealants to reduce the use of water and water trucks. Use of lignin-based sealants recommended due to low environmental toxicity. For excavations and levelling - Revegetate exposed areas as soon as feasible; - Revegetate or cover stockpiles if feasible; - Expose the minimum area required for the works, and undertake; and exposure on a staged basis to minimize dust blow.
Noise and Vibrations Impacts	Construction activities and equipment are not expected to result in significant levels of vibration. Equipment that might high levels of vibration (such as impact piling or vibratory compaction) will not be used	- Siting noisy plant and equipment as far away as possible from human settlement, and use of barriers (e.g., site huts, acoustic sheds or partitions) to reduce the level of construction noise at receptors wherever practicable; - Where practicable, noisy equipment will be orientated to face away from the nearest Human settlement and other receptors; - Working hours for significant noise generating construction work (including works required to upgrade existing access roads or create new ones), will be daytime only;

RISK	ANTICIPATED IMPACT	MITIGATION
		- Alternatives to diesel and petrol engines and pneumatic units, such as hydraulic or electric-controlled units, will be used, where practicable; - Where practicable, stationary equipment will be located in an acoustically treated enclosure; - For machines with fitted enclosures, doors and door seals will be checked to ensure they are in good working order; also, that the doors close properly against the seals; - Throttle settings will be reduced and equipment and plant turned off, when not being used; - Equipment will be regularly inspected and maintained to ensure it is in good working order. The condition of mufflers will also be checked; and fitting of mufflers or silencers of the type recommended by manufacturers.
Impacts on vegetation cover	Stripping of vegetation cover will be on isolated cases only limited the trees and will have minimal impact to soil structure. Within Mwache forest the impact will be to <i>Manilkara-Acacia</i> Savannah and <i>Acacia Euphorbia</i> bushes and dominant mangrove species such as ⁵<i>Heritiera littoralis</i>. <i>Rhizophora mucronata</i>⁶, <i>Ceriops tagal</i> and <i>Avicenia marina</i>⁷ are the dominant species Impacts of the pipeline within Mwache forest will be along the forest periphery with sparsely vegetated as shown in figure 1.1. the pipeline result to stripping a 15m corridor comprising of assorted tree species including; <i>coconut trees</i>, <i>Tamarind tree</i>, <i>Neem tree</i>, <i>Flame Tree</i>, <i>Acacia ssp</i>, <i>Diospyros ssp</i>, <i>Cynometra-Manilkara</i> type. <i>For the section close to Mwache creek impact will be on mangrove species namely</i> <i>Aricennia marina</i>, <i>Bruguera gymnorhiza</i>, <i>Rhizophora mucronata</i>, <i>Ceriops tagal</i> and <i>Sonnerata alba</i>. <i>Rhizophora mucronata</i>, <i>Ceriops taga</i>. Other species will include in local languages <i>Mwawa</i>, <i>Mwanga</i>, <i>Mkanju</i> (Cashew nuts), <i>Mporojo</i>, <i>Kikwata</i>, <i>Mkone</i>, <i>Mnyubu</i>, <i>Mkilifi</i> (neem tree), <i>Mbuyu</i>	- Avoidance of impacts should be prioritized. However, if not possible then compensatory planting of trees that will be cut by the contractor during works will be undertaken. - Vegetation shall only be cleared if it will interfere with Project construction and/or present a hazard. - Areas to be cleared shall be agreed and demarcated before the start of the clearing operations to minimize exposure. - The use of existing cleared or disturbed areas for the Contractor's office, stockpiling of materials etc. shall be encouraged. - Whenever possible, all damaged areas shall be reinstated and rehabilitated upon completion of the contract to as near pre-construction conditions as possible. - Rehabilitation of temporary construction sites and pioneer camps (if needed) should be done as swiftly as possible and always with suitable native grasses and other plants - In liaison with KFS, Planting of compensatory trees, approximately 500 different species within listed in column (2), a budget is Kshs 2,500,000 is provided for purchase, planting and naturing of the trees for 6months from the time of planting - Synergize findings from the ecological impacts assessment commissioned by Ministry of Water to the downstream users, the findings of this study will be used to enhance mitigation measures for the pipeline impacts within the Mwache forest

⁵ *Heritiera littoralis* has most recently been assessed for The IUCN Red List of Threatened Species in 2008. *Heritiera littoralis* is listed as Least Concern

⁶ True Mangrove *Rhizophora mucronata* has most recently been assessed for The IUCN Red List of Threatened Species in 2008. *Rhizophora mucronata* is listed as Least Concern.

⁷ <https://link.springer.com/article/10.1007/BF00008202>

RISK	ANTICIPATED IMPACT	MITIGATION
	<i>(Boabab), Mfunne, Mchonge Mahana and Mkwakwa.</i>	
<u>Biodiversity Impacts within Mwache forest</u>	<u>Loss of floral and fauna listed under section (3.6) of this report within the trunk main section 1.5km that will traverse through the forest</u>	<u>Administrative Measures</u> <u>Service Level Agreement (SLA) between Kenya forest Service (KFS) and Coast Water Works Development Agency (CWWDA). The SLA will describe details agreements related to applicable permit procedures and measures of ensuring Ecological Equivalence for the selected off set in terms of (i) Habitat Type, (ii) Species Composition, (iii) Ecological Condition, (iv Long-term Protection) and (v) Monitoring CWWDA to take lead</u> <u>Implementation of provisions of Biodiversity Plan, in relation to budgets and staff to be hired (i) Environmental and biodiversity / Ecology advisor at the supervising engineer side and (ii) Ecological clerk of works at the Contractor side (Estimated Costs)</u> <u>To address data gap triggered by lack seasonality data considering that the Critical Habitat Assessment conducted once during the Month of April – May 2025. The ESIA recommends series of 3nr other additional assessments including; (i) supplementary monitoring in October to November 2025 during the short rains. (ii) January to February 2026 During Dry Season and finally (iii) April to May 2027 during long rains. CWWDA will be responsible for hiring an ecologist to undertake the assignment to be financed under the Budget prepared as part of Biodiversity Management Plan presented in the CHA report.</u> <u>Avoidance Measures</u> <u>Avoid placing construction equipment, stockpiles, locating contractors' camps, lay bay areas</u> <u>Avoid disturbance to priority nocturnal fauna from project-related light, noise and vibration impacts.</u> <u>Avoid adversely impacting flora through the open-burning of wastes and forest fires.</u> <u>Avoid adversely impacting wildlife species (recorded in the CHA through illegal hunting and trafficking from project-related employees or contractors</u>

RISK	ANTICIPATED IMPACT	MITIGATION
		• <u>Avoid introduction of invasive species and pests</u> Minimization Measures • <u>Minimize clearance of forest flora listed under table 4.1 of this report of natural habitats and more specifically vulnerable tree species discussed under section (4.1).</u> • <u>Minimize impacting fauna, flora within the forest through spills of hazardous materials</u> • <u>Minimize the impact of an accidental spill of hazardous materials on into the environment.</u> • <u>Minimize introduction of invasive species and pests</u> • <u>Minimize the indirect impacts to natural habitats with exploitation of natural resources and illegal hunting from Project-related facilitated access.</u> Rehabilitation / Restoration Measures • <u>Restore the physical landscapes that have been impacted by Project activities.</u> • <u>Establish and implement a Tree Planting Scheme for the Project</u> • <u>Undertake regular watering and monitoring to minimize the risk of poor species establishment following planting.</u> Offset Measures through KFS • <u>CWWDA to formally apply for approval to lay the pipeline within Mwache Forest, the application to be addressed to the Chief Conservator of Forest (CCF), Kwale County.</u> • <u>The application will clearly indicate the scope of works planned to be undertaken within the forest.</u> • <u>The application will include a clear Layout Plan and indicate the proposed pipeline route</u> • <u>The CCF will review the application and communicate the decision of KFS officially to CWWDA.</u> • <u>After approval is granted by KFS, CWWDA will undertake survey of the pipeline route.</u> • <u>After Survey works is completed, CWWDA will further apply through the CCF for approval or authority to commence pipeline construction.</u> • <u>KFS will undertake a census of trees that will be affected the pipeline corridor and bill CWWDA. From our estimate is that the tree carrying density per 1 acre is approximated at 177, this</u>

RISK	ANTICIPATED IMPACT	MITIGATION
		<u>implies that for the 3.33acres of Mwache pipeline wayleave a total of 589 trees at an estimated cost of Ksh 17,670,000 or Euro 121,862 will be required to offset the loss.</u> • <u>This application will be reviewed and approval granted to CWWDA by KFS for construction works upon CWWDA paying the cost of offsetting the trees that shall be fell along the alignment. This will be through issuance of a special user's license that will be renewed on an annual basis.</u>
Community Health Safety and Security Impacts	Increased Project-related traffic, civil works for site preparation including site clearance and excavation and levelling, change to the environment due to increased noise, decreased air quality, inappropriate waste handling or disposal, and accidental leaks and spills, and the presence of the Project workforce all present potential hazards for the health and safety of local communities	• Contractor will develop and monitor the implementation of a Community Health and Safety Management Plan (CHSMP) • Contractor will develop Emergency Response Plans (ERPs) in cooperation with local emergency authorities and hospitals. • Contractor will extend the Worker Code of Conduct to include guidelines on worker –community interactions and will provide training on the worker code of conduct to all employees including drivers as part of the induction process. • Contractor will provide primary health care and first aid at construction office sites to avoid pressure on local healthcare infrastructures. • Contractor will implement a Community Grievance Mechanism. • Contractor will develop and implement a Traffic Management Plan covering aspects such as vehicle safety, driver and passenger behaviour, use of drugs and alcohol, operating hours, rest periods, community education on traffic safety and accident reporting and investigations.
Worker Health and Safety and Workers Management impacts	Workers' rights including occupational health and safety need to be considered to avoid accidents and injuries, loss of man-hours, labour abuses and to ensure fair treatment, remuneration and working conditions. These issues should be considered not only for those who are directly employed on the Project but also those indirectly employed. The Project could potentially lead to workforce-related social and health issues throughout the life cycle of the Project if worker management and rights do not meet Kenyan law or international best practice.	• Contractor will develop a Human Resources Policy, which will outline worker rights to be included in all contracts including restrictions on working hours in line with applicable ILO standards, compensation including consideration of overtime, holidays etc. contractor will require its subcontractors to put in place policies in line with national legislation and applicable international legislation and contractor Code of Conduct and Policies. • Contractor will establish contractual clauses (signed code of conduct) to be embedded in the contracts of the workers and sub-contractors that require adherence to Kenyan law and international standards to be upheld related to worker rights. • Contractor will prohibit the use of alcohol or drugs, which could adversely affect the ability the employee

RISK	ANTICIPATED IMPACT	MITIGATION
		to perform the work safely or adversely affect the health and safety of other employees, community members or the environment. • Contractor and self-employed contractors will assess the H&S risks related with the tasks to be performed during the construction phase. • Pre-employment medical assessments will be put in place as a workforce risk management tool to screen individuals for risk factors that may limit their ability to perform a job safely and effectively. Expected benefits of conducting pre-employment medical assessments include a safer working environment, reduction in workplace injuries, minimized downtime, matching the capacity of the employee with the role, and overall recruitment cost and risk reduction. • Contractor will ensure that training on health and safety measures is provided to all construction workers prior to starting to work on the Project and that supervisors have adequate experience to deliver on their responsibilities. • Contractor will implement regular health and safety checks and audits of workers, and subcontractors and implementing sanctions in case of breaches of national standards and the Project's specific standards. Such audits to include workplace H&S; worker contracts, working hours, pay and conditions; housing and food standards. • Contractor will develop and implement a Workers Grievance Mechanism for the Project workforce including workers and subcontractors. • Contractor will establish a procedure for the recording and analysis of incidents and lessons learned such that additional actions can be implemented to avoid or minimize occupational health and safety risks. • Contractor will ensure that facilities and work sites are designed and maintained such that robust barriers are in place to prevent accidents. • Contractor will ensure that its Code of Conduct is followed to regulate the performance and behaviour of all workers, including provision for disciplinary action for anti-social behaviour and non-compliance with health and safety regulations such as lack of use of PPE. • Contractor will ensure that IFC/World Bank Health and Safety guidelines regarding the construction and management of worker accommodation and the provisions of medical facilities at worker accommodation are followed. • Contractor will ensure that adequate clean water, adequate food and access to medical care is provided to all workers on the worksite and at accommodation. • Contractor will develop a Waste Management Plan for the construction phase with clear guidelines for the safe storage and disposal of hazardous waste and handling of hazardous materials.

RISK	ANTICIPATED IMPACT	MITIGATION
	Protection of Children	• The contractor will develop and implement a Children Protection Strategy that will ensure minors are protected against negative impacts associated by the Project including SEA. • All staff of the contractor must sign, committing themselves towards protecting children, which clearly defines what is and is not acceptable behaviour • Children under the age of 18 years should not be hired on site as provided by Child Rights Act (Amendment Bill) 2014 • Wherever possible, ensure that another adult is present when working in the proximity of children. • Not invite unaccompanied children to workers home, unless they are at immediate risk of injury or in physical danger. • Refrain from physical punishment or discipline of children • Refrain from hiring children for domestic or other labor, which is inappropriate given their age, or developmental stage, which interferes with their time available for education and recreational activities, or which places them at significant risk of injury. • Comply with all relevant local legislation, including labor laws in relation to child labor specifically provisions of Kenya's Employment Act Cap 226 of 2007 Part VII on protection of children against exploitation
	Gender-based violence and Sexual Harassment	• Ensure clear human resources policy against sexual harassment that is aligned with national law • Integrate provisions related to sexual harassment in the employee COC • Ensure appointed human resources personnel to manage reports of sexual harassment according to policy • The Contractor shall require his employees, sub-contractors, and any personnel thereof engaged in construction works to individually sign and comply with a Code of Conduct with specific provisions on protection from sexual exploitation and abuse • The contractor will implement provisions that ensure that gender-based violence at the community level is not triggered by the Project, including: - effective and on-going community engagement and consultation, particularly with women and girls; - Review of specific project components that are known to heighten GBV risk at the community level, e.g., compensation schemes; employment schemes for women; etc. • The contractor shall develop specific plan for mitigating these known risks, e.g., sensitization around gender-equitable approaches to compensation and employment; etc. • The contractor will ensure adequate referral mechanisms are in place if a case of GBV at the

RISK	ANTICIPATED IMPACT	MITIGATION
		community level
	Sexual Exploitation and Abuse by project workers against community members	- Develop and implement a SEA action plan with an Accountability and Response Framework as part of the C-ESMP. The SEA action plan will follow guidance on the World Bank's Good Practice Note for Addressing Gender-based Violence in Investment Project Financing involving Major Civil Works (Sept 2018). - The SEA action plan will include how the project will ensure necessary steps are in place for: - Prevention of SEA: including COCs and ongoing sensitization of staff on responsibilities related to the COC and consequences of non-compliance; project-level IEC materials; - Response to SEA: including survivor-centered coordinated multi-sectoral referral and assistance to complainants according to standard operating procedures; staff reporting mechanisms; written procedures related to case oversight, investigation and disciplinary procedures at the project level, including confidential data management; - Engagement with the community: including development of confidential community-based complaints mechanisms discrete from the standard GRM; mainstreaming of PSEA awareness-raising in all community engagement activities; community-level IEC materials; regular community outreach to women and girls about social risks and their PSEA-related rights; - Management and Coordination: including integration of SEA in job descriptions, employment contracts, performance appraisal systems, etc.; development of contract policies related to SEA, including whistle blower protection and investigation and disciplinary procedures; training for all project management; management of coordination mechanism for case oversight, investigations and disciplinary procedures; supervision of dedicated PSEA focal points in the project and trained community liaison officers.
HIV/AIDs	Spread of communicable diseases and HIV/AIDs	- Sensitize workers and the surrounding communities on awareness, prevention and management of HIV/AIDs and sexual health and rights through staff training, awareness campaigns, multimedia and workshops or during community Barazas. - Use existing clinics to provide VCT services to construction crew and provision of ARVs for vulnerable community members - Ensure safety of women and girls in provision of VCT services. - Work to minimize or altogether eliminate mosquito-breeding sites.

E.7 CUMMULATIVE IMPACTS ASSESSMENT

Definition

The assessment of cumulative impacts is a long-established requirement for any comprehensive ESIA. For the purposes of this Proposed Project, the IFC Performance Standards and IFC Good Practice Note: Cumulative Impact Assessment and Management Guidance for the Private Sector in Emerging Markets have been used as a primary reference source. IFC PS12 defines cumulative impacts as:

“...impacts that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted”.

The impacts of the Proposed Project thus need to be considered in conjunction with the potential impacts from other future developments or activities that are existing, planned or reasonably defined, and are located within a geographical scope where potential environmental and social interactions could act together with the Proposed Project to create a more or less significant overall impact.

The concept of Valued Environmental and Social Components (VECs)

The Cumulative Impact Assessment Good Practice Handbook was issued by the IFC in August 2013. This Handbook supplements the IFC PS1 and its Guidance Note, providing further guidance on the practical assessment of cumulative impacts, recognizing some of the uncertainties and constraints faced by private sector proponents. It also introduces the concept of Valued Environmental and Social Components (VECs), which are environmental and social attributes that are considered to be important in assessing risk and can include:

- Physical features;
- Wildlife populations;
- Environmental processes;
- Ecosystem conditions (e.g. biodiversity);
- Social conditions (e.g. health, economics); or
- Cultural aspects.

Existing, Planned or Reasonably Defined Developments

A number of sources were reviewed to establish whether there is existing, planned or reasonably defined developments that are located within a geographical scope where potential environmental and social interactions could act together with the Proposed Project to create a more or less significant overall impact.

- Mwache Multi-Purpose Dam Project
- Mombasa Southern Bypass Highway Project
- the special economic zone development project at dongo kundu
- 800mw Liquefied Natural Gas (Lng) Power Plant At Dongo Kundu
- Storm Water Drainage System That Will Cover Mvita, Changamwe, Jomvu, Kisauni, Nyali and Likoni Sub Counties
- North Mainland Transmission Line Project

Evaluation of Cumulative Effects on VECs

Evaluation of cumulative effects takes into consideration the potential impacts that could be generated by the Project and adds those generated by identified past, existing and future projects. This evaluation will be realized through the analysis of the various projects' effects on each of the VECs.

Table E.16: Assessment of VECs and Cumulative Impacts Implication

#	VECs	Impacts	Consideration
1	Water Resources	• Transport of exposed or disturbed soils towards water courses during rain events • Accidental spills and leaks from machinery and vehicle operations or associated with inadequate management of hazardous products and wastes • Contamination risk through excavation site exposing groundwater • Groundwater extraction for construction and operation requirements	Some cumulative effect may be anticipated. However, with the application of the standard and specific mitigation measures presented in this chapter, the overall residual cumulative impact should remain moderate to minor.
2	Soils	Affecting soil stability in steep areas during land clearing, soil movements which could generate or accentuate existing erosion.	With the application of the standard measures presented in this section overall cumulative effect would be no greater than moderate.
3	Terrestrial Habitat	• Loss of non-critical terrestrial habitat through development of the project within the existing right-of way and implementation of temporary construction facilities and new borrow pits; • Potential spread of invasive species and alteration of local conditions that will alter vegetation composition;	Cumulative effect is anticipated. However, considering the existing level of degradation of terrestrial habitat, the overall residual cumulative impact should be minor.
4	Terrestrial Fauna	Habitat degradation or modification through construction work. With the mitigation measures, the magnitude of the residual impacts was identified as minor.	Cumulative effect is anticipated. However, considering the existing level of degradation of terrestrial habitat, the overall residual cumulative impact should be minor.
5	Community Relations and Social Justice	Past, present and future projects may contribute to perpetuating women economic dependency, increase gender-based violence, heighten the number of single mothers, increase the prevalence of HIV/AIDS and STIs, and cause or exacerbate land use and compensation disputes. In addition, they may trigger community tensions and conflict.	The application of mitigation measures outlined in this section 8.4.3 should ensure that most residual cumulative impacts on gender, and community relations remain of moderate magnitude.

E.8 CLIMATE RISKS VULNERABILITY ASSESSMENT

The National Climate Change Response Strategy (2010) provides that climate change is one of the greatest challenges facing humanity this century. In Kenya, this phenomenon is already unmistakable and intensifying at an alarming rate as is evident from countrywide temperature increases and rainfall irregularity and intensification. Climate change impacts on water infrastructure will be caused by either excessive rainfall that destroys that these impacts are discussed below.

Table E.17: Consideration on Climate Change Resilience

#	Impact Trigger	Impact details	Water Pipelines Design Consideration
1	Impacts of increased rainfall on water utility infrastructure is related to storm and flooding	The most significant impact of climate change related to increased rainfall that leads to flooding will be destruction of water infrastructure including washing away of water transmission pipelines.	Include in the design Flood barriers to protect critical infrastructure include levees and dikes. A related strategy is flood proofing, which involves elevating critical equipment or placing it within waterproof containers or foundation systems.

Operation impacts

The most significant challenges currently facing water distribution systems are aging infrastructure, increasing demand for potable water, maintaining potable water quality, weakened infrastructure as a result of system inefficiencies, Microbial Growth, Biofilms and Sediments, Disinfectants and Disinfection Byproducts, Nitrification, Corrosion, Permeation and Leaching and Water Losses and Main Breaks which will be addressed by the Mombasa and Kwale Water Companies at the operation stage of the Project.

E.9 FINDINGS

A summary of ESIA findings associated with proposed construction of Water Pipeline alignment on biophysical and social receptors within Kasemeni, Gandini, Mbuguni and Ng'ombeni Locations is given below.

- Mwache Trunk Main traverses south-east, through undeveloped land and small scale cultivated lands to the Mwache Forest. Within the Mwache Forest, the trunk main (1.7km from Ch. 1+000 to Ch. 2+700) is proposed to be laid between the newly constructed Standard Gauge Railway (SGR) and the Mwache River.
- CWWD will be required to apply for Way leave permit from Kenya Forest Services Kwale Office. During ESIA stage, KFS officers from Kwale indicated that layout plans of the section traversing the forest should be attached to the application
- The South Mainland Transmission Main (Kaya Bombo Pipeline) branches off from the Mwache trunk main at Ch. 2+900 of the Trunk Main and traverses in the S.W direction, through the Mwache Forest to the Mwache / Bonje Creek. The ESIA has mapped this creek as a sensitive receptor, appropriate mitigation measures are provided for project likely impacts to water and soil resources within this ecosystem.
- The Kaya Bombo Transmission Pipeline then follows the alignment of the existing Marere Pipeline for approx. 6.4km up to Ch. 9+586 at Lutsangani. At this location, the proposed pipeline turns S.W. to join the existing DN 200 Kaya Bombo Pipeline wayleave for 12.2km up to the existing Kaya Bombo reservoir site at Ch. 21+744. A separate RAP has been prepared for project impacts related to loss of land and likely project impacts to peoples assets and sources of livelihood
- The impact of water pipeline construction will result to both physical and economic displacement of the 281 Project Affected PAPs who include 129 Male PAPs and 152 Female PAPs and 1 community Church. The total number of PAPs includes; 4Nr vulnerable PAPS who are 1Nr disabled male PAP located in Gandini, 1Nr Elderly female PAP in Gandini, 1Nr Elderly female PAP in Ng'ombeni and 1Nr Elderly female PAP in Mbuguni.
- The Pipeline on this section will cross the Pemba River at Ch. 11+090. It will then traverse through Mteza, Mbuguni, Majera and Kaya Bombo villages to the existing Kaya Bombo reservoir site. Again the ESIA has mapped the Pemba river as a sensitive receptor, appropriate mitigation measures are provided for project likely impacts to water and soil resources within this ecosystem

- The ESIA also identified social receptors along the pipeline corridor which included; Amani Nursery School Dzivani, Dzivani B Mosque, Dzivani Primary School, Mwandegwa Gospel Church, Grave site in Gandini, Lutsangani Primary, Lutsangani Dispensary, Tsunza Shopping Centre, Mbuguni Mosque, Ningawa Primary School, Kiteje Shopping Center. The receptors might be exposed to health and safety risks associated with the Project activities, the ESIA has provided appropriate mitigation measures risks associated with community health and safety at such establishments.

E.8 PROVISIONS

The ESIA Make Provisions Listed below

- The Environment and Social Management Plan (ESMP) prepared under this ESIA assessment provides a budget of **Kenya Shillings Four Million, Six Hundred Thousand (Kshs 4,600,000)** for mitigation of environment and social impacts identified in this Report. The Bid Documents to be prepared for the project should incorporate the Environment, Social provisions discussed under Chapter 8 (Environment and Social Impact Assessment and Mitigation Measures).
- The RAP report prepared separately as part of this ESIA present the **Total RAP budget to be Kenya Shillings Forty Seven Million, Three Hundred and Eighty Thousand, Seven Hundred and Sixty (Kshs. 47,380,760.00)**. This budget should be secured by CWWDA and PAPs compensated, pipeline corridor secured before commencement of civil works under the Project.
- Project Contract Document to include provisions for the contractor for preparing and implementing Construction Environment and Social Management Plan (C-EMSP), annexes to the C-EMSP will include but not limited to: Soil and Sedimentation Control Plan, Spoil Management Control Plan, Dust Management Plan, Health, Hygiene and Safety Plan, Labour Management Plan, Child Protection Strategy, Gender-based Violence Action Plan, Waste Management Plan, Contractors Code of Conduct, Gender Inclusivity Strategy , HIV/Aid Prevention Strategy. The contractors will be required to engage services of a qualified Environment, Health and Safety Officers and Social Safeguards Officer at the time of Project implementation.
- At Project implementation stage, the contractor with approval of the supervising engineer will prepare periodic Environmental and Social Implementation Report. The reports will provide status of implementation of risks & impacts management measures to date from the project start to the end of the reporting period. From an occupational Health and Safety approach, the contractors will ensure they undergo the following; OSH risk assessment, Registration of workplaces, Safety and Health (OSH) Audit, Fitness to work assessment of employees, Training of all workers or workers' representatives in basic Occupational Safety and Health, Accident and incident reporting, Compensation of injured workers who die or get injured and disabled and Examination of Safety Plants and Equipment.
- At Project completion stage, within the Defects Liability Period, Coast Water Works Development Agency (CWWDA) will initiate an Initial Environment and Social Audit for the Project as required by EIA/EA Audit Regulations of the year 2003 and subsequent annual self-audits. The Audit will develop an Environment and Social Audit Action Plan (ESAAP) that will be used to track Project Environment and Social Compliance during Project implementation stage.
- Secure Euros 389,405.10 detailed in the CHA report that will be utilized for implementing biodiversity Management measures detailed in this EIA and CHA, the budget will facilitate initiatives including listed below;
 - ✓ Implement supplementary Biodiversity Assessment and monitoring in October to November 2025 during the short rains, January to February 2026 During Dry Season and April to May 2027 during long rains

- ✓ Service Level Agreement (SLA) between Kenya forest Service (KFS) and Coast Water Works Development Agency (CWWDA). The SLA will describe details agreements related to applicable permit procedures and measures of ensuring Ecological Equivalence for the selected off set in terms of (i) Habitat Type, (ii) Species Composition, (iii) Ecological Condition, (iv Long-term Protection) and (v) Monitoring - CWWDA to take lead
- ✓ Implementation of provisions of Biodiversity Plan, in relation to budgets and staff to be hired (i) Environmental and biodiversity / Ecology advisor at the supervising engineer side and (ii) Ecological clerk of works at the Contractor side
- ✓ Capacity Building and Training of CWWDA safeguards team and Community Engagement and Grievance Resolution

MAIN REPORT

1. INTRODUCTION

1.1. GENERAL

Mombasa is the second largest city in Kenya, after Nairobi, which is the Capital City of Kenya. Based on the 2019 Population Census, Mombasa has a population of approx. 1,208,000 people. The city acts as a major gateway to the Country and the larger Eastern African region, hosting a major port and an International Airport. Mombasa is also a major tourist hub, key to the coastal tourism industry.

The City comprises of four distinct areas namely;

- Mombasa North Mainland
- Mombasa Island
- Mombasa West Mainland
- Mombasa South Mainland

The above distinct areas form a particular pattern as shown in the figure below. Two creeks separate the downtown located on the island from the mainland and sub-divide this latter into three geographically independent zones: North Mainland (NML), West Mainland (WML) and South Mainland (SML). These distinct zones are shown in **Figure 1.1 below**. The island is connected to the NML by the Nyali Bridge, to the WML by the Makupa Causeway and to the SML by the Likoni Ferry and the recently constructed Likoni pedestrian foot bridge. An additional link between the West Mainland and South Mainland via the Dongo Kundu Bridge and Viaduct is under construction.

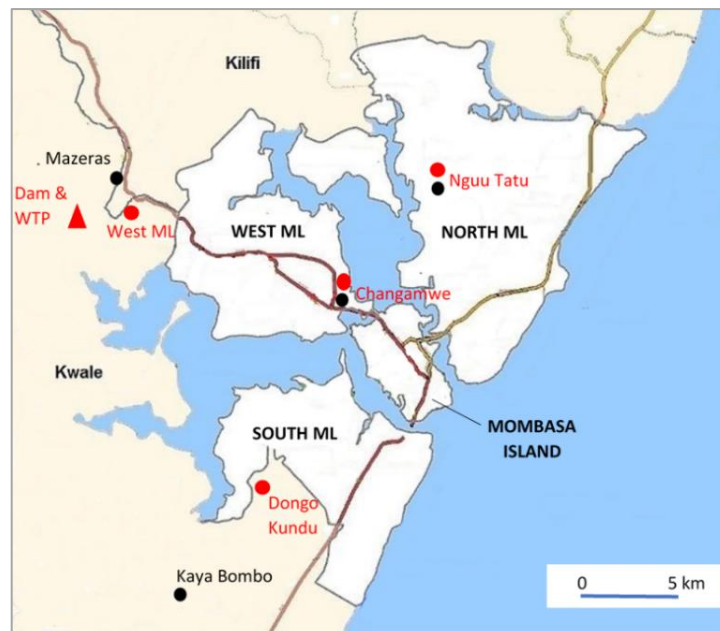


Figure 1.1: Location Plan of the Project Area

The Water Supply and Sanitation sector in Mombasa is under the jurisdiction of the Coast Water Works Development Agency (CWWDA), whose area of jurisdiction also covers the surrounding counties of Kwale, Kilifi, Taita Taveta, Lamu and Tana River. CWWDA has contracted the Mombasa Water Supply and Sanitation Company Limited (MOWASSCO) as the Water Service Provider for Mombasa City.

At present, Mombasa City is served by the following bulk water sources, which also supply other towns in the neighbouring counties; data based on the Mombasa Water Distribution Network Master Plan (MIBP & Nippon Koei, 2017):

- Baricho wellfield: capacity is estimated at 110,000 m³/d, supply to Mombasa is 45,000 m³/d
- Mzima springs: capacity is estimated at 35,000 m³/d, supply to Mombasa is 15,000 m³/d
- Marere springs: capacity is estimated at 12,000 m³/d, supply to Mombasa is 2,000 m³/d
- Tiwi Wellfield: capacity is estimated at 10,000 m³/d, supply to Mombasa is 2,500 m³/d

The total average current supply to Mombasa County is approximately 64,500 m³/d.

The Year 2015 Water Demand for Mombasa as estimated in the Water Supply Master Plan for Mombasa City (Vitens Evides & Royal Haskoning DHV, 2016) was 152,000m³/day while the Water Distribution Network Master Plan Report (MIBP & Nippon Koei, 2017) estimated the Year 2020 demand for Mombasa as 227,000m³/day. Updated Water Demand Projections prepared under the current Consultancy Assignment and presented in the recently submitted Data Review Report (ARTELIA/ MIBP - July 2021) indicated a current (Year 2020) Water Demand of 194,699 m³/day, projected to increase to 317,534 m³/day in year 2035.

1.2. PROJECT BACKGROUND

To bridge the huge deficit in water supply, and to meet future projected water demands of Mombasa County, the Ministry of Water, Sanitation and Irrigation (MWSI) commenced planning for new projects in the early 2010's. Several studies have been carried out, leading to proposals for phased development of new water supply projects. Among the projects proposed under the recent studies is the Mwache Dam Water Supply Project, to be implemented in the priority stages, amongst other projects to be implemented in later stages.

The Mwache Dam Water Supply Project entails construction of:

- 84m RCC Dam on Mwache River, crest length 526 m
- A Raw Water Pumping Station, Raw Water Pumping Main, Water Treatment Plant (WTP) with a clear water tank and associated facilities within the vicinity of the Dam with a proposed production capacity of 186,000 m³/d
- 4Nr. Terminal Reservoirs; one for each of the target supply areas (NML, WML, SML and Island); namely
 - Nguu Tatu terminal reservoir, proposed within the existing Nguu Tatu Reservoir Site, serving the North Mainland
 - Changamwe Reservoir, proposed at the existing Changamwe Reservoir Site, serving Mombasa Island
 - Dongo Kundu Reservoir, proposed to be constructed within Dongo Kundu area in Mtongwe, serving the South Mainland
 - West Mainland reservoir, proposed to be located at around 100 masl on a site within the West Mainland, to serve the West Mainland area
- A system of Treated Water Transmission Pipelines, transmitting treated water from the Mwache WTP to the proposed Reservoirs

The MWSI has secured funds from the World Bank (WB) and the Agence Francaise de Développement (AFD), for financing implementation of the various component of the Mwache Dam Water Supply Project. The WB

component is scheduled to finance the Dam and possibly the North Mainland and West Mainland Transmission pipelines and their corresponding reservoirs. The AFD component will finance the WTP & associated facilities, the West Mainland and Dongo Kundu reservoirs, the trunk transmission pipeline (common to all demand areas) and the South Mainland Transmission Pipeline to Dongo Kundu.

A schematic diagram showing the proposed project components of the Mwache Dam Water Supply System and their respective financing agencies is given in **Figure 1.2** below.

Although the construction of some of the North Mainland and West Mainland Water Transmission Pipelines and their corresponding reservoirs is likely to be financed by the WB, their Design and Construction Supervision is included in the present Consultancy Contract funded by the AFD.

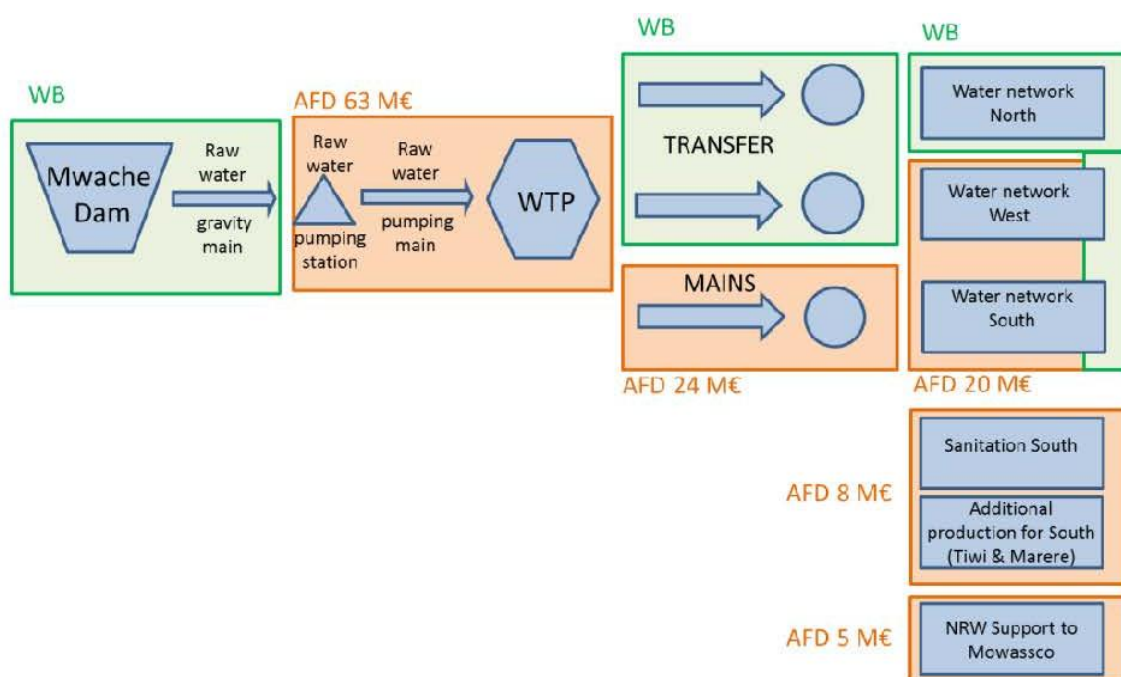


Figure 1.2 - Components of the Mwache Dam Project and respective Financing Agencies

The overall Mwache Dam Project as planned by CWWDA also includes a Water Distribution component, to be financed by both the WB and the AFD. This component will ensure that water produced under the Mwache Dam Project will reach the end consumers within Mombasa County and partially in Kwale County.

The Mwache Water Transmission Pipelines are proposed to transmit treated water from the proposed Mwache Water Treatment Plant (WTP) Clear Water Tank Outlet to the terminal reservoirs serving the respective demand areas in Mombasa North Mainland, Mombasa Island, Mombasa West Mainland and Mombasa South Mainland. The proposed outlet level at the Clear Water Tank is 115 masl, to ensure economic sizing for gravity transmission to all target service areas while maintaining adequate residual pressures. The Water Transmission Pipelines will transmit treated water from the WTP to the following Terminal Reservoirs.

- West Mainland Reservoir at 100 masl inlet level, supplying the Mombasa West Mainland service area.
- Changamwe Reservoir at 62.5 masl inlet level, supplying the Mombasa Island service area.
- Nguu Tatu Reservoir at 71.5 masl inlet level, supplying the Mombasa North Mainland service area.
- Dongo Kundu Reservoir at 75 masl inlet level, supplying the Mombasa South Mainland service area.

The Transmission Pipelines layout is in form of a Branching Network system, with a common Trunk Transmission Pipeline from the WTP site, branching into respective Transmission Pipelines transmitting the flow allocation from the Mwache Project to the respective terminal reservoirs.

A layout of the proposed Mwache Water Transmission Pipelines Project is given in Figure 1.3 on Page 4

Under the current Consultancy Assignment, the Terms of Reference require the Consultant to carry out a Full ESIA Study and RAP for the Trunk Main and the South Mainland Transmission Pipeline (Kaya Bombo Pipeline), and the corresponding Storage Reservoirs, and Preliminary SEA and RAP for the North Mainland and Changamwe Transmission Pipelines and the respective Storage Reservoirs.

This Report therefore presents the Full ESIA for the Trunk Main and South Mainland Transmission Pipeline, including the West Mainland Reservoir and the Dongo Kundu Reservoir. Final RAP on the same Project Components has been carried out and a RAP Report compiled separately for purposes of RAP Implementation by Coast Water Works Development Agency (CWWDA).

Study Duration and Team

The study was undertaken for a period of 3 month from October 2021 to January 2022, and reviewed in January 2024, the study team comprised of below listed experts

#	Name	Qualifications	Profession
1	Godwin Lidahuli Sakwa	MA Environmental Planning and Management	Lead Environmentalist – NEMA License NO 2492
2	Dr Adimo Aggrey	PHD Philosophy Landscape Planning and Conservation	Lead Environmentalist – NEMA License NO 2074
3	Dorothy Mbuvi	MA Sociology	N/A
4	Obra Mmaisti	Research Assistant	N/A
5	Eng Eric Muriithi	Civil Engineer	MIBP
6	Eng James Kilonzo	Civil Engineer	MIBP

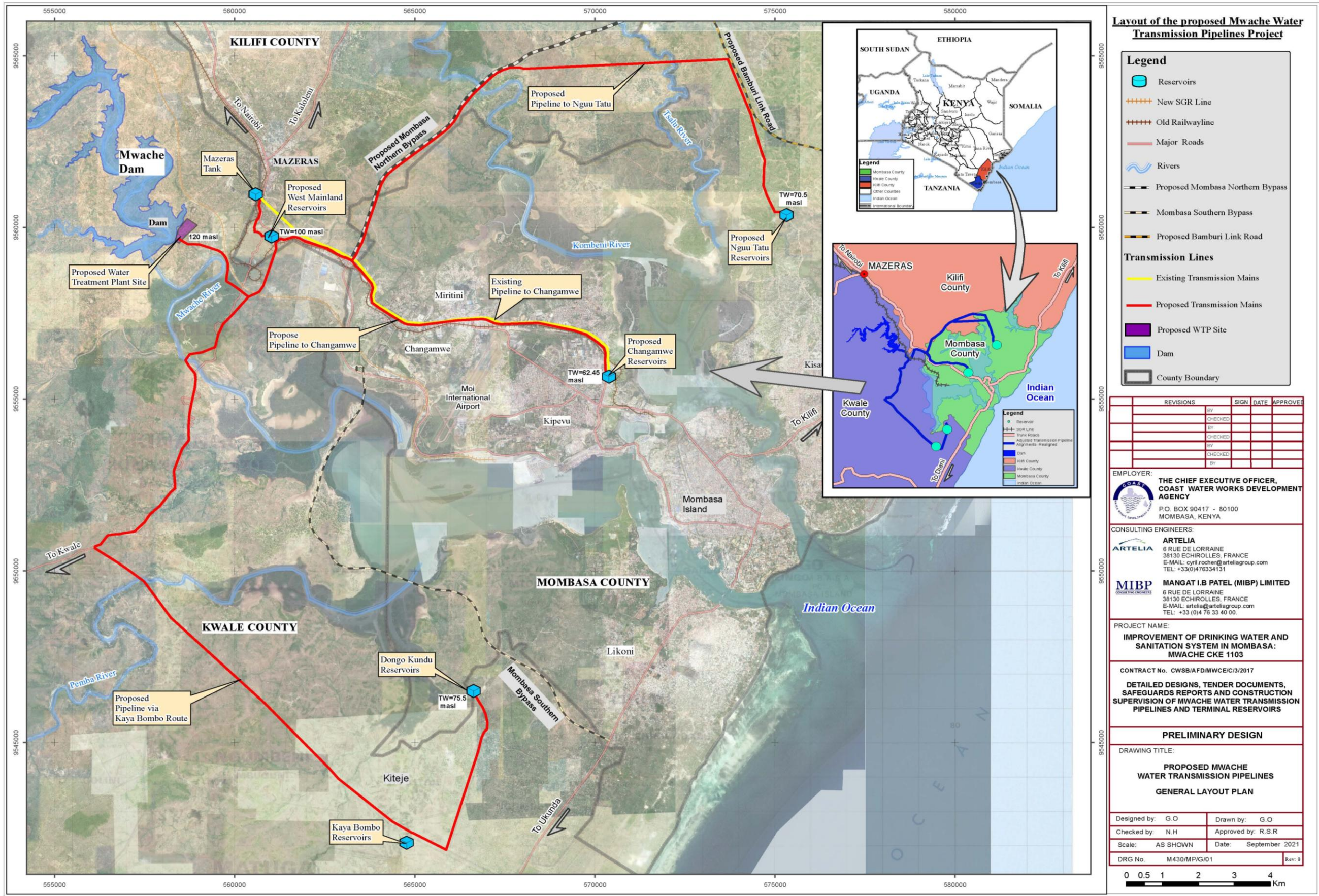


Figure 1.3: Layout of the proposed Mwache Water Transmission Pipelines Project

2 PROJECT DESCRIPTION

2.1 TRUNK MAIN ROUTE BASELINE CHARACTERISTICS

The Trunk Main section of the Mwache Water Transmission Pipelines covers the 5.1km long pipeline section from the WTP to the West Mainland Reservoir located within Kasemeni Location of Kinango Sub County in Kwale County. The start point elevation of the Trunk Main at the WTP is 115 masl, which is the adopted clear water tank outlet level. From the WTP, the Mwache Trunk Main traverses south-east, through undeveloped land and small scale cultivated lands to the Mwache Forest. Within the Mwache Forest, the trunk main is proposed to be laid between the newly constructed Standard Gauge Railway (SGR) and the Mwache River. The section of the trunk main within the forest is approx. 1.5km in length. This section of the trunk main has a high cross-fall slope between the SGR and the Mwache River.

After the forest, the trunk main continues generally along the standard gauge railway for approx. 250m up to Ch. 2+930, where the Transmission Main to the South Mainland (Kaya Bombo Transmission Main) branches off. At this point, the trunk main, transmitting flow allocations for West Mainland, Changamwe and Nguu Tatu turns to the N.E, crossing the SGR at Ch. 3+155 then continues further to the N.E for 300m before turning North, traversing through undeveloped land to the old Meter Gauge Railway at Ch. 4+725.

Upon crossing the old meter gauge railway, the Transmission Main to the North Mainland (Nguu Tatu Transmission Main) branches off from the Trunk Main at Ch. 4+800. From this point, the trunk main, now transmitting the West Mainland and Island water allocation from the Mwache Dam project traverses northwest for 300m to the WML reservoir site, terminating at the WML reservoir inlet at Cha. 5+100. The end-point elevation of the Trunk Main at the WML reservoir inlet is 100 masl

A schematic layout of the Mwache Trunk Main is shown in **Figure 2.1** below while **Figure 2.2** on **Page 8** shows a Layout Plan of the alignment of the Trunk Main section of the Mwache Transmission Pipelines.

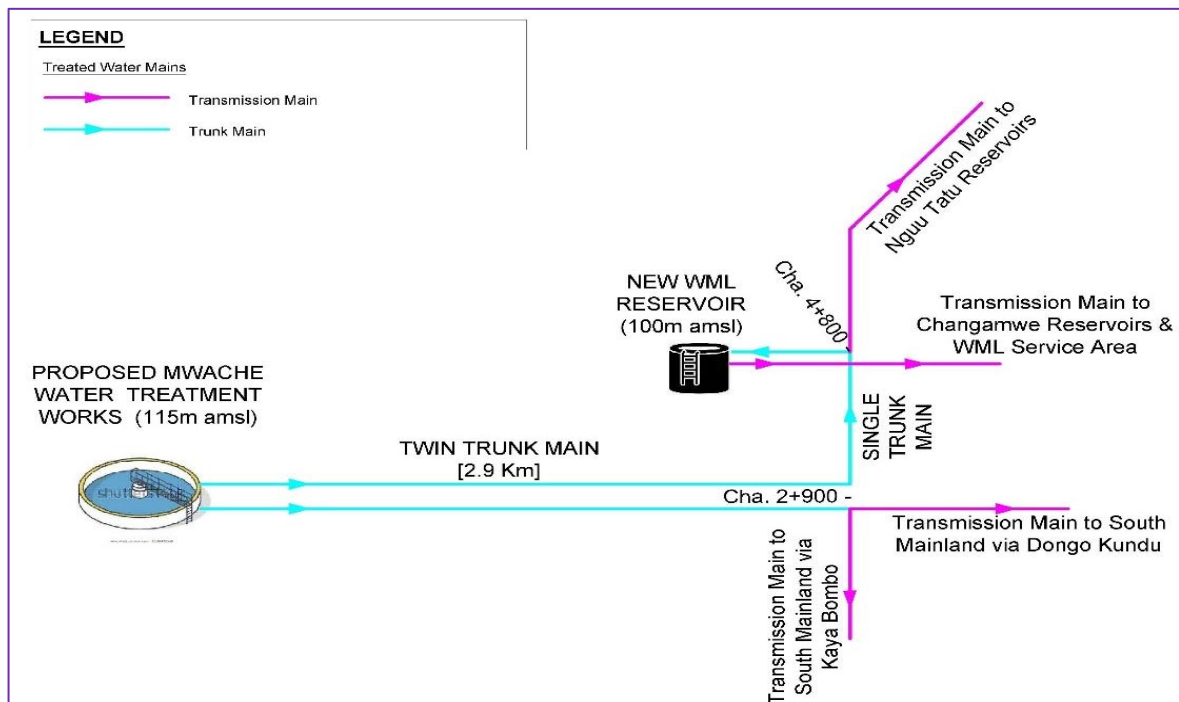


Figure 2.1: – Schematic Layout of the proposed Trunk Main

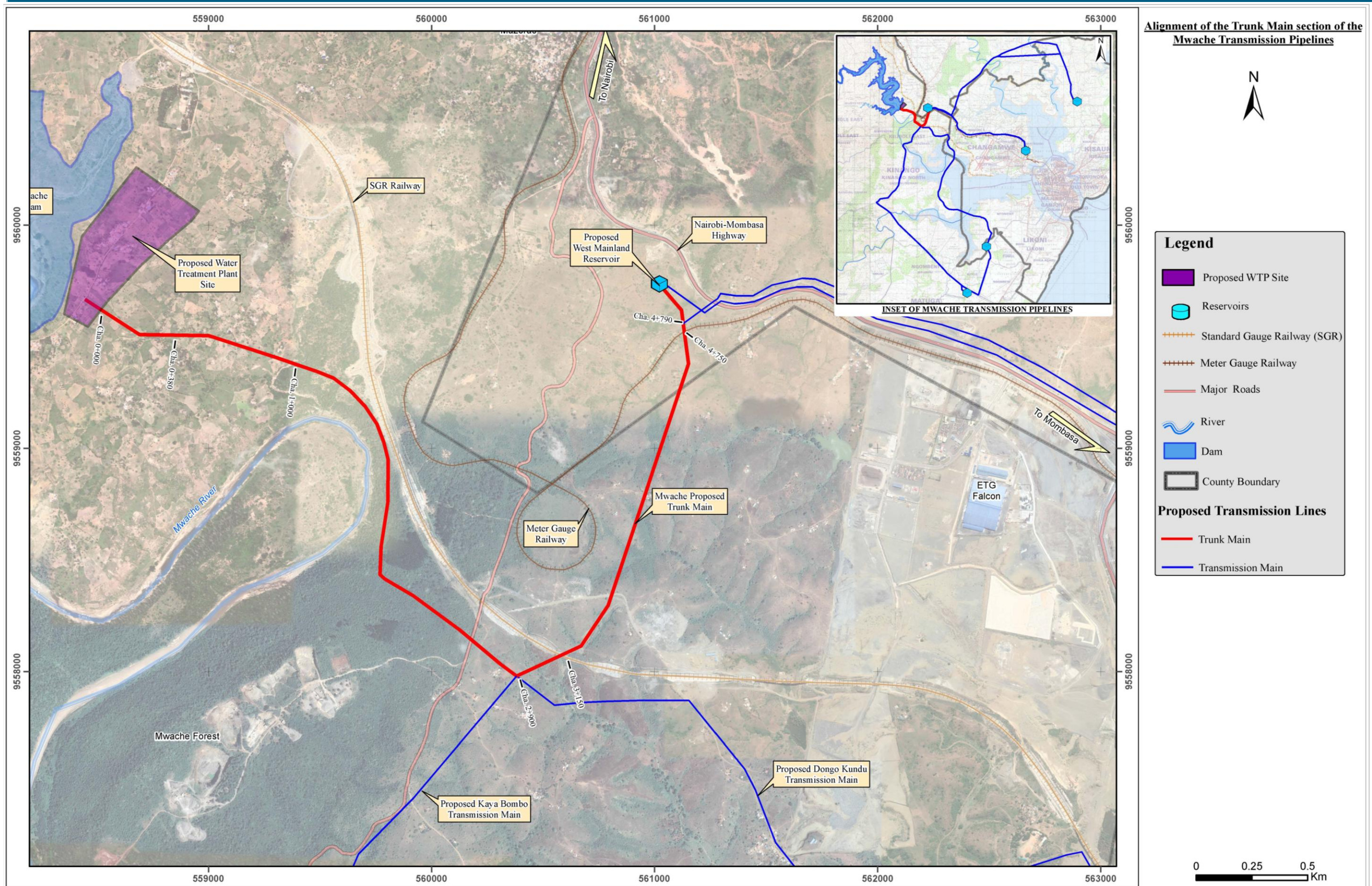


Figure 2.2: Layout Plan of the Trunk Main section of the Mwache Transmission Pipelines

2.2 TOPOGRAPHY, LAND-USE AND PIPELINE WAYLEAVES FOR THE TRUNK MAIN ROUTE

The topography of the trunk main route is generally characterized by a hilly terrain, with steep slopes along and across the alignment, with numerous seasonal water courses including streams and gulleys, and a seasonal river at Ch. 1+000.

A 1.5 km long section of the pipeline (from Ch. 1+000 to Ch. 2+500) is to be laid within the Mwache forest, which is a gazetted forest reserve, within the jurisdiction of the Kenya Forest Service (KFS). The remaining length of the trunk main traverses through undeveloped private parcels of land, with sections of small scale cultivated land. This section of the trunk main has a high cross-fall slope between the SGR and the Mwache River.

A 1 km section of the trunk main alignment from the WTP to the river forming the Mwache Forest boundary is within the proposed Dam operation area, whose RAP implementation is in progress. No additional RAP will be required for this section.

CWWDA will be required to enter into easement lease agreements with KFS for the section of trunk main within the Mwache forest. The sections of the trunk main to be laid within private parcels will require easement acquisition for the pipeline wayleave. **Table 2.1** gives a brief outline of the trunk main route.

Table 2.1: Brief Description of the Mwache Trunk Main Pipeline Route

SECTION	CHAINAGE (M)	DESCRIPTION
1	0+000	Mwache Water Treatment Plant Clear Water Tank Outlet at 115 masl
2	0+000 – 1+000	- Pipeline from the Mwache WTP traversing through the Dam Operation Area towards Mwache forest. The section is part of the area currently being acquired under RAP implementation for the Dam. - Steep slopes from the WTP location to the stream at Ch. 0+380, pipe to be supported with anchors. - Seasonal river crossing at Ch. 1+000, forming boundary between dam operation area and the Mwache forest. - Aerial crossing to be provided at the river crossing, which is characterized by gentle slope at the upstream bank and a cliff on downstream bank. No additional RAP requirement for this section of the Trunk Main.
3	1+000 – 2+500	- Pipeline section within the Mwache Forest - Trunk main alignment between the Mwache River and the Standard Gauge Railway - Very steep cross slopes with difficult access in some sections. Pipeline to be supported with slip anchors along steep sections - Dense thicket in the forest to be cleared for pipe laying works and maintenance access. Easement lease agreement between CWWDA and the KFS shall be required.
4	2+500 – 5+100	- Pipeline section after Mwache Forest, traversing through undeveloped open grazing lands. Easement acquisition will be required between KFS and CWWDA. - The South Mainland Transmission Pipeline via Kwale (Kaya Bombo) branches from the trunk main at Ch. 2+900 - Pipeline crosses the SGR at Ch. 3+150 - Pipeline crosses the old meter gauge railway at Ch. 4+750 - Nguu Tatu transmission pipeline branches from the Trunk Main at Ch. 4+800. - Terminal point of Trunk Main at Ch. 5+100, where the line enters the WML reservoir, inlet level at 100 masl. - Evidence of unstable ground conditions, with signs of erosion. Erosion control measure to be provided at erosion prone sections.

SECTION	CHAINAGE (M)	DESCRIPTION
		Section characterized by an undulating topography with gentle to steep slopes, with numerous valleys. Pipeline to be supported with slip anchors.

2.3 SOUTH MAINLAND TRANSMISSION MAIN PIPELINE ROUTE BASELINE CHARACTERISTICS

The Mwache South Mainland Transmission Main (Kaya Bombo Pipeline) which is 27.7km of a single DN 1000 Pipeline branches off from the Mwache trunk main at Ch. 2+900 of the Trunk Main and traverses in the S.W direction, joining the existing wayleave of Marere Water Transmission pipeline, then runs along the Marere Pipeline for approx. 600m to the Creek where it is proposed to cross beside the existing creek Crossing. The transmission line traverses Kasemeni and Gandini Locations in Kinango Sub County and N'gombeni Location of Matuga Sub County in Kwale County.

The length of the crossing from the high tide level on the LHS bank to the high tide level on the RHS bank is approx. 700m.

The Mwache South Mainland Transmission Pipeline then follows the alignment of the existing Marere Pipeline for approx. 6.4km up to Ch. 9+586 at Lutsangani. At this location, the proposed pipeline turns S.W. to join the existing DN 200 Kaya Bombo Pipeline wayleave for 12.2km up to the existing Kaya Bombo reservoir site at Ch. 21+744.

The Pipeline on this section will cross the Pemba River at Ch. 11+090. It will then traverse through Mteza, Mbuguni, Majera and Kaya Bombo villages to the existing Kaya Bombo reservoir site.

At the existing Kaya Bombo Reservoir Site, an offtake from the transmission pipeline will deliver the 4,000m³/day allocation to Kwale County, to the existing reservoirs then the main pipeline will continue S.E along the alignment of the existing DN 350 Tiwi Pipelines for approx. 1.1km to the Kiteje - Kaya Bombo road at Ch. 22+824. At this point, the pipeline will turn N.E, along the Kiteje-Kaya Bombo road for approx. 4.6km to Ch. 27+370 where it will traverse through private parcels for approx. 250m to the proposed reservoir site at Ch. 27+625. **Figure 2.3** on **Page 11** shows the alignment of the proposed Kaya Bombo Pipeline route.

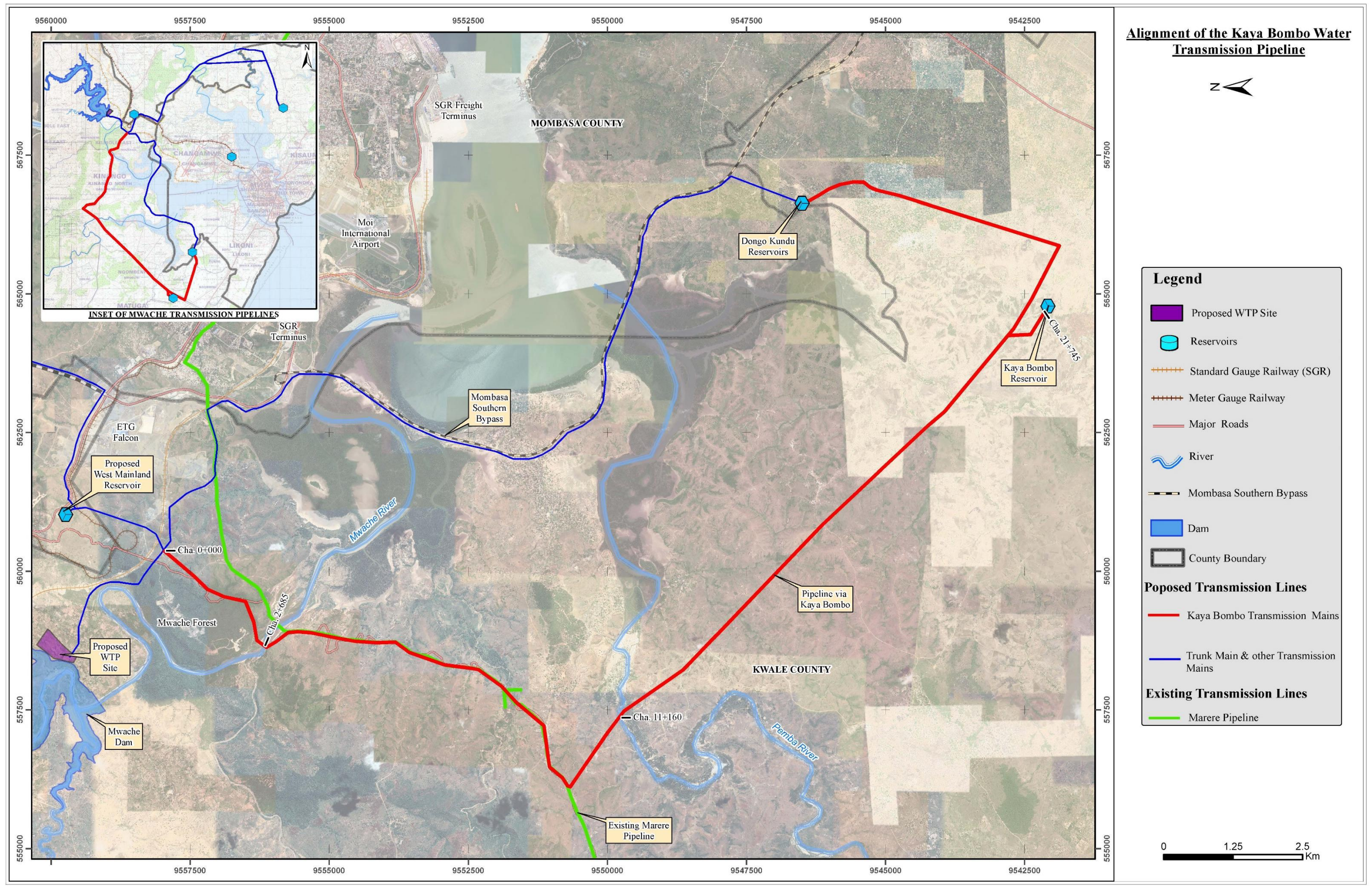


Figure 2.3: Alignment of the Kaya Bombo Water Transmission Pipeline

2.4 TOPOGRAPHY, LAND-USE AND PIPELINE WAYLEAVES FOR THE SOUTH MAINLAND TRANSMISSION PIPELINE ROUTE

The topography of the South Mainland Transmission Pipeline (Kaya Bombo Pipeline) route is characterized by a generally hilly terrain, with predominantly steep slopes on the entire section from the start point to the Kaya Bombo reservoir site. The section between Kaya Bombo reservoir site and the proposed Dongo Kundu reservoir site is generally flattish.

The pipeline on the initial section within the Mwache forest falls from 90 masl at the upper edge of the forest, to sea level at the Mwache Creek crossing within a distance of 2.5km. The Pipeline then rises gradually, with numerous high points and valleys, to approx. 80 masl at Ch. 9+586 at Lutsangani. The Pipeline profile then drops to a low of 10 masl at the Pemba River crossing at Ch. 11+390.

The Pipeline section from the Pemba River crossing to the Kaya Bombo Reservoir site is characterized by an undulating topography, with numerous high points and dips along the profile. The highest point on this section is at 85 masl at Ch. 16+172 within Mbuguni area while the lowest point is at 10 masl at Ch. 19+600 at Manjera.

The elevation at the existing Kaya Bombo Reservoir Site is approx. 70 masl.

The topography of the Pipeline section between the existing Kaya Bombo reservoir site and the proposed Dongo Kundu reservoir site is characterized by gentle slope falling from 70 masl at the Kaya Bombo reservoir site to 50 masl along the Kiteje road then rising to 69 masl at the proposed Dongo Kundu reservoir site.

The land use along the proposed pipeline use is generally small-scale subsistence cultivation, with pockets of undeveloped grazing land.

The section of the Kaya Bombo pipeline before the Mwache creek is entirely within the Mwache forest, a gazetted forest reserve. CWWDA will be required to enter into an easement agreement with Kenya Forest Service for the section of Pipeline within the Mwache Forest.

The entire alignment of the proposed pipeline from Mwache Creek to the Kaya Bombo reservoir site lies within an existing pipeline wayleave. Documentation of the existing wayleave needs to be ascertained. Adequacy of the wayleave will also be ascertained, to confirm if additional construction wayleave will be required. The construction wayleave can be acquired on a temporary basis. **Table 2.1 on Page 11** gives a brief outline of South Mainland Transmission Main route.

Table 2.2: – Brief Description of the South Mainland Transmission Main Route

SECTION	CHAINAGE (M)	DESCRIPTION
1	0+000	Start point of the South Mainland Transmission Pipeline at Ch. 2+900 of the Mwache Trunk Main
2	0+000 – 1+902	Section traversing undeveloped private parcels, with a short section traversing through cultivated land and within homesteads before joining the alignment of the existing Marere Pipeline.
3	1+902 – 2+502	- Pipeline section along the alignment of the existing Marere Pipeline - Section characterized by a generally steep slope, from 85 masl at the upper edge of the forest to sea level at the Mwache Creek crossing.
4	2+502 – 3+202	- Mwache Creek Crossing, total length across the creek approx. 700m, - Creek crossing beside the existing Marere Pipeline crossing.
5	3+202 – 9+586	- Mainly traversing small scale cultivated land within the existing DN 500 Marere Pipeline wayleave. - CWWDA to confirm documentation of the existing pipeline wayleave along the section. - Pipeline section characterized by numerous water courses which will require under and aerial pipeline crossings.
6	9+586 – 21+745	- Mainly traversing small scale cultivated land and undeveloped land within the existing pipeline wayleave for the DN 200 Kaya Bombo Pipeline from the Marere Pipeline offtake at Lutsangani to the existing Kaya Bombo Reservoir Site. - Pemba River Crossing at Ch. 11+160. - Pipeline enters the existing Kaya Bombo Reservoir Site at Ch. 21+745
7	21+745 – 27+625	- Pipeline section to be laid within the existing Kiteje – Kaya Bombo road reserve from the existing Kaya Bombo reservoirs to the proposed Dongo Kundu Reservoir site. - Extent of existing road reserve to be ascertained and required additional wayleave to be acquired. 1.1km section from the Kaya Bombo reservoir site to be laid along the existing Tiwi Pipelines.

2.5 PIPELINE ROUTE ALTERNATIVES

2.5.1 Options for the South Mainland Pipeline

The previously submitted Data Review Report proposed three options for water transmission to the South Mainland:

- Two options based on the Water Transmission pipeline along the Mombasa Southern By-Pass Road, with 4Nr. DN 450 pipes on the bridges as per a previous agreement with KeNHA and the roadworks Consultant:
 - One option comprising of a single DN 1,000 pipeline along the Bypass Road, DN 1000 (outside bridges) up to Dongo Kundu reservoir, extending in DN 400 up to Kaya Bombo reservoirs.
 - The other option consisting of a DN 1,000 pipeline along the Southern Bypass Road and on bridges, up to Dongo Kundu reservoir, and a second DN 300 pipeline through Kwale County transmitting the Kwale County allocation of the Mwache Dam project to the Kaya Bombo reservoirs.
- One option independent from the Southern Bypass Road, consisting of a DN 1000 pipeline through Kwale County up to Kaya Bombo reservoirs, extended in a DN 900 line to supply Dongo Kundu reservoir.

Subsequent to the above referenced discussions with KeNHA and the roadworks Consultant, Via their letter dated 2nd June 2021, KeNHA's Roadworks Consultant informed CWWDA and ARTELIA / MIBP that construction of the bridges on the Southern Bypass Road is at advanced stages and installation of the DN 450 pipes as previously agreed is not possible. They further proposed an alternative pipework arrangement consisting of 12Nr. DN 250 pipes.

The pipework arrangement on the bridges as proposed by KeNHA's Consultant is not compatible with the first two options mentioned above. The hydraulic bottleneck resulting from the manifold would be critical. The velocity in the DN 250 pipes would be 1.4 to 1.5 m/s and would generate head losses of almost 30 m over the 2.8 km cumulative length of the manifold. This would require a DN 1600 transmission main outside the bridges to counteract the effect of this bottleneck. This option is therefore ruled out and has not been considered further.

The following two options have therefore been considered for Water Transmission to the South Mainland:

- The first option, denoted as Option I below, entails the installation of a single transmission pipeline through Kwale County to supply both the existing Kaya Bombo reservoirs and the proposed new Dongo Kundu reservoir.
- The second one, denoted as Option II below, consists of two pipelines transmitting equal flows to the South Mainland, one along the Mombasa South Mainland and via the bridges and the second via the Kwale route, both pipes with much more balanced flowrates in order to be compatible with the piping system on the bridges as proposed by Roadworks Consultant.

Hydraulic calculations for the above two options are presented in **Appendix 3 of the design report** of this Report while their characteristics and cost estimates are summarized in Table 2.3 below.

Table 2.3: – Pipeline to the South Mainland

OPTION	LENGTH km	DIA. Mm	DAILY VOL. m ³	UNIT COST USD/m	TOTAL COST 1000 USD
Option I : one pipeline in Kwale County, extended to Dongo Kundu					
K = 0.1mm					
Pipeline to Kaya Bombo, through Kwale County	21.7	1000	71,900	755	16,383
Extension from Kaya Bombo to Dongo Kundu	5.9	900	67,900	655	3,865
Total cost estimate (rounded)					20,250
K = 0.5mm					
Pipeline to Kaya Bombo, through Kwale County	21.7	1000	71,900	755	16,383
Extension from Kaya Bombo to Dongo Kundu	5.9	900	67,900	655	3,865
Total cost estimate (rounded)					20,250
K = 1mm					
Pipeline to Kaya Bombo, through Kwale County	21.7	1100	71,900	830	18,022
Extension from Kaya Bombo to Dongo Kundu	5.9	900	67,900	655	3,865
Total cost estimate (rounded)					21,887
Option II : one pipeline along the Southern Bypass Road & one pipeline in Kwale County, extended to Dongo Kundu					
K = 0.1mm					
Pipeline to D. Kundu along the Southern Bypass Road					
Outside bridges and viaduct	14.9	700	35,950	494	7,360
On bridges and viaduct	12 x 2.8	250	35,950	155	5,208
Pipeline in Kwale County					
Pipeline to Kaya Bombo	21.7	800	35,950	541	11,740
Extension to Dongo Kundu	5.9	700	31,950	494	2,915

OPTION	LENGTH km	DIA. Mm	DAILY VOL. m ³	UNIT COST USD/m	TOTAL COST 1000 USD
Total cost estimate (rounded)					27,220
K = 0.5mm					
Pipeline to D. Kundu along the Southern Bypass Road	14.9	800	35,950	541	8,060
Outside bridges and viaduct	12 x 2.8	250	35,950	155	5,208
On bridges and viaduct					
Pipeline in Kwale County	21.7	800	35,950	541	11,740
Pipeline to Kaya Bombo	5.9	700	31,950	494	2,915
Extension to Dongo Kundu					
Total cost estimate (rounded)					27,920
K = 1mm					
Pipeline to D. Kundu along the Southern Bypass Road	14.9	800	35,950	541	8,060
Outside bridges and viaduct	12 x 2.8	250	35,950	155	5,208
On bridges and viaduct					
Pipeline in Kwale County	21.7	800	35,950	541	11,740
Pipeline to Kaya Bombo	5.9	700	31,950	494	2,915
Extension to Dongo Kundu					
Total cost estimate (rounded)					27,920

2.5.2 Conclusion on the Design and Size of the South Mainland Water Transmission Main

The arrangement proposed by KeNHA's consultant (12 pipes DN 250 on the two bridges and the viaduct) would create a serious hydraulic bottleneck which makes impossible the implementation of the least cost option previously identified in the Data Review Report, consisting in a single pipeline along the Southern Bypass Road extended up to Kaya Bombo.

In this new situation, **the least cost option is Option I consisting in a DN 1000 pipeline via the Kwale County route as described in chapter 6 as the Kaya Bombo Pipeline route, up to the existing Kaya Bombo reservoir site, extending in 900 mm dia. Up to the proposed Dongo Kundu reservoir.** This transmission main will transmit the South Mainland flow of 67,900 m³/day to the proposed Dongo Kundu Reservoir as well as the 4,000m³/day allocation for Kwale County to the existing Kaya Bombo reservoirs.

In view of the foregoing, **Option I above is recommended** for adoption in the Detailed Design for Water Transmission to the South Mainland.

2.6 MWACHE TRUNK MAIN SECTION WITHIN THE FOREST PIPELINE ROUTE OPTIONS

The following 3 Pipeline route options are available for construction of the Mwache Trunk Main section within the Forest.

i) Route Option 1: Pipeline within Mwache forest as per the original design.

In this option, a 15m width of forest would be affected, leading to clearing of 2.5Ha. of the forest land over 1.7km of pipeline section within the forest.

The Mwache forest lies within the jurisdiction of the Kenya Forest Service (KFS). The KFS were involved at the design stage and during RAP and ESIA preparation for the project, including issuing their No-Objection to the National Environment Management Authority for issuance of an ESIA License. The pipeline route under this option does not impact on the railway.

Comments by AFD during the E&S mission to the project in January 2025 necessitated review of measures to reduce the impact of the pipeline section within the forest to the forest ecosystem. Measures considered involved:

- Review of option for partial re-alignment of sections of the Transmission Pipelines within the forest to reduce the sections to a minimum possible length and width, hence significantly reducing the scale and magnitude of the impacts.
- Review of the mitigation and compensation measures, including proposal for carrying out a key biodiversity assessment, in line with the AFD comments.

The above measures resulted in commissioning of a Critical Habitat Assessment (CHA) discussed in this report. In order to reduce the pipeline impact on the forest, two alternative re-alignment routes for the section within the forest as follows:

- Pipeline route Option 2; Pipeline to be laid within 4m width of the forest adjacent to the SGR reserve
- Pipeline route option 3; Pipeline within the existing Railway Service Road beside the Standard Gauge Railway

ii) Route Option 2: Pipeline within 4m wide corridor of the Mwache forest adjacent to the SGR Reserve.

The pipeline route within the Mwache Forest under this option will be 1.5km comprising of two (2) sections as follows.

- Section 1; Initial 400m section of the pipeline within the forest to be laid fully within the forest due to hydraulic considerations. The width of forest affected under this option will be 8m. The area of forest land affected on this 400m long section is 0.33Ha.
- Section 2; 1.1km section of the pipeline along the alignment of the SGR. The pipeline on this section will be laid within a 4m wide corridor adjacent to the existing SGR reserve, hence affecting only a 4m wide section of the forest for the 1.1km section of pipeline along the railway. The area of forest land affected on this 1.1km long section is 0.44Ha.

The total area of forest affected under this option will be 0.77Ha, within the overall length of 1.5km., leading to a 69% reduction of the area of forest affected.

The reduction in area of forest affected will be achieved by using the existing railway service road temporarily as a construction access and for working space during construction of the pipeline. This will enable the pipe laying works to be limited to only 4m of the forest, where the permanent works will be installed.

Approval by both KFS and Kenya Railways will be required to carry out the works under this option, with KFS granting the special user license to lay the pipeline within the 8m corridor on the section 1 (400m length) and 4m corridor on section 2 (1.1km length) of the pipeline, and Kenya Railways to grant permission to temporarily use the railway reserve for construction access and working space during construction. Under this arrangement, approval by Kenya Railways can be easily obtained as no permanent works will be installed within the railway reserve. Considering the significant reduction of the forest land affected under this option, the KFS approval will be for a significantly smaller corridor as compared to that in the original design (option 1 above).

iii) Route Option 3: Pipeline along railway service road within the SGR Reserve.

The pipeline route within the Mwache Forest under this option will be 1.5km comprising of two (2) sections as follows.

- Section 1; Initial 400m section of the pipeline within the forest to be laid fully within the forest due to hydraulic considerations. The width of forest affected under this option will be 8m. The area of forest land affected on this 400m long section is 0.33Ha.
- Section 2; 1.1km section of the pipeline along the alignment of the SGR. The pipeline on this section will be laid within an existing railway service road entirely within the existing SGR reserve. There will be no impact to the forest on this section within the railway reserve.

The area of forest affected under this option will be 0.33Ha, leading to an 87% reduction of the area of forest affected.

Under this option, Approval by both KFS and Kenya Railways will be required to carry out the works, with KFS granting the special user license to lay the 400m on the initial section of the pipeline entirely within the forest (within an 8m corridor) and Kenya Railways to grant permission for laying 1.1km of the pipeline within the railway reserve. From past experience, approval by Kenya Railways to carry out permanent works within the railway reserve will be lengthy and bureaucratic, hence not the preferred option.

iv) Summary and Conclusion

A summary comparison of the 3Nr options presented above is given in the Table 2.4 below.

Table 2-4: Comparison of Pipeline Route Options for the Mwache Trunk Main

S/No.	Aspect	Route Option 1	Route Option 2	Route Option 3
1	Impact to the forest (Area of forest land affected)	2.5Ha	0.77Ha	0.33Ha
2	Impact on Biodiversity	Significant	Less significant	Less significant
3	Forest Fragmentation	Yes	No	No
4	Approval requirements	KFS	KFS & Kenya Railways	KFS & Kenya Railways
5	Ease of approval	Easy	Relatively Easy	Relative complex

Based on the above, it is recommended that Option 2 of the Pipeline route options be adopted as it will result in significantly low impact to the forest while ensuring timely implementation of the Project.

Figure 2.4 on Page 17 illustrates layout Plan of the proposed Pipelines overlaid on Mwache Forest District Sections (Kaya Section, Creek Section and Mwache Forest Reserve Section)

2.7 Determination of Discrete Management Unit (DMU)

The assessment focussed on the 1.5km stretch with a 15m wider corridor which translates into 3.3acres continuous polygon as illustrated in figure 2-4 on Page 11⁸. This was only a fraction of the Mwache forest where the study focused on the pipeline footprint. However, with the understanding that the area assessed for Critical Habitat is not just the direct footprint, but a relevant spatial 'Discrete Management Unit' (DMU) that includes

⁸ The South Mainland pipeline does not traverse the forest but rather Note that the pipeline section from the trunk undeveloped open farmlands to the existing wayleave of Marere Water Transmission pipeline that crosses Mwache Creek at an existing pipeline bridge

the direct footprint and potential secondary/indirect impacts. In this case, the entire Mwache forest which is 417ha translated to 1030.43acres total tree cover of Mwache Forest.

This approach is precautionary, intending to take direct and indirect impacts into account, and to acknowledge the inherent connectivity of ecological systems. Hence, crucially, Critical Habitat is identified irrespective of the type or scale of the development or impact: it is value-based, not risk-based. An area can be Critical Habitat despite zero predicted impacts on the biodiversity for which it was designated. Therefore, developments can take place within Critical Habitat, but only if it can be demonstrated it will not have significant impacts on the biodiversity for which it was designated as Critical Habitat (a set of conditions described in Paragraph 17 of PS6).

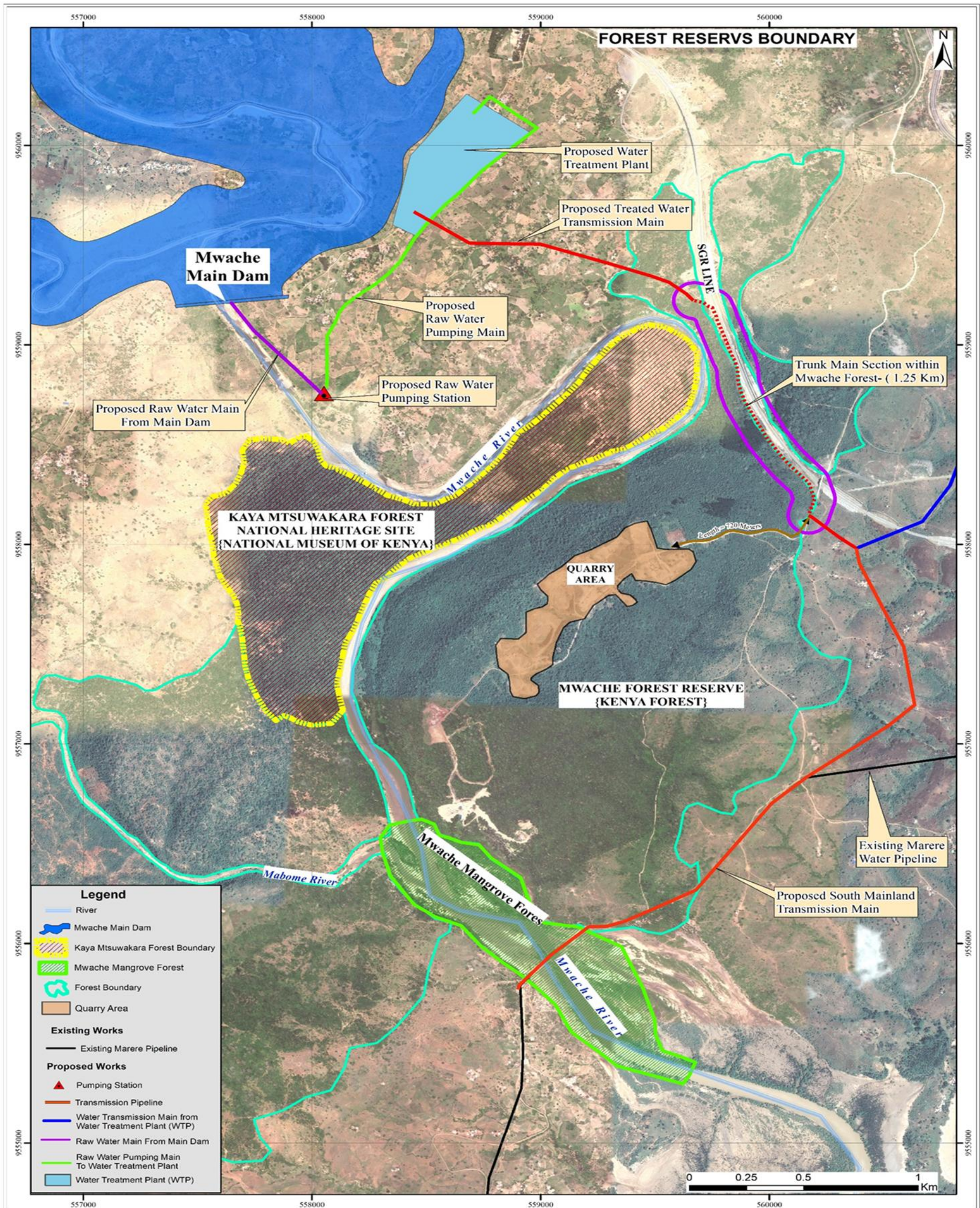


Figure 2.4: Layout of Proposed Water Transmission Mains Overlaid on Mwache Forest District Section

3 ENVIRONMENTAL BASELINE INFORMATION

3.1 CLIMATE

Annual Average precipitation⁹ of Kinango Sub County is 852mm. The precipitation is highest in the months of April and May while no or little precipitation occurs from December to March. 75% Dependable Annual rainfall is 610 mm.

The annual minimum temperatures in the area range between 22.5°C and 24.5°C while the maximum temperatures vary between 27°C and 32°C along the coastal belt. The district is generally hot and humid all the year round, with a relative humidity of about 60% along the coastal belt due to the high evaporation rate and availability of surface water¹⁰.

The precipitation is highest in the months of April and May while no or little precipitation occurs from December to March. Annual Average precipitation is about 900mm against an average 1,860mm evapo-transpiration in the region, with 75% Dependable Annual rainfall equivalent to 610 mm. Evaporation rates recorded at the Moi International Airport in Mombasa provide the appropriate parameter to describe evaporation variation in the project area. The results indicate that the mean daily evaporation rates vary from 3.5 mm in July to 6.3 mm in February. The Relative humidity data shows the Coastal nature of climate. Relative humidity varies between 70% - 75% from January to March and 65% – 67% from April to December.

3.2 DRAINAGE AND HYDROLOGY

The drainage of Kasemeni, Gandini, Mbuguni and Ng'ombeni Locations within Kinanango and Matuga Sub Counties of Kwale County is influenced by the ocean, which determines the easterly surface slope. While there are no permanent rivers and streams, the pipeline alignment is characterized with notable dry streams and seasonal rivers, among them Mwache river, Gandini and Ng'ombeni streams as well as the Pemba river.

The dry streams collect surface runoff discharging from numerous drains from the immediate catchment and watershed resulting into soil erosion that has left notable gullies, especially on steep sloppy areas. Additionally, apart from some sections of the larger riverbeds that tend to retain water after floods, there are no possibilities of flooding around the project areas. This implies a well-drained area in both surface as well as the largely porous geological formations.

Mwache River is the main water body (though it is seasonal by nature) in the project area with its source in the Taita hills. The main tributaries (also seasonal) discharging into the river include Bome river from the south immediately downstream of the proposed dam axis lines and Mnyenzi river also from the southwest immediately upstream of the dam axis. There are also numerous dry surface drains into Mwache River that seemingly flows with water only during rainy seasons. The water resources along the proposed pipeline route have varying Water quality from one water body to the other, with a particular difference between the fresh water and the brackish water from the Mwache Creek. The general water quality as presented in the ESIA

⁹ <https://www.worlddata.info/africa/kenya/climate-coast.php>

¹⁰ State of Coast Report for Kenya (Enhancing Integrated Management of Coastal and Marine Resources in Kenya) – NEMA 2017

report for the Mwache Roads presented below summarized results as indicated in **Table 3.1** on **Page 13** while water quality results for water flowing within Mteza stream is presented in **Table 3.2** page 13

Table 3.1: Mwache River Water Quality Parameters¹¹

PARAMETER	DESCRIPTION
pH	Water generally neutral in river and the creek (6.0 –9.0)
Colour	Surface water is highly coloured compared to ground water (<25mgPt/l)
Electrical Conductivity	Ground water and creek brackish (<2,000mg/l)
Turbidity	Surface water is highly turbid compared to ground water (<5NTU)
Dissolved Oxygen	Surface water and ground water is fresh (>5mg/l)
Total Dissolved Solids	Ground water and creek saline. Mwache pools are fresh (<1,500mg/l)
Suspended Solids	High suspended matter clear due to settlements) <30mg/l

Table 3.2: Mteza stream Water Quality Parameters¹²

Parameters	Units	Results	NEMA	Remark
pH, @ 25°C	-	8.33	6.5 – 8.5	Acceptable
Colour	TCU	15	30 Max	Acceptable
Biochemical Oxygen Demand (BOD)	mg/l	17.02	30 Max	Acceptable
Dissolved Oxygen (DO)	mg/l	5.2	NEMA- no Standard, WHO- No health-based guideline value proposed	Unacceptable; healthy water should generally have DO concentrations above 6.5-8 mg/l.
Chemical Oxygen Demand (COD)	mg/l	29.6	50 Max	Acceptable
Total dissolved solids (TDS)	mg/l	431	1200 Max	Acceptable
Turbidity	NTU	162	NEMA- no Standard, WHO- No health-based guideline value proposed	Unacceptable; turbidity values less than 10 NTU are considered low, a value of 50 NTU would be considered moderately turbid, and very high turbidity values can be more than 100 NTU.
Total suspended solids (TSS)	mg/l	136	30 Max	Unacceptable
Oil and grease	mg/l	Nil	Nil	-

3.3 GEOLOGY AND SOILS

The soil types have a strong correlation with the geology and topography of the region and differ widely in depth, texture, physical and chemical properties with variations running parallel to the coastal line due to sedimentation process. The significance of this geological and soil characteristics is the porosity associated with

¹¹ Environmental Impact Assessment Report for Mwache Roads

¹² Environmental Impact Assessment Report for Mwache Roads

the sedimentary type of soils. Infiltration to the groundwater aquifers of polluting substances from the ground surface is also highly likely.

The coastal zone is generally underlain by a base rock of sedimentary origin (shells, sandstones and clays). In general, the boundary between the geological systems or groups and their sub-divisions run parallel to the coastline, the rocks becoming progressively older as one travels inland. This series could fall into three well-marked divisions as presented below in order of their succession.

- The Duruma Sandstone Series consisting of grits, sandstone and shales. The division is divisible into three broad lithological units with coarse sandstones at the top and bottom of the succession and finer sandstone and shales in the middle.
- The Jurassic rocks that are entirely of marine origin and consists of limestone, mudstones, shales and occasional thin sandy beds. The airport largely lies within this division.
- The Cainozoic rocks that include a thick series of sand and gravels, coral reef with associated lagoon deposits of coral, calcareous sands and beach sands and various subsidiary sandy beds.

The pipeline corridor from Gandini to Ng'ombeni falls within the Cainozoic rocks that occur on the coastal strip of land bordering Indian Ocean and include stratigraphic units belonging to Pliocene, Pleistocene and Recent periods. These are composed of sands, dune sands, raised coral reef, crags, red wind-blown sands and raised alluvial deposits.

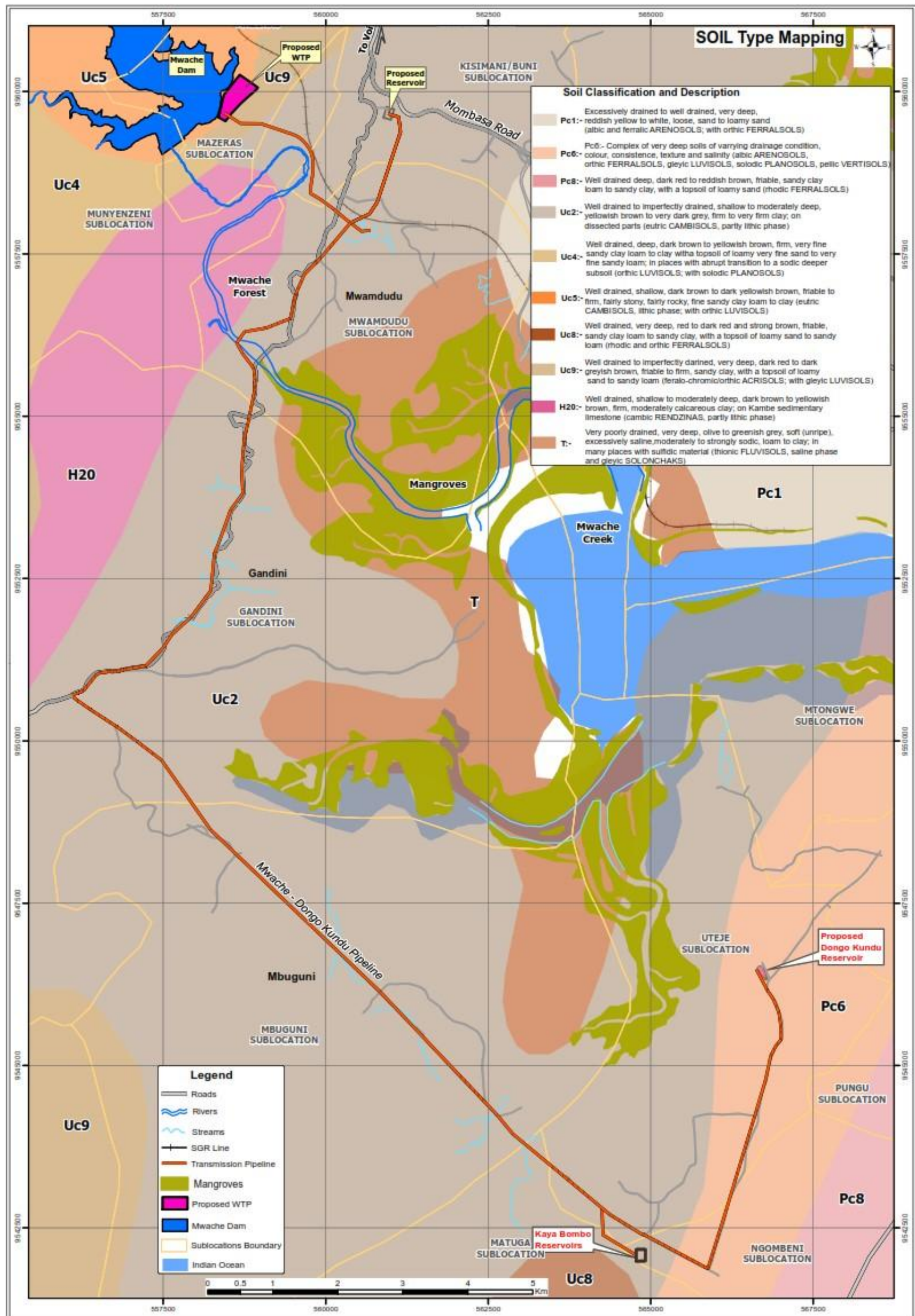
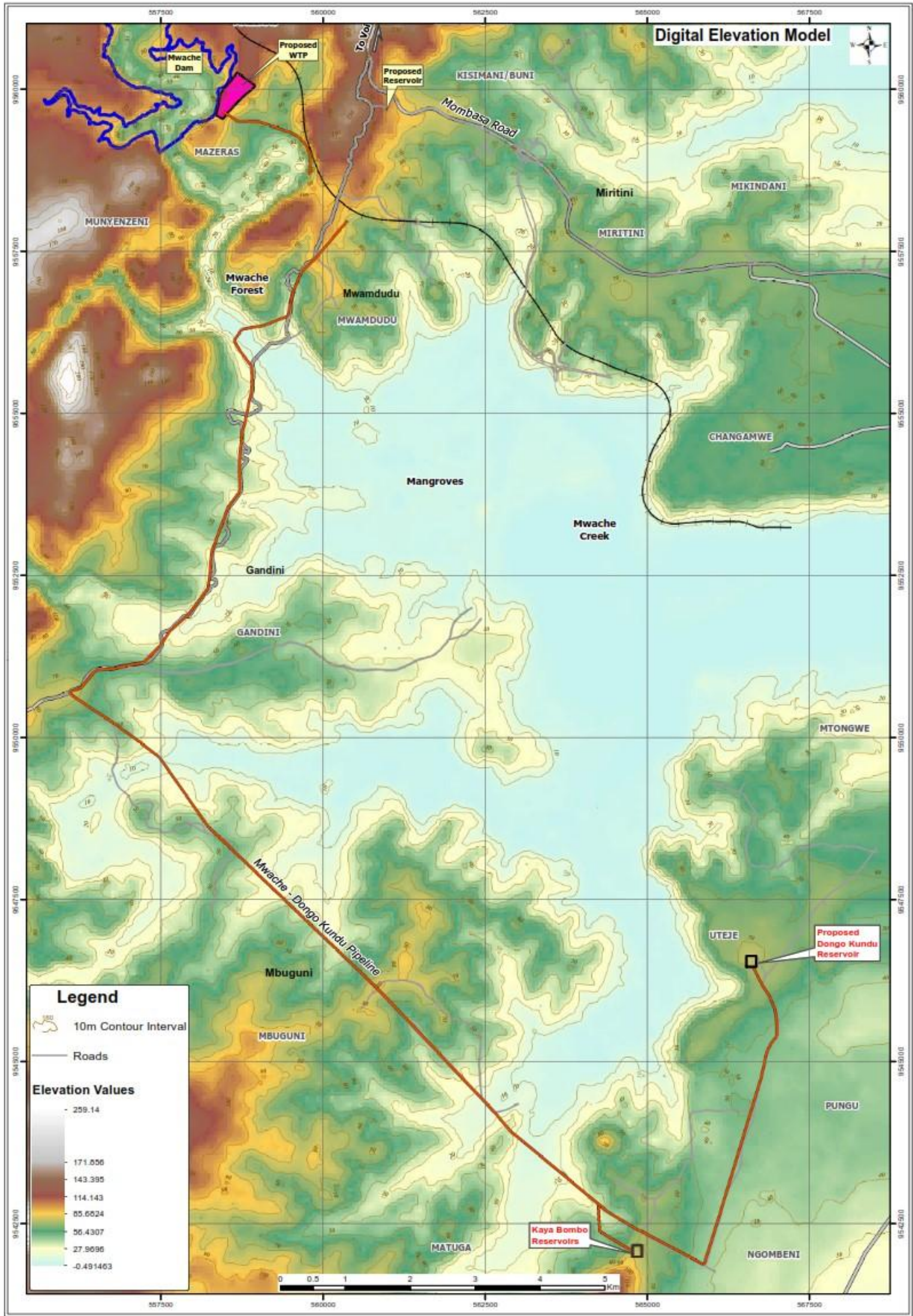


Figure 3.1: Soil Map of the pipeline Route

3.4 TOPOGRAPHY

The topography of the pipeline corridor gently rises from Mombasa Island near Indian Ocean coast of Kenya and from EL 0.0m (mean sea level), rising steadily towards Kinango and Matuga Sub Counties. The topography of the trunk main route is generally characterized by a hilly terrain, with steep slopes along and across the alignment, with numerous seasonal water courses including streams and gulleys, and a seasonal river at Ch. 1+000.

The topography of the South Mainland Transmission Pipeline (Kaya Bombo Pipeline) route is characterized by a generally hilly terrain, with predominantly steep slopes on the entire section from the start point to the Kaya Bombo reservoir site. The section between Kaya Bombo reservoir site and the proposed Dongo Kundu reservoir site is generally flattish.



3.5 AIR QUALITY

The assessment referenced air quality sampling results done in the same area under the Mwache Road ESIA Study, the assessment sampled air quality in Chigato ECDE Kindergarten, Chigato residential areas, Chigato dispensary, Chigato water project, Myenzi residential areas, Myenzi Primary and secondary school, Sacred Mijikenda Kaya Forest, Agricultural lands under cultivation, SMS school for special children, Closest farming homestead, and Mazeras High school. Baseline air quality samples were taken for a short-term exposure level which would serve as emission inventory and reference once construction commences. Air quality analysis included particulate matter (PM_{2.5} and PM₁₀), Sulphur Dioxide (SO₂), Nitrogen Dioxide (NO₂), Carbon Monoxide (CO) and Ozone (O₃).

Results of the sampled presented below listed findings¹³

All Nitrogen Dioxide monitoring data recorded in the project sites were below the EMC (Air quality) regulations 2014 of 0.5 ppm. The maximum 1-hour NO₂ concentration was observed to be 0.03 ppm at the station ML—8 situated near Mazeras high school. The minimum 1-hour NO₂ concentration was observed to be less than detection levels (<0.001) at all the remaining nine stations.

All Sulphur Dioxide monitoring data recorded in the project sites were below the EMC (Air quality) regulations 2014 of 0.191 ppm. The maximum 1-hour SO₂ concentration was observed to be 0.03 ppm at the station ML—8 situated near Mazeras high school. The minimum 1-hour SO₂ concentration was observed to be less than detection levels (<0.001) at seven of the ten stations.

All Carbon Monoxide monitoring data recorded in the project sites were below the EMC (Air quality) regulations 2014 of 10.0 mg/m³. The maximum 1-hour CO concentration was observed to be 0.22 mg/m³ at the station ML—8 situated near Mazeras high school. The minimum 1-hour CO concentration was observed to be 0.07 mg/m³ at the station ML—1, ML—6 and ML—7. The maximum and minimum results are 100.00% within the acceptable limits.

All Ozone monitoring data recorded in the project sites were below the EMC (Air quality) regulations 2014 of 0.12 ppm. The maximum 1-hour O₃ concentration was observed to be 0.07 ppm at the station ML—8 situated near Mazeras high school. The minimum 1-hour O₃ concentration was observed to be less than detection levels (<0.001) at ML-7 and ML-10.

3.6 BIODIVERSITY

Vegetation impacted within Mwache Forest Section

The Critical Habitat Assessment was carried between the Month of April to May 2025 as provided by the International Finance Corporation (IFC) Performance Standards PS6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources (IFC 2012, 2019).

IFC Guidance Note (GN) 6 paragraphs GN70–83 provides that biodiversity values should be screened using critical habitat criteria and thresholds including (i). Criterion 1: Critically Endangered (CR) and Endangered Species (EN) applicable thresholds being areas that support globally important concentrations of an IUCN Red-listed EN or CR species (≥ 0.5% of the global population and ≥ 5 reproductive units GN16 of a CR or EN species). (ii) Criterion 2: Endemic and Restricted-range Species for terrestrial vertebrates and plants, restricted-range species are defined as those species that have an Extend of Occurrence (EOO) less than 50,000 square kilometres (km²) and (iii) Criterion 3: Migratory and Congregatory Species, being areas known to sustain, on a

¹³ Environmental Impact Assessment Report for Mwache Roads Project

cyclical or otherwise regular basis, ≥ 1 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle and areas that predictably support ≥ 10 percent of the global population of a species during periods of environmental stress.

Trees and Shrubs

The tree and shrub diversity of the forest patch is dominated by *Obetia radula*, a tree and grows primarily in the seasonally dry tropical forests of eastern Africa and western Indian Ocean islands. It has the highest importance value (56.102) of all the species encountered (Table 1). Thirty-four of these were trees or small shrubs with the potential of developing into full-grown trees. The second most noticeable is *Encephalartos hildebrandtii*, a cycad native to eastern African coasts at elevations up to 600m asl. The IVIs for the 12 most abundant species are illustrated in Figure 3-1 on Page 22 while Table 3.3 below presents Trees and Shrubs Abundance and Cover.

Table 3-3: Trees and Shrubs Abundance and Cover

#	Species	Rel. dens	Rel. freq	Rel. dom / basal area	Imp value
1	<i>Obetia radula</i>	9.15	3.09	43.86	56.10
2	<i>Encephalartos hildebrandtii</i>	1.72	4.12	17.65	23.49
3	<i>Grewia plagiophylla</i>	3.92	7.22	6.12	17.26
4	<i>Milletia usaramensis</i>	1.96	2.06	9.18	13.20
5	<i>Bullockia mombazensis</i>	1.57	5.15	3.59	10.31
6	<i>Canthium mombazense</i>	1.57	5.15	3.59	10.31
7	<i>Markhamia zanzibarica</i>	4.66	4.12	1.35	10.13
8	<i>Terminalia obicularis</i>	5.39	2.06	1.76	9.22
9	<i>Chrysophyllum viridifolium</i>	5.39	2.06	0.45	7.90
10	<i>Donella viridifolia</i>	5.39	2.06	0.45	7.90
11	<i>Maytenus heterophylla</i>	3.59	3.09	0.95	7.63
12	<i>Garcinia livingstonei</i>	2.45	4.12	0.47	7.04
13	<i>Zanthoxylum chalybeum</i>	0.98	1.03	4.90	6.91
14	<i>Psydrax parviflora</i>	2.61	3.09	1.19	6.90
15	<i>Atrabotrys modestus</i>	2.45	4.12	0.30	6.87
16	<i>Croton dichogamus</i>	4.41	2.06	0.38	6.85
17	<i>Lonchocarpus bussei</i>	1.23	4.12	0.90	6.25
18	<i>Vachelia zanzibarica</i>	2.45	2.06	1.73	6.24
19	<i>Grewia forbesii</i>	1.72	4.12	0.31	6.15
20	<i>Terminalia spinosa</i>	3.43	2.06	0.59	6.08
21	<i>Asteranthes asterias</i>	4.90	1.03	0.13	6.06
22	<i>Phyllanthus reticulata</i>	2.29	3.09	0.21	5.59
23	<i>Ormocarpum trichiocarpum</i>	1.23	4.12	0.15	5.50
24	<i>Vepris trichocarpa</i>	2.94	2.06	0.24	5.24
25	<i>Senegalia mellifera</i>	1.96	2.06	1.08	5.11

#	Species	Rel. dens	Rel. freq	Rel. dom / basal area	Imp value
26	<i>Capparis tomentosa</i>	1.63	3.09	0.16	4.88
26	<i>Rinorea spp</i>	2.94	1.03	0.10	4.07
28	<i>Uvaria acuminata</i>	2.94	1.03	0.04	4.02
29	<i>Strychnos spinosa</i>	1.47	2.06	0.19	3.73
30	<i>Rhus natalensis</i>	0.98	2.06	0.12	3.17
31	<i>Combretum spp</i>	1.96	1.03	0.16	3.15
32	<i>Rhoicissus revoilii</i>	1.96	1.03	0.13	3.12
33	<i>Senna siamea</i>	1.96	1.03	0.10	3.09
34	<i>Lantana camara</i>	0.98	2.06	0.04	3.08
35	<i>Caturagerum nilotica</i>	0.98	2.06	0.03	3.07
36	<i>Hemenodictylon parvifolium</i>	0.98	2.06	0.02	3.07
37	<i>Ozoroa insignis</i>	0.98	1.03	0.70	2.72
38	<i>Vachelia tortilis</i>	0.98	1.03	0.17	2.18
39	<i>Commiphora edulis ssp shimperiana</i>	0.98	1.03	0.16	2.17
40	<i>Vepris uquinifolia</i>	0.98	1.03	0.15	2.16
41	<i>Calliandra calothyrsus</i>	0.98	1.03	0.12	2.13
42	<i>Commiphora shimperi</i>	0.98	1.03	0.05	2.06
43	<i>Polysphaeria parvifolia</i>	0.98	1.03	0.03	2.04
44	<i>Acalypha fruticosa</i>	0.98	1.03	0.02	2.03
45	<i>Tinnaea aethiopica</i>	0.98	1.03	0.01	2.02

Herbs and Grasses

The most common herbs and grasses were *Periploca linearifolia*, a twining climber or liane with milky latex and known for its traditional values, and *Panicum maximum*, a densely clumping perennial grass. Other common grasses were *Chloris roxburghiana* and *Cynodon dactylon*, both important pasture species sensitive to land degradation and overgrazing as detailed in Table 3-4 below.

Table 3-4. Common herbs and Grasses

Species	H/G	Maximum % cover
<i>Periploca linearifolia</i>	H	40%
<i>Panicum maximum</i>	G	30%
<i>Chloris roxburghiana</i>	G	20%
<i>Cynodon dactylon</i>	G	10%
<i>Asystasia gangetica</i>	H	<10%
<i>Cenchrus ciliaris</i>	G	<10%
<i>Cissampelos pareri</i>	H	<10%
<i>Crotolaria spp</i>	H	<10%
<i>Cynanchum spp</i>	H	<10%
<i>Gnidia spp</i>	H	<10%
<i>Heteropogon contortus</i>	G	<10%

Species	H/G	Maximum % cover
<i>Melhaniania velutina</i>	H	<10%
<i>Sida ovata</i>	H	<10%
<i>Solanum incanum</i>	H	<10%
<i>Tephrosia villosa</i>	H	<10%

Avian Species

Birdlife was profiled all along the transect alignment within forest, notable species encountered during a cursory survey and during TSC were the African or fork-tailed drongo (*Dicrurus adsimilis* LC), black swift (*Apus barbatus* LC), black kite (*Milvus migrans* LC), paradise fly-catcher (*Terpsiphone viridis* LC), ring-necked dove (*Streptopelia capicola* LC), pied crow (*Corvus albus* LC), pied wagtail (*Motacilla alba* LC), speckled mousebird (*Colius striatus* LC), village or spot-backed weaver (*Ploceus cucullatus spilonotus* NE) and an unidentified hornbill. The scientific names used here follow <https://ebird.org/explore>.

Mammals

Among the mammals identified were the African civet (*Civettictis civetta*), vervet monkey (*Cercopithecus aethiops*), Kenya coast galago or dwarf bushbaby (*Paragalago cocos*), Kirk's dik-dik (*Madoqua kirkii*), duiker (*Cephalophus silvicultor*), Clawless Otter (*Aonyx capensis*), squirrels, rabbit, rats and mice.

From the flora and fauna species analysis undertaken in this assessment, none of the species collected along the sampling polygon along the pipeline corridor met the thresholds detailed by the IFC PS 6 Guidance Note GN70–83. Further, assessment of species listed under IBAT was undertaken applying the thresholds provided under GN6.1 (criteria 1–5) that assessed presence or absence of the species, habitat suitability, observation status and threshold status (Appendix 3 of Critical Habitat Assessment Report), similarly, no species met the thresholds of triggering either of the criterion detailed in para above.

General Flora Within the Pipeline Corridor¹⁴

Impacts of the pipeline within Mwache forest will be along the forest periphery with sparsely vegetated as shown in figure 1.1. the pipeline result to stripping a 15m corridor comprising of assorted tree species including; *Adansonia digitata* (Baobab), *Cynometra alexandri* (mpingo), *Cycas micronesica*, *Pachyceres Waberi* (Cactus), *Luceana leucocephala*, *Pinus Patula*, *Vachellia tortilis*, *Euphorbia* bush see **Table 3.3**. For the section close to Mwache creek impact will be on mangrove species namely; *Aricennia marina*, *Bruguiera gymnorhiza*, *Rhizophora mucronata*, *Ceriops tagal* and *Sonnerata alba*. *Rhizophora mucronata*, *Ceriops taga*.

Other species will include in local languages Mwawa, Mwanga, Mkanju (Cashew nuts), Mporojo, Kikwata, Mkone, Mnyubu, Mkilifi (neem tree), Mbuyu (Baobab), Mfunu, Mchonge Mahana and Mkwakwa. In liaison with KFS, Planting of compensatory trees, approximately 500 different species within listed in column (2), a budget is Kshs 1,500,000 is provided for purchase, planting and naturing of the trees for 6months from the time of planting

Flora of the project area are influenced by the ecosystems namely Mwache forest, Coastal vegetation, Shimba hills as well as Arabuko Sokoke to the north. The ASAL conditions to the west (Tsavo National Park) also influence the western zones of the project area and part of the watersheds. Among the trees and plant species

¹⁴ ¹⁴ https://www.biodev2030.org/wp-content/uploads/2021/07/Annexe-33_Rapport-Final_National-Biodiversity-Threat-Assessment_Kenya.pdf

noted around the project influence area are; *coconut trees, Tamarind tree, Neem tree, Flame Tree, Acacia ssp, Diospyros ssp, Cynometra-Manilkara type*.

Riverline¹⁵ plants observed are; reeds, grasses / sedges among others. Mwache Creek also presents species of mangroves. The typical species of creek mangroves in the Kenya coast include; *Aricennia marina, Bruguera gymnorhiza, Rhizophora mucronata, Ceriops tagal and Sonnerata alba. Rhizophora mucronata, Ceriops taga*. The following plant species are domesticated and grown in the project influence area along the water transmission pipeline; *Maize (green), Maize, Cow peas, Cassava, Sisal, Water melon, Banana, Sukuma wiki (Kalas), Tomato, Groundnut, Coconut, Cashew nut. (others in local languages Mwawa, Mwanga, Mkanju (Cashew nuts), Mpororo, Kikwata, Mkone, Mnyubu, Mkilifi (neem tree), Mbuyu (Boabab), Mfunu, Mchonge Mahana and Mkwakwa among others)*¹⁶.

The pipeline traverses through Kasemeni, Gandini, Mbuguni and Ng'ombeni Locations which exhibit ASAL characteristics. In terms of Agro-ecological zone classification the entire pipeline corridor lies within Agro Ecological Zones (AEZ) three. The zone comprises of Mangrove Swamps Zone that covers only a small portion of Kinango Sub County area mainly on the sides of the Mwache creek. There are only a few species, which form dense mangrove forest that border Mwache Forest that is composed of *Manilkara-Acacia Savannah* and *Acacia Euphorbia bush* land. Mangroove species include; *Rhizophora mucronata, Avicennia marina, Ceriops tagal, Lumnitzera racemosa, Bruguiera gymnorrhiza, Sonneratia alba, Xylocarpus granatum, Xylocarpus moluccensis and Heritiera littoralis. R. mucronata, C. tagal and A. marina* are the dominant species within forest.

The Lowland Ranching varies in altitude of 90-300m with mean annual temperature of 27°C and annual precipitation of 350-700mm. Major activities within this zone include subsistence livestock rearing. Coconut-Cassava Zone: This zone has the highest potential for crop production in the county spreading along the coastal uplands and low-level coastal plains. Major farming activities include tree cropping (mango, citrus, cashew nuts, and coconuts), vegetables (chilli, brinjals, okra etc.), food crops (maize, bananas, cowpeas, green grams etc.) and upland rice. Dairy farming also does well in this zone. It has an average precipitation of 1,300mm per annum and mean annual temperature of 24°C. Image of Mwache Forest and Bonje Creek Mangrove is presented in the photos below.



¹⁵ National Marine Ecosystem Diagnostic Analysis (MEDA) GeF, UNDP

¹⁶ Kenya National Biodiversity Threat Assessment Direct Human Threats Impacting Kenya's Biodiversity Masumi S. Gudka for IUCN – BIODIV2030 – September 2020

General Fauna¹⁷

Avian population recorded in Mwache forest and adjoining ecosystem like Shimba hills¹⁸, etc. can be listed as; Southern Banded Snake-eagle *Circaetus fasciolatus* (Near Threatened); Brown-headed Parrot *Poicephalus cryptoxanthus* (least concern), Fischer's *Turaco* *Tauraco fischeri* (Near Threatened), African Green-tinkerbird *Pogoniulus simplex* (Least Concern), Mombasa *Woodpecker* *Campethera mombassica* (Least Concern), Chestnut-fronted Helmet-shrike *Prionops scopifrons* (Least Concern), Black-bellied Glossy-starling *Lamprotornis corruscus* (Least Concern), Spotted Ground-thrush *Zoothera guttata* (threaten), Plain-backed Sunbird *Anthreptes reichenowi* (Near Threatened) Sokoke *Pipit Anthus sokokensis* (Endangered).

An inventory of **fish species** within Mwache River and seasonal streams along the Water transmission line show that there are 4 common fish species in the main river trunk, 5 prawn species and 1 crab species. These species are distributed in various ecological habitats that include brackish water, riverine and tributaries. The main commercial species are the prawn species. Other species are *tilapia*, *catfish* and *barbus*. The proposed Mwache Dam Reservoir will help establish a vibrant fishery because water temperature ranges are conducive from a minimum of 25^o C in the morning to a maximum of 35^o C at 3.00 p.m.

Mangroves, intertidal mudflats and shallow brackish water creeks are well known feeding and nursery areas not only for fish but also for crustaceans (crabs and prawns) on which many fish species in the coastal area are found. The fishery in brackish water environment is dominated by Prawns (Kamba). Occasional catches are realized from Rabbit fish (Tafi), Redfin robber (English), *Nkwakwa* (*Pokomo*), *Milkfish* (English), scavengers (Tangu), *Mullets* (*Mkizi*), *Sardines* (Simu), Snappers (Pali). Artisanal fishers use crafts consisting of Dug out (Mtumbwi), Foot fishers, Pointed crafts (Mashua) and Hori with gears such as gillnets, seine nets, hand lines, beach seines, traps and fences. Trawling also takes place in the deep areas (> 5 m) also targeting prawns. The main prawn species targeted are *Penaeus indicus*, *Metapeneaus monoceros*, *P. semisulcatus*, *P. monodon* and *P. japonicas*. Images of Redfin robber (English), *Nkwakwa* (*Pokomo*), *Milkfish* (English) found within Mwache creek is presented in the photos below. The pipeline traverser's settlement villages and therefore the impact to animal will be limited to domestic animals grazing on free range,



Detailed Critical Habitat Assessment is Presented Separately as Appendix 5

¹⁷ https://wedocs.unep.org/bitstream/handle/20.500.11822/25890/Kenya_MEDA.pdf?sequence=1&isAllowed=y

¹⁸ Shimba hills and Mwache forest ecosystem are interconnected and birds migrate from either of the ecosystem.

However, we note that the project activities will not directly interphase the birds habitat, see map of pipeline figure 3.3 section through mwache forest which illustrates the pipeline is on the forest periphery

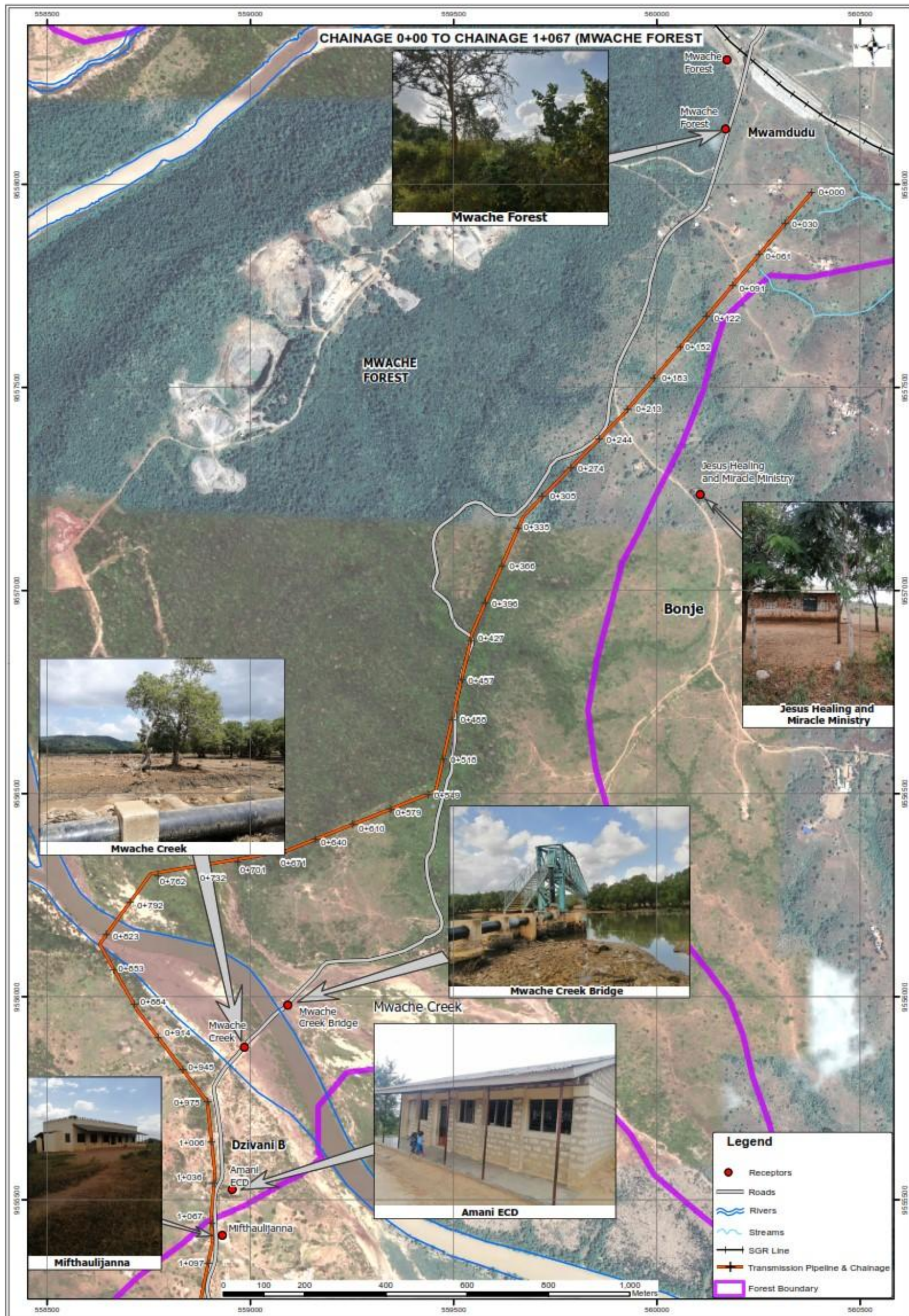


Figure 3.3: Layout map of pipeline section through Mwache forest

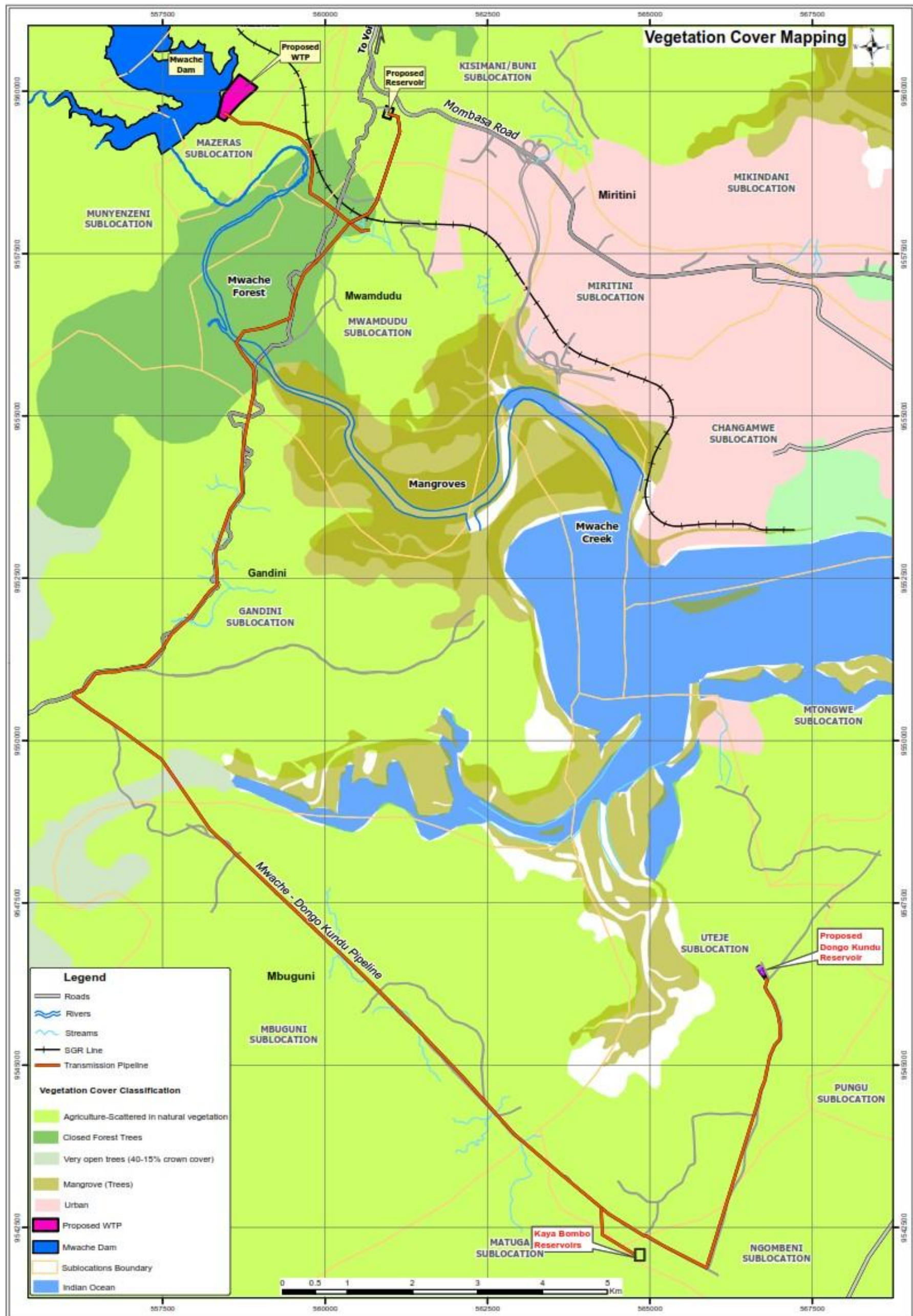


Figure 3.4: Map of vegetation map

3.7 ENVIRONMENTAL RECEPTORS WITHIN PROJECT AREA

The assessment identified relevant social baseline receptors that might be exposed to degradation risks associated with the construction of the proposed water line. The pipeline will not directly interphase with the creek, but rather the creek might be affected from cumulative nature of impacts associated with the project, these activities might involve wastes solid and liquid wastes which require to be disposed off appropriately. This implies that the aquatic fauna and flora within the creek and mteza rivers will be safeguarded from potential eutrophication of the water resources because of both organic and inorganic wastes. The receptors are indicated in **Table 3.2**.

Table 3.5: Environmental Receptors

NAME	Location	GPS CORDINATE
Mwache (Bonje) Creek	Gandini	0558734, 9555844
Mwache Forest	Kasemeni	'0560398, 9558200
Degraded Area	Gandini	'0559021, 9555350
Pemba River	Mbuguni	Pemba River at Ch. 11+090.

4 SOCIO ECONOMIC BASELINE INFORMATION

4.1 LOCATION AND ADMINISTRATION

The Trunk Main section of the Mwache Water Transmission Pipelines covers the 5.1km long pipeline section from the WTP to the West Mainland Reservoir located within Kasemeni Location of Kinango Sub-County in Kwale County. The South Mainland Transmission Main (Kaya Bombo Pipeline) branches off from the Mwache trunk main at Ch. 2+900 of the Trunk Main and traverses in the S.W direction, through the Mwache Forest to the Mwache Creek. The Pipeline section within the Mwache Forest is 1.9km from Ch. 0+740 to Ch. 2+640 where it crosses the Mwache Creek. The transmission line traverses Kasemeni, Gandini and Mbuguni Locations in Kinango Sub County and N'gombeni Location of Matuga Sub County of Kwale County.

4.2 LAND OWNERSHIP AND SETTLEMENT PATTERNS

Land ownership along the pipeline alignment is a mix of registered subdivided parcels and clan based communal land. This influences the settlement trends. The process of adjudicating land rights for individual ownership is in progress under Mwache Dam Compensation program by National Lands Commission (NLC), in liason with Kinango Land Adjudication office. Land use is subsistence farming with very low land productivity value due to poor rainfall, poor soil quality and the people's culture.

The settlement pattern in the Coastal Kenya is influenced by infrastructure network such as roads, water, electricity, availability and accessibility of areas of gainful employment, availability of cheap housing, security and land tenure. Along the pipeline corridor, settlement villages were observed along the murram road connecting Mwache Creek to Kaya Bombo to Dongo Kundu and exits to Mtongwe within the South Mainland. The villages include; Mteza market, Dzivani, Mwandegwa, Lutsangani, Tsunza, Mbuguni, Ningawa and Kiteje villages. Photographs below illustrate nature of houses within the Project area.



4.3 EDUCATIONAL INSTITUTIONS

There are five educational institutions in Gandini location which include; 1Nr. Secondary School, 2Nr. Primary Schools and 2Nr. Early Childhood Development Centres(ECD). In Mbuguni Location there are three educational institutions which include; 2N.r Primary Schools and 1Nr. Secondary School while in Kiteje Sub location there

are two educational institutions which include; 1 Nr. Primary School and 1Nr. Secondary School. School enrolment levels is generally low, attributed to unemployment and lack of household financial capacity, this contributes to high illiteracy levels in the area. Marriage at young age and premature pregnancies are also indicators of poor school enrolment levels.

A socio-economic assessment undertaken during the ESIA process indicated that majority of people in Gandini have completed primary School at 62.3%, in Ng'ombeni 75.7% of residents have completed secondary education, In Mbuguni 59.5% and Kasemeni 64% have completed primary education. This information is presented in **Figure 4.2** below while **Table 4-1** presents educational institutions with the Project area.

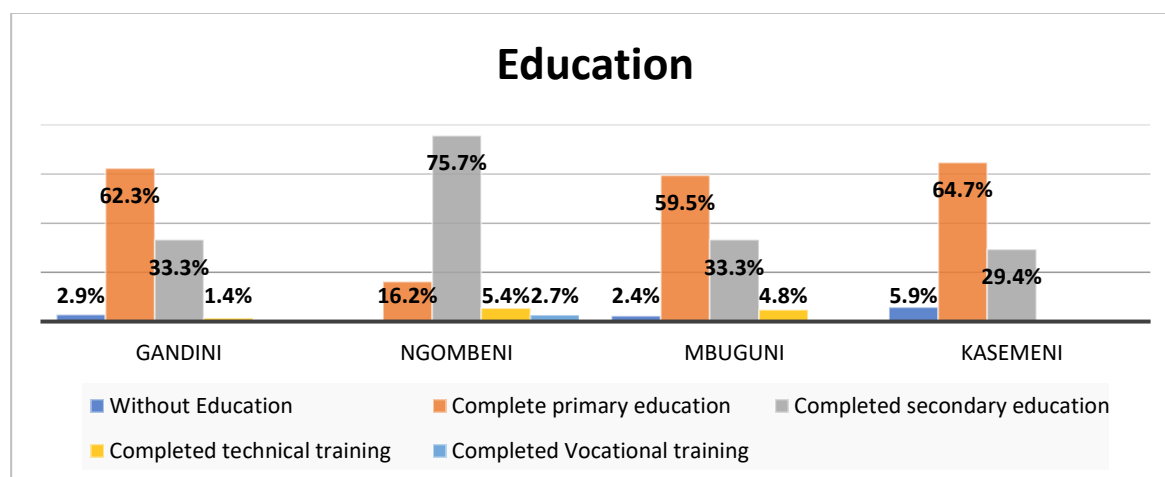


Figure 4.1: Education level of Residents within the Project Area

Table 4.1: Educational Institutions Project Area

LOCATION	NAME OF INSTITUTION
Gandini Location	Amani ECD
	Dzivani Primary School
	Lutsangani ECD
	Lutsangani Primary School
	Lutsangani Secondary School
Mbuguni Location	Mbuguni Primary School
	Mteza Primary School
	Mbuguni Secondary School
Kiteje Sub-Location	Ningawa Primary School
	Kiteje Secondary School

4.4 HEALTH INSTITUTIONS

Healthcare facilities within the project area include; Maami Home Care Dispensary and Lutsangani Dispensary in Gandini Location, Mbuguni Dispensary and Mteza Dispensary in Mbuguni location. Others include; Mwache and Mnyenzi. Mazeras dispensary. There are also numerous private health facilities in Mazeras town while major services are offered in Kinango Sub-County Hospital. Coast County Hospital is located in Mombasa, some 20km from the project area. There are several pharmacies and drug shops in Mazeras, Mombasa and almost all the shopping centres in the area.

4.5 INCOME STREAMS

The overall average monthly cash income for households in the project-affected area is estimated to be Kshs. 13,000 to Kshs 30,000 on average per household, varying significantly from household to household. Crop production, including vegetables, tubers, fruits and cereals is the major economic activity contributing to annual cash income for the households. The second most important economic activity is nonfarm activities (casual laborers in private sector, masonry, quarrying, livestock selling). As shown in **Figure 4.2** below, majority of residents at 53% in Gandini engage in subsistence farming while 45.9% and 52.9% are casual labourers.

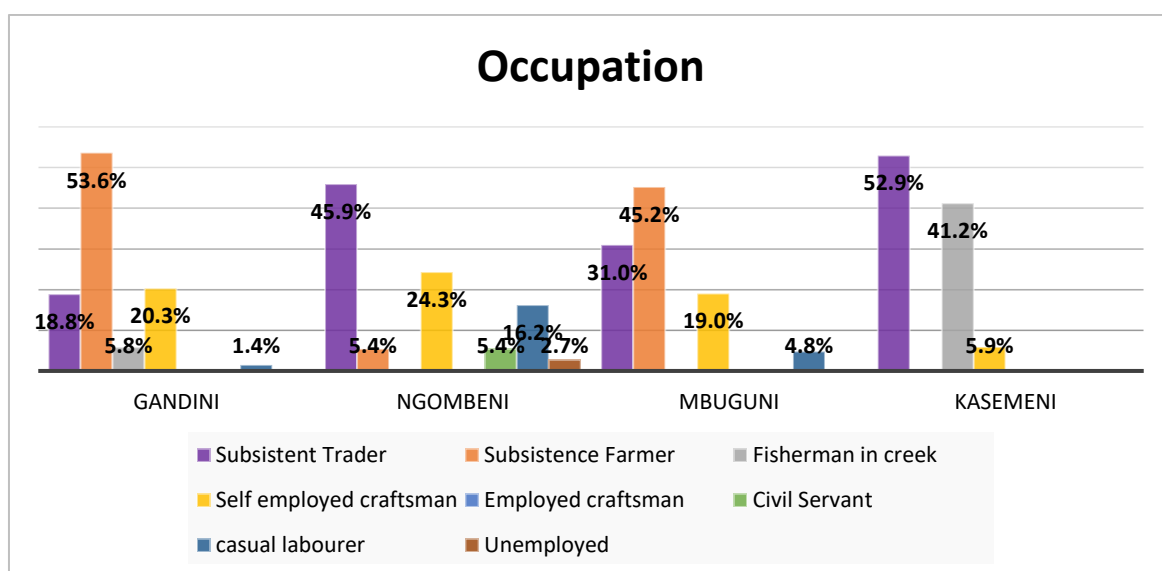


Figure 4.2: Income Streams of People along the Pipeline Corridor

4.6 ACCESS TO DRINKING WATER

Kasemeni, Gandini, Mbuguni, and Ng'ombeni locations are not endowed with adequate surface water sources since all streams and rivers are seasonal. Flash floods originating from the highlands flow into the area during the rains (though the project area also receives limited rainfall). It has not been possible to quantify how much water is effectively drawn from the rivers for social and economic use. The seasonal Mwache River, the main stream in the area, is characterized with stagnant pools in most sections, which most of the residents rely on for washing, watering livestock and limited farming along the river flood plain.

A socio-economic survey undertaken during the ESIA assessment indicated that people from the project locations listed above rely on the limited piped water within the markets at 56.5% in Gandini, 75.7% in Ng'ombeni, 66.7% in Mbuguni and 64.7% in Kasemeni. The remaining segment of residents depend on surface water, rainwater and shallow wells. This information is presented in **Figure 4.3** on **Page 19**.

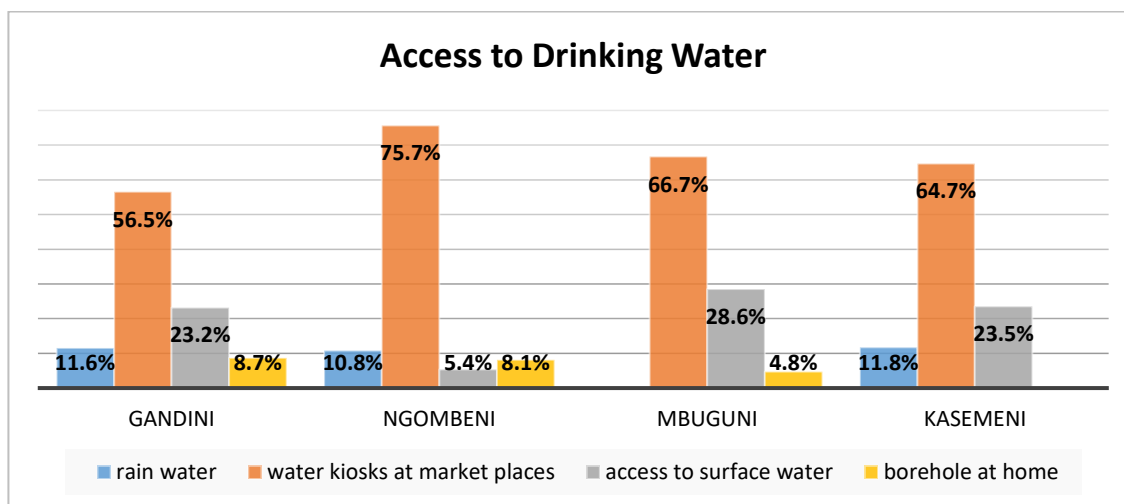


Figure 4.3: Source of Water to Residents

4.7 SANITATION AND HYGIENE

The absolute poverty of the people in the area has had a direct link to lack of basic sanitation facilities. Without improved sanitation, people continue to suffer from ill health, lost incomes, inconveniences and indignity. The socio-economic survey undertaken during the ESIA study indicated that 88.4% of residents of Gandini, 75.7% Ng'ombeni, 83.3% Mbuguni and 88.2% in kasemeni have constructed and use pit latrines as the main means of excreta disposal. This information is summarized in **Figure 4.4** below.

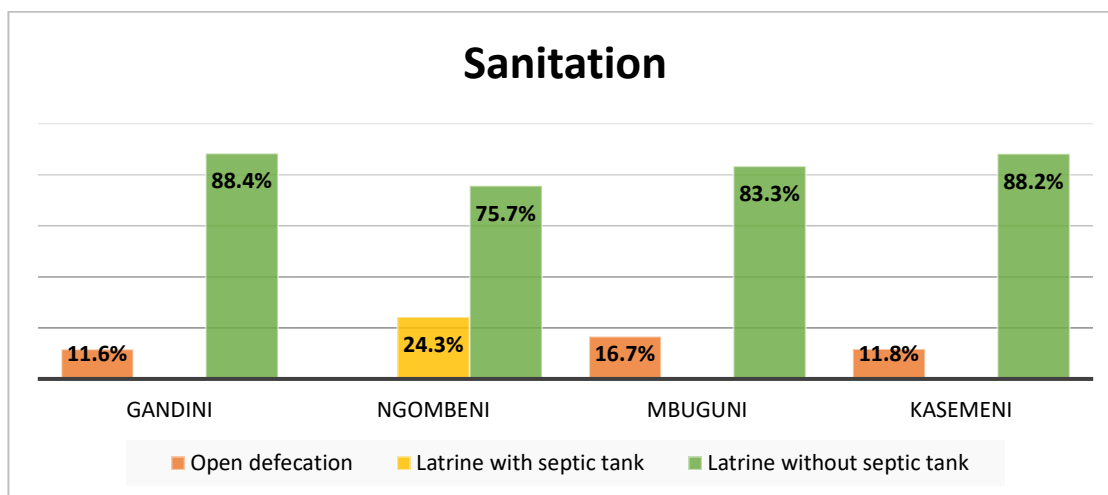


Figure 4.4: Access to Sanitation Services

4.8 SOURCES OF ENERGY

Lack of affordable energy alternatives and poverty has contributed to High level of direct reliance on firewood as a source of energy, other sources include; Electricity in market centres, kerosene and solar. As indicated in **Figure 4.5** on **Page 20**, residents of Gandini depend on wood fuel for cooking at 69.8%, in Ng'ombeni the residents depend on charcoal for cooking at 35.1%, while in Mbuguni and Kasemeni the residents depend on wood fuel for cooking at 69.0% and 58.8% respectively.

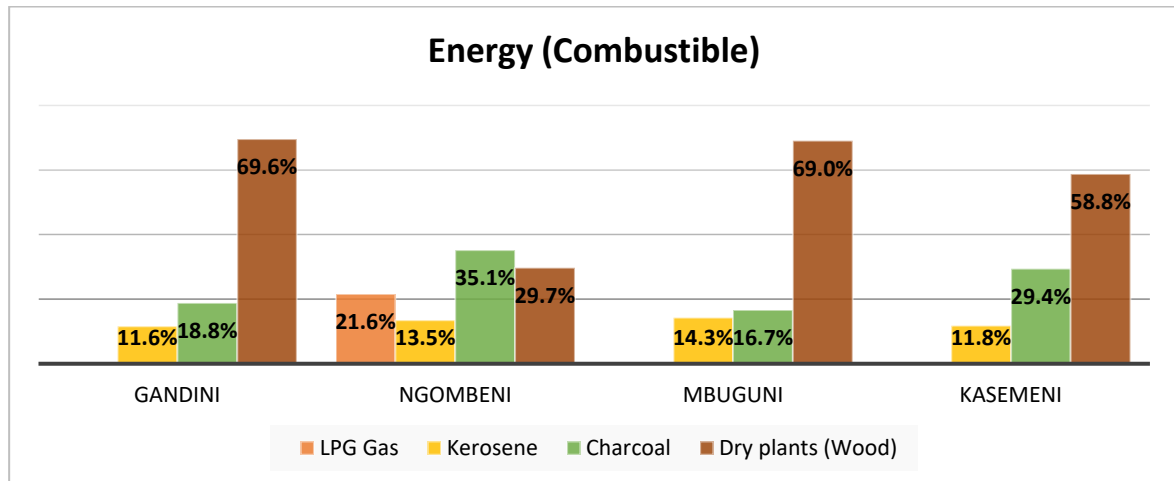


Figure 4.5: Sources of Energy for Residents

4.9 SOCIAL RECEPTORS WITHIN PROJECT AREA

The pipeline has been designing along existing road and within river riparian, however, the pipeline will impact on Project Affected Persons (PAPs) own private land and residential or none residential structures, crops and trees, as well as graves along the pipeline route from Mwache Creek to proposed Dongo Kundu Tank as detailed under E.6 and on Page 80 discussing resettlement impacts. Further indirect impact will be on social receptors listed below which might be exposed to health and safety risks associated with the construction of the proposed water transmission pipelines.

The receptors are indicated in **Table 4.2** while the photographs present some Social Receptors which include Dzivani Nursery School and Mwandegwa Gospel Church in Gandini Location.

Table 4.2: Social Receptors within Pipeline Corridor

RECEPTOR	LOCATION	GPS COORDINATES
Amani Nursery School Dzivani	Gandini	'0559016, 9555207
Dzivani B Mosque	Gandini	'0559012, 9555105
Dzivani Primary School	Gandini	0558807, 9553827
Mwandegwa Gospel Church	Gandini	0558806, 9553626
Grave site	Gandini	0556217, 9550383
Lutsangani Primary	Gandini	0556861, 9550774
Lutsangani Dispensary	Gandini	0557004, 9550782
Tsunza Shopping Centre	Gandini	0557044, 9550799
Mbuguni Mosque	Mbuguni	0567099, 9545087
Ningawa Primary School	Ng'ombeni	0566689, 95328013
Kiteje Shopping Center	Ng'ombeni	0562789, 95228045



5 APPROACH AND METHODOLOGY

5.1 SCREENING ASSESSMENT

Environmental and Social screening is intended to ensure that the proposed Water Transmission Mains Project is subjected to the appropriate extent and type of environmental assessment (EA). The process of screening helps in determining the level of scrutiny for environmental and social assessment from which Environmental Management Plans (EMPs) and Resettlement Action Plans (RAPs) are prepared in cases where land acquisition and displacement of population is triggered. In addition, screening process identifies the various opportunities resulting from a Project's activities and how these opportunities can be enhanced.

The main objective of Environment and Social Screening was therefore;

- To identify the environmental and social opportunities and risks likely to result from the proposed Water Transmission Pipelines Project.
- To determine the scale and scope of potential environmental and social risks of the proposed Project early on in the Project design;
- To determine the level of the required environmental and social assessment required to mitigate against the likely risks.
- To determine the applicability of the Environmental and Social Risk Management (ESRM) Policy for AFD-funded Operations, World Bank Operational Policies and Government of Kenya policies and laws to ensure compliance.
- To determine relevant stakeholders to be meaningfully consulted and engaged during the ESIA stage.
- To determine the scope and geographical extend of environment and social impacts to be analysed further at ESIA stage.

The Environmental and Social Risk Management Policy for AFD-funded Operations states that AFD's financing is conditional upon the implementation by the client of continuous and systematic environmental and social assessment procedures to (i) assess the environmental and social impacts of operations, (ii) propose appropriate measures to avoid the negative impacts or, when they are unavoidable, reduce or offset them in an appropriate manner, (iii) monitor the application of such measures during the implementation phase of the operation, and (iv) conduct an ex post evaluation of the effectiveness of the proposed measures

Therefore, screening was intended to ensure that the impact assessment focuses on those issues that are most important for design, decision-making and stakeholder interest. The screening checklist is appended as **Appendix 2**.

5.2 FULL STUDY TERMS OF REFERENCE (TOR) PREPARATION

The process of Environment and Social Impacts (ESIA) preparation started with a scoping assessment that informs the Terms of Reference (ToR) for the assessment in case of full Studies.

The assessment informed that the level of Environment and Social Impact Assessment (ESIA) required for the proposed Project Components as indicated below.

- Determination of applicable national and international policy provisions and legal statute relevant to the Project
- Relevant stakeholders to be meaningfully consulted and engaged during the ESIA stage
- Determination of the scope and geographical extend of Environment and Social Impacts to be analyzed further at ESIA stage.

The Terms of Reference preparation involved; Literature Review, Field Assessment, Data collection and Site Surveys and Secondary and Primary Data. The ToR presents aspects summarized below.

- Description of Project Background
- Determination of Project Area of Influence (Geographical, Social and Stakeholders)
- Consideration of all project-relevant physical, biological, socioeconomic, cultural aspects & risks
- Analysis of alternatives
- Impact identification (Direct, Indirect, Induced, & Cumulative)
- Preliminary mitigation measures
- Definition of assessment methods for ESIA & personnel required.

Appendix 1 provides NEMA ToR approval.

5.3 BASELINE CONDITIONS

To provide a context within which the impacts of the project can be assessed, a site visit was conducted with the aim of undertaking physical assessment of baseline situation biophysical and social setup of the pipeline route. The approach of collecting data was through field observation for flora and fauna, water resources, soils, land use and landscape as well as secondary literature review. A description of the physical, biological, and social conditions is detailed in **Chapter 4** of this report.

5.4 STAKEHOLDER ENGAGEMENT

An effective impact assessment requires engagement with relevant stakeholder throughout the key stages. This was undertaken during the ESIA stage. This process assisted in understanding stakeholder views on the Project and in identifying issues that should be taken into account in the prediction and evaluation of impacts. The schedule of public barazas within the Gandini, Mbuguni Location and Kiteje Sub Locations is summarized in **Table 5.1**.

Table 5.1: Schedule of Public Participation

LOCATION/ SUB LOCATION	VENUE	DATE	ATTENDEES
Gandini Location	Gandini Chiefs Camp office	21 st October 2021	67
MBuguni Location	Gandini Chiefs Camp office	22 nd October 2021	52
Kiteje Sub Location	Kiteje Sub Location Office	23 rd October 2021	42

Minutes and the attendance list of the public baraza are presented as **Appendix 3** to this report.

5.5 IMPACT ASSESSMENT METHODOLOGY

Impact identification and assessment starts with scoping and continues through a structured impact assessment process. The principal steps comprise the following steps.

- Impact prediction - to determine what could potentially happen to resources and receptors as a consequence of the Project and its associated activities;
- Impact evaluation - to evaluate the significance of the predicted impacts by considering the magnitude of the effect and the sensitivity, value, and importance of the affected resource or receptor;
- Mitigation and enhancement - to identify appropriate and justified measures to mitigate negative impacts and enhance positive impacts; and
- Residual impact evaluation - to evaluate the significance of impacts assuming effective implementation of mitigation and enhancement measures.

The terminologies used to describe impact characteristics is shown in **Table 5.2**.

Table 5.2: Impact characteristics

CHARACTERISTIC	DEFINITION	DESIGNATION
Type	A descriptor indicating the relationship of the impact to the Project (in terms of cause and effect)	Direct, Indirect, Induced
Extent	The 'reach' of the impact (e.g., confined to a small area around the Project Footprint, Projected for several km etc.)	Local, Regional, International
Duration	The time period over which a resource/ receptor is affected	Temporary, Short term, long term Permanent
Scale	The size of the impact (e.g., the size of the area damaged or impacted, the fraction of a resource that is lost or affected, etc.)	No fixed designation, intended to be a numerical value or a qualitative description of intensity
Frequency	A measure of the constancy or periodicity of the impact	No fixed designation, intended to be a numerical value or a qualitative description

The definitions for the type designations are shown in **Table 5.3**.

Table 5.3: Impact characteristics

DEFINITION	DESIGNATION
Direct	Impacts that result from a direct interaction between the Project and a resource/receptor (e.g., between occupation of a plot of land and the habitats which are affected)
Indirect	Impacts that follow on from the direct interactions between the Project and its environment as a result of subsequent interactions within the environment (e.g., viability of a species population resulting from loss of part of a habitat as a result of the Project occupying a plot of land).
Induced	Impacts that result from other activities (which are not part of the Project) that happen as a consequence of the Project (e.g., influx of camp followers resulting from the importation of a large Project workforce).

The above characteristics and definitions apply to planned and unplanned events. An additional characteristic that pertains unplanned events is likelihood.

The likelihood of an unplanned event occurring is designated using a qualitative scale, as described in **Table 5.4**.

Table 5-4: Definition of Likelihood

LIKELIHOOD	DEFINITION
Unlikely	The event is unlikely but may occur at some time during normal operating conditions
Possible	The event is likely to occur at some time during normal operating conditions.
Induced	Impacts that result from other activities (which are not part of the Project) that happen as a consequence of the Project (e.g., influx of camp followers resulting from the importation of a large Project workforce).
Likely	The event will occur at normal operating conditions (i.e., it is essentially inevitable).

Once an impact's characteristics are defined, the next step in the impact assessment phase was to assign each impact a 'magnitude'. Magnitude is a function of some combination of the following impact characteristics:

- Extent
- Duration
- Scale
- Frequency

Magnitude essentially describes the intensity of the change that is predicted to occur in the resource/receptor as a result of the impact. As discussed above, the magnitude designations themselves are universally consistent, but the descriptions for these designations vary on a resource/receptor-by resource/receptor basis. The universal magnitude designations are:

- Positive
- Negligible
- Small
- Medium
- Large

In the case of a positive impact, no magnitude designation (aside from 'positive') is assigned. It is considered sufficient for the purpose of the area of influence to indicate that the Project is expected to result in a positive impact, without characterizing the exact degree of positive change likely to occur.

In the case of impacts resulting from unplanned events, the same resource/receptor-specific approach to concluding a magnitude designation is utilized, but the 'likelihood' factor is considered, together with the other impact characteristics, when assigning a magnitude designation.

In addition to characterizing the magnitude of impact, the other principal impact evaluation step is definition of the sensitivity, vulnerability and importance of the impacted resource/receptor. There are a range of factors to be taken into account when defining the sensitivity/vulnerability/importance of the resource/receptor, which may be physical, biological, cultural or human. Other factors may also be considered when characterizing sensitivity/vulnerability/importance, such as legal protection, government policy, stakeholder views and economic value.

As in the case of magnitude, the sensitivity/vulnerability/importance designations themselves are universally consistent, but the definitions for these designations vary on a resource/receptor basis.

The sensitivity/vulnerability/importance designations used herein for all resources/receptors are:

- Low

- Medium
- High

Significance

Once magnitude of impact and sensitivity/vulnerability/importance of resource/receptor were characterized, the significance was assigned for each impact. Impact significance was designated using the matrix shown in **Table 5.5**.

Table 5-5: Impact Significance

Magnitude of Impact	SENSITIVITY / VULNERABILITY / IMPORTANCE OF RESOURCE / RECEPTOR			
		Low	Medium	High
	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major

The matrix applies universally to all resources/receptors, and all impacts to these resources/receptors, as the resource/receptor-specific considerations were factored into the assignment of magnitude and sensitivity, vulnerability and importance designations that enter into the matrix.

5.6 MITIGATION AND ENHANCEMENT MEASURES

Further, once the significance of an impact was characterized, the next step was to evaluate what mitigation and enhancement measures are warranted. For the purposes of this assessment, the following order or hierarchy was applied for development of mitigation:

- Avoid at Source, Reduce at Source: avoiding or reducing at source through the design of the Project (e.g., avoiding by siting or re-routing activity away from sensitive areas or reducing by restricting the working area or changing the time of the activity).
- Abate on Site: add something to the design to abate the impact (e.g., pollution control equipment, traffic controls, perimeter screening and landscaping).
- Abate at Receptor: if an impact cannot be abated on-site then control measures can be implemented off-site (e.g., noise barriers to reduce noise impact at a nearby residence or fencing to prevent animals straying onto the site).
- Repair or Remedy: some impacts involve unavoidable damage to a resource (e.g., agricultural land and forestry due to creating access, work camps or materials storage areas) and these impacts can be addressed through repair, restoration or reinstatement measures.
- Compensate in Kind, Compensate Through Other Means: where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate (e.g., planting to replace damaged vegetation, financial compensation for damaged crops or providing community facilities for loss of fisheries access, recreation and amenity space).

The priority in mitigation for the Project was to first apply mitigation measures to the source of the impact (i.e., to avoid or reduce the magnitude of the impact from the associated Project activity), and then to address the resultant effect to the resource/receptor via abatement or compensatory measures or offsets (i.e., to reduce the significance of the effect once all reasonably practicable mitigations have been applied to reduce the impact magnitude

5.7 RESIDUAL IMPACT

In addition, once mitigation and enhancement measures were specified the next step in the Impact Assessment Process was to assign residual impact significance. This is essentially a repeat of the impact assessment steps discussed above, considering the implementation of the proposed mitigation and enhancement measures.

5.8 MANAGEMENT AND MONITORING AND AUDIT

The final stage in the impact assessment process was the development of a management plan for implementing controls and mitigation and also monitoring the effectiveness. Monitoring is done to verify that: a) impacts or their associated project components remain in conformance with applicable standards; and b) mitigation measures are effectively addressing impacts and compensatory measures and offsets are reducing effects to the extent predicted.

An Environmental and Social Management Plan (ESMP), which is a compilation of all actions identified in the impact assessment, is provided in **Chapter 8**. This includes mitigation measures, compensatory measures and offsets and management and monitoring activities

6 POLICY AND LEGAL FRAMEWORK

This chapter outlines the policy, legal and institutional framework governing environmental issues in Kenya and the World Bank Policy framework for development projects. Further, Environmental and Social Risk Management Policy for AFD-funded Operations is also discussed.

6.1 POLICY PROVISIONS

Table 6.1 Error! Reference source not found. presents a summary of relevant policies that were analysed in this ESIA.

Table 6.1: Policy Framework Relevant to Water Infrastructure

NO	POLICY	RELEVANCE	APPLICABILITY TO THE PROJECT
1	National Environment Policy (NEP) 2013	The Policy goal is towards a better quality of life for present and future generations through sustainable management and use of the environment and natural resources. The objective of the policy among others is to ensure sustainable management of the environment and natural resources, such as unique terrestrial and aquatic ecosystems, for national economic growth and improved livelihoods.	The proposed project will contribute to achievement of this policy's mission through implementation of Water Transmission Pipelines Project. This Project will lead to equitable sharing of scarce water resource within Kwale, Kilifi and Mombasa Counties.
2	The National Water Policy 2012 (Draft)	The Policy is built on the achievements of the sector reform commenced with the Water Act and based on the sector principles lined out in the National Water Policy 1999. On water resources management, the policy seeks the management of water resources along natural catchment/basin boundaries following the Integrated Water Resource Management approach. It aims to ensure a comprehensive framework for promoting optimal, sustainable, and equitable development and use of water resources for livelihoods of Kenyans.	The Water Transmission Pipeline Project will result into sustainable utilization of scarce water resources in Mwache that is categorized as an Arid and Semi-Arid Lands (ASALs).
3	The National Environmental Sanitation and Hygiene Policy- July 2007:	The Policy is devoted to environmental sanitation and hygiene in Kenya as a major contribution to the dignity, health, welfare, social well-being and prosperity of all Kenyan residents. The Policy recognizes that healthy and hygienic behavior and practices begin with the individual. The implementation of the Policy will greatly increase the demand for sanitation, hygiene, food safety, improved housing, use of safe drinking water, waste management, vector control at the household level and encourage communities to take responsibility for improving the sanitary conditions of their immediate environment.	Mwache Water Transmission Pipeline Project contributes towards achievement of this policy through provision of sustainable water for domestic and Livestock to Kwale, Kilifi and Mombasa County residents.

NO	POLICY	RELEVANCE	APPLICABILITY TO THE PROJECT
4	National Policy on Water Resources Management and Development (Sessional Paper No.1 of 1999)	The management of water resources in Kenya is guided by four specific policy objectives, namely: • Preserve, conserve, and protect available water resources and allocate it in a sustainable rational and economic way; • Supply water of good quality in sufficient quantities to meet the various water needs, including poverty alleviation, while ensuring the safe disposal of wastewater and environmental protection; • Establish an efficient and effective institutional framework to achieve a systematic development and management of the water sector; and • Develop a sound and sustainable financing system for effective water resources management, water supply and sanitation development.	The Water Transmission Pipeline Project will result into sustainable utilization of scarce water resources in Mwache area that is categorized as an Arid and Semi-Arid Lands (ASALs).
5	Kenya Vision 2030	The Kenya Vision 2030 is the current National Development blueprint for period 2008 to 2030. The vision has three pillars; economic, social and political. It is recognized that Kenya is a water scarce Country but stated (Kenya, 2007: 115) that the Vision for the water and sanitation sector is “to ensure water and improved sanitation services availability.	The Project will directly contribute towards achievement of objectives of vision under the environment and social pillar through construction of the Mwache Water Transmission Pipeline Project.
6	National Climate Change Response Strategy, 2010	The strategy paper recognizes that Kenya is a water scarce country and offers a variety of strategies for ensuring that the resource is utilized in ways that recognize that it is a finite resource. The paper also argues that interventions in the water sector should take a participatory approach involving different water users including gender groups, socio-economic groups, planners and policy makers in water resource management (Kenya, 2010: 53).	Provision of Sustainable water to residents of Kwale and Mombasa is a way of ensuring community resilience to climate change impacts. The Project will ensure that water resource is utilized in ways that recognize that it is a finite resource
7	Climate Change Policy Framework 2016	The Policy was developed to facilitate a coordinated, coherent and effective response to the local, National and global challenges and opportunities presented by climate change. An overarching mainstreaming approach has been adopted to ensure the integration of climate change considerations into development planning, budgeting and implementation in all sectors and at all levels of government. This Policy therefore aims to enhance adaptive capacity and build resilience to climate variability and change, while promoting a low carbon development pathway.	The policy discusses opportunities to catalyze realignment of Kenya’s development model to one that is climate resilient, based on lower GHG emissions, and takes full advantage of the green economy. Mwache Water Transmission pipeline Project is among the projects that align to provision above especially in fight against poverty and food security through provision of sustainable water to residents of Kwale and Mombasa Counties.
8	Economic Recovery for	The overall goal of the strategy is to ensure clear improvement in the social and economic	The key areas covered in the strategy are: Expanding and improving

NO	POLICY	RELEVANCE	APPLICABILITY TO THE PROJECT
	Wealth and Employment Creation Strategy 2006	wellbeing of all Kenyans; thereby giving Kenyans a better deal in their lives, and in their struggle to build a modern and prosperous nation.	infrastructure and Safeguarding environment and natural resources among others. Mwache Water Transmission Pipeline Project directly conforms to these provisions.
9	Big 4 Agenda	President Uhuru Kenyatta's development blueprint, The Big 4 Agenda, comprises of Food Security; Affordable Housing; Manufacturing and Affordable Healthcare.	Water system is an enabler for this and driver of economic growth.
10	Kenya National Youth Policy 2006	This Policy aims at ensuring that the youth play their role alongside adults in the development of the Country. The National Youth Policy visualizes a society where youth have an equal opportunity as other citizens to realize their fullest potential.	The project will provide direct employment to the youth as required by the Policy.
11	National Gender and Development Policy, 2019	The goal of the policy is to "achieve gender equality and women's empowerment in national development so as to enhance participation of women and men, boys and girls, vulnerable and marginalized groups for the attainment of sustainable development". The policy sets, legislative and administrative measures to address the existing gaps in the realization of gender equality and women's empowerment.	The policy will be important at the time of recruiting workers at the time of Project implementation.
12	National policy for prevention and response to gender based violence, 2014	The overall Goal of this National Policy is to accelerate efforts towards the elimination of all forms of GBV in Kenya. The Policy Goal is to be realized as laid out in the key objectives which seek to ensure; a coordinated approach in addressing GBV and effective programming; enhanced enforcement of laws and policies towards GBV prevention and response; increase in access to quality and comprehensive support services across sectors; and improved sustainability of GBV prevention and response interventions.	Provisions of this policy will be adhered to during project implementation phase.
13	The National Occupational Safety and Health Policy, 2012	The main objective of this policy is to establish National occupational safety and health systems and programmes geared towards the improvement of the work environment. The Policy seeks to reduce the number of work-related accidents and diseases, and equitably provide compensation and rehabilitation to those injured at work or who contract occupational diseases. It thus requires employers to ensure safety and health at workplace, establishment of safety and health committees at workplaces, conduct training on occupational safety and health and report accidents, diseases and other dangerous occurrences to relevant authorities	The contractor will be given a copy of the ESMP to develop contractor-ESMP for compliance during construction including provision of PPE, erection of signages at critical points, sealing the pan construction area to avoid unauthorized entry and accidents.

6.2 LEGAL FRAMEWORK

Applicable Acts of Parliament as summarized in **Table 6.2** were reviewed.

Table 6.2: Legal Framework Relevant to Water Infrastructure

ACTS	RELEVANCE	APPLICABILITY TO THE PROJECT
Constitution of Kenya (CoK) 2010	Article 43 (1) provides that every person has the right – (b) to accessible and adequate housing, to reasonable standards or sanitation; and, (d) to clean and safe water in adequate quantities. These provisions oblige state organs and bind them to provide not just high quality or clean and safe water but also adequate quantities to all people that they will serve. The proposed project will comply with all constitutional requirement of ensuring sound management of the environment by implementing the proposed environmental and social management plan.	It also calls for the duty given to the Project proponent, in this case CWWDA, to co-operate with State organs and other persons to protect and conserve the environment as mentioned in Part II.
EMCA 1999 Cap 387	The Environmental Management and Coordination Act of 1999 (EMCA) Cap 387 was enacted to provide an appropriate legal and institutional framework for the management of the environment and for matters connected therewith and incidental thereto. EMCA does not repeal the sectoral legislation but seeks to coordinate the activities of the various institutions tasked to regulate the various sectors. These institutions are referred to as Lead Agencies in EMCA. Lead Agencies are defined in Section 2 as any Government ministry, department, parastatal, and State Corporation or local authority in which any law vests functions of control or management of any element of the environment or natural resource. EMCA and its subsidiary legislations are enforced by the National Environment Management Authority (NEMA). Section 58, all projects listed in the Second Schedule of the Act must submit a study report to NEMA.	The proposed Mwache Water Transmission Pipelines Project is classified under Medium-risk project in the Second Schedule of EMCA 1999, and thus requires an ESIA. By conducting this ESIA, the project therefore complies with the Act. The Act provides regulations as summarized in subsequent rows below
Land Act, 2012	It is the substantive law governing land in Kenya and provides legal regime over administration of public and private lands. It also provides for the acquisition of land for public benefit. The government has the powers under this Act to acquire land for projects, which are intended to benefit the general public. This Act provides for the procedure to be followed during compulsory acquisition of land by the Government and the just compensation which should be paid promptly and in full to all persons whose interest in land has been affected.	The proposed Transmission Pipelines Project will traverse community and private land. A separate RAP report has been prepared for Resettlement Impacts triggered by the Project.
Environment and Land Court Act, 2011	Article 162 of the constitution provides for the creation of specialized courts to handle all matters on land and the environment. Such a court will have the status and powers of a High Court in every respect. Article 159 on the principles of judicial authority, indicates that courts	The act will be useful in provision of guideline on resolving disputes that might arise related to land or environment.

ACTS	RELEVANCE	APPLICABILITY TO THE PROJECT
	will endeavour to encourage application of alternative dispute resolution mechanisms, including traditional ones, so long as they are consistent with the constitution. Section 20, of the Environment and Land Court Act, 2011 empowers the Environment and Land Court, on its own motion, or on application of the parties to a dispute, to direct the application of alternative dispute resolution (ADR), including traditional dispute resolution mechanisms.	
Water Act, 2016	Article 43 of the Constitution stipulates that every person in Kenya has the right to clean and safe water in adequate quantities and to reasonable standards of sanitation. In conformity to this constitutional requirement, the Water Act, 2016 was enacted. Strategy (Article 10 (1)) on five-year cycles. The Strategy shall provide the Government's plans and programs for the protection, conservation, control and management of water resources (2). Article 10(3) gives the details of the contents of the National Water Resource Strategy, i.e.: (a) existing water resources and their defined riparian areas; (b) measures for the protection, conservation, control and management of water resources and approved land use for the riparian area; (c) minimum water reserve levels at national and county levels; (d) institutional capacity for water research and technological development; (e) functional responsibility for national and county governments in relation to water resources management; and (f) any other matters the Cabinet Secretary considers necessary. The new law aligned national water management and water services provision with the requirements of the Constitution of Kenya 2010 particularly on the clauses devolving water and sanitation services to the county governments.	The proposed Transmission Pipelines Project is envisaged to provide reliable water to residents of Kwale and Mombasa Counties in line with the provisions of this Act.
County Government Act No. 17 of 2012	The preamble to the Act gives overriding object and purpose of the Act. It states that, 'An Act of Parliament to give effect to Chapter Eleven of the Constitution; to provide for county governments' powers, functions and responsibilities to deliver services and for connected purposes. Part II elaborate on the functions and powers of the county government, emphasizing its constitutional authority to enter into contracts, acquire and hold and dispose of assets, and delegate functions, such as through sub-contracts and partnerships.	PART VIII of the Act provided for Citizen Participation principles which include timely access to information, data, documents, and other information relevant or related to policy formulation and implementation among others. Similarly, implementation of the proposed Transmission Pipelines Project will be done through sustained public participation as provided for by this Act.

ACTS	RELEVANCE	APPLICABILITY TO THE PROJECT
	Part VI considers administration of decentralization to the sub-county level, including to urban areas and cities. The County Government Act, 2012, provides the basis for spatial plans as statutory requirements in the county. The Act stipulates a 10-year spatial plan be developed by each county to provide for: (a) spatial depiction of the social and economic development programme of the county as articulated in the integrated county development plan; (b) a clear statement of how the spatial plan is linked to the regional, national and other county plans; and (c) a clear clarification on the anticipated sustainable development outcomes of the spatial plan.	
Physical and Land Use Development Plan Act 2019	Part IV of the Act provides objectives of development control which are to ensure orderly physical and land use development, to ensure the proper execution and implementation of approved physical and land use development plan and to protect and conserve the environment Further section 56 provides that Subject to the provisions of this Act, the Urban Areas and Cities Act, 2011, and the County Governments Act, 2012, the county governments shall have the power within their areas of jurisdiction to consider and approve all development applications and grant all development permissions among other roles.	As guided by this Act, CWWDA will seek requisite approvals from the County Director of Physical Planning (Kwale County) prior to commencement of the works discussed in this report.
Occupational Health and Safety Act (OSHA 2007)	The Act provides Environment Health and Safety (EHS) Guidelines which shall be followed by both the Contractor and Supervising Consultant during implementation of the Project to avoid injuries and even loss of life to workers and neighboring community.	OSHA is enforced by the directorate of occupational safety and health services (DOSHS). Further, the project contractor will be expected to register the site as a work place with DOSHS and also engaged the directorate in handling work related accidents.
HIV and AIDS Prevention and Control Act 2011	The objective and purpose of this Act is to (a) promote public awareness about the causes, modes of transmission, consequences, means of prevention and control of HIV and AIDS; (b) extend to every person suspected or known to be infected with HIV and AIDS full protection of his human rights and civil liberties.	The Act provisions will be applied during Project implementation phase where the contractor will be required to create awareness among workers and community at large as well as other measures such as provision of condoms among others.
Sexual Offences Act 2006	An Act of Parliament that makes provision about sexual offences aims at prevention and the protection of all persons from harm from unlawful sexual acts and for connected purposes. Section 15, 17 and 18 focuses mainly on sexual offenses on minor (children).	In an effort to comply to provisions of this Act, the contractor will integrate SEA in job descriptions, employments contracts, performance appraisal systems, etc.; development of contract policies related to SEA, including whistle-blower protection and investigation and disciplinary procedures; training for all project management; management of coordination mechanism for case oversight, investigations and disciplinary procedures; supervision of dedicated SEA focal points in the project and

ACTS	RELEVANCE	APPLICABILITY TO THE PROJECT
		trained community liaison officers among other measures.
Child Rights Act (Amendment Bill) 2014	This Act of Parliament makes provision for parental responsibility, fostering, adoption, custody, maintenance, guardianship, care and protection of children. It also makes provision for the administration of children's institutions, gives effect to the principles of the Convention on the Rights of the Child and the African Charter on the Rights and Welfare of the Child. Contractors implementing the various Project components envisaged under the Master Plan Study will be required to comply to provisions of the Act during Project implementation.	The contractor will undertake the below listed measures among others; - The contractor will develop and implement a Children Protection Strategy that will ensure minors are protected against negative impacts associated by the Project including SEA. - All contractor's staff must sign, committing themselves towards protecting children, which clearly defines what is and is not acceptable behaviour
Labour Relations Act 2012	An Act of Parliament to consolidate the law relating to trade unions and trade disputes, to provide for the registration, regulation, management and democratization of trade unions and employers organizations or federations, to promote sound labour relations through the protection and promotion of freedom of association.	This act will be applied by labour force on site in addressing disputes related to working conditions.
National Gender and Equality Commission Act 2011	The over-arching goal for NGEK is to contribute to the reduction of gender inequalities and the discrimination against all; women, men, persons with disabilities, the youth, children, the elderly, minorities and marginalized communities.	This Act will be applied during hiring of workforce on site especially during hiring of workers, the aim will be to ensure adequate representation of women in the Project.
The National Museums and Heritage Act 2006	An Act of Parliament to consolidate the law relating to national museums and heritage; to provide for the establishment, control, management and development of national museums and the identification, protection, conservation and transmission of the cultural and natural heritage of Kenya; to repeal the Antiquities and Monuments Act (Cap. 215) and the National Museums Act; and for connected purposes.	This act together with world bank policy OP 4.11 on Physical Cultural Resources will be quoted in the event that the project will encounter such materials, chance find procedures have been provided in this report. The provisions of the Act are mainly enforced by the National Museums of Kenya (NMK)
Energy Act 2019	PART VIII provided for energy efficiency and Conservation of energy resources, the Act provides that factories and buildings and energy appliances by types, quantities of energy use, or methods of energy utilization for purposes of energy efficiency and conservation, as provided by the act safe handling of petroleum used by plant and equipment on site will be emphasized	Requirements for dealing in energy handling including safety are enforced by the Energy and Petroleum Regulatory authority (EPRA). EPRA will be instrumental in licensing the bulk storage of petroleum on site where necessary.
Traffic Act 2015	PART V of the Act provides driving and other offences relating to the use of vehicles on roads. The act provides explicit measures related to; Speed of motor vehicles, Penalties in relation to speed, Driving under influence of drink, Driving on pavement, pedestrian walkway, Causing death by driving or obstruction, Reckless driving, Signals and signs to be obeyed, Condition of vehicles, Limitation of loads.	This Act will be cited in relation to operation of plant and equipment on site. This act is enforced by the Traffic Police Department and the National Transport and Safety Authority (NTSA).
PUBLIC HEALTH ACT, CAP 242	This is an Act of Parliament which makes provision for good public sanitation and maintenance of health. Part III	The contractor will be required to provide sanitary facilities and solid waste

ACTS	RELEVANCE	APPLICABILITY TO THE PROJECT
	section 17-18 highlights on what the proponent should do in case of an outbreak of infectious diseases within the area. The infectious diseases apply to small pox, plague, cholera, typhus fever, acute poliomyelitis, rabies and many more as highlighted in this section. The Public Health Act makes provision for securing and maintaining health. For instance, the local authorities are supposed to take measures for preventing any pollution dangerous to health of any supply of water that the public uses for domestic purposes and purifying the sources that have been polluted. They are also supposed to take action against persons causing pollution to the water sources.	containers for use by construction workers on site during construction phase.
CLIMATE CHANGE Act 2016	The Act establishes a cooperation called National Climate Change Council whose responsibility among others is to advise the national and county governments on legislative, policy and other measures necessary for climate change response and attaining low carbon climate change resilient development. The act further provides that the Cabinet Secretary shall, in accordance with Article 10 of the Constitution and section 3 of this Act, and through public consultation, formulate a National Climate Change Action Plan (NCCAP) In formulating the National Climate Change Action Plan, the Cabinet Secretary shall be informed by social circumstances in particular, the likely impact of the action plans, strategies and policies on biodiversity and ecosystem services among other measures.	The proposed Transmission Pipelines Project is among projects that align to provision of the National Climate Change Action Plan (NCCAP) with regards to protection of biodiversity and ecosystem services.
Penal code CAP 63	Chapter XVII on “Nuisances and offences against health and convenience” contained in the penal code strictly prohibits the release of foul air into the environment which affects the health of the persons. Section 191 of the penal code states that if any person that voluntarily corrupts or foils water for public springs or reservoirs, rendering it less fit for its ordinary use is guilty of an offence.	Human and Solid (refuse) Waste disposal and other project related activities shall be carried out in such a manner as to conform to the provisions of the code.
The Standards Act Cap 496	This Act promotes the standardization of the specification of commodities, and provides for the standardization of commodities and codes of practice to ensure public health and safety. It establishes the Kenya Bureau of Standards (KEBS) and defines its functions as related to: promotion of standardization in industry and commerce; and Making arrangements or provision of facilities for the testing and calibration of precision instruments, gauges and scientific apparatus, for the determination of their degree of accuracy by comparison with standards	This means that the contractor under the supervision of the county engineer will ensure that all materials used on site adheres to the highest standards and do not pose any human health and safety risk.

ACTS	RELEVANCE	APPLICABILITY TO THE PROJECT
	approved by the Minister on the recommendation of the Council, and for the issue of certificates in regard thereto.	
The National Construction Authority Act, 2011	The Act provides for the establishment, powers and functions of the National Construction Authority (NCA). For accountability purposes, it requires all contractors to be registered and having valid annual practicing licenses. It also allows for public complaints against the contractor, which may trigger investigation by NCA into the conduct of such a contractor.	The proponent (CWWDA) will only hire a licensed contractor to undertake the construction works. Complaints against the contractor will first be addressed through the project GRM, and other measures only acting as a last resort.
Malaria Prevention Act (CAP 246)	The Act provides for the prevention and control of malaria and for connected purposes. It prohibits the construction of a dam or any other construction so as to obstruct the flow of water into or out of a drain, or alter the level of water so as to reduce the flow of water without consent.	The Proponent will be required to provide measures (such as sensitize the community on use of treated mosquito nets, local spraying and bush clearing near households) for the prevention and control of malaria

6.3 REGULATIONS AND RULES

Applicable Regulations and Rules are summarized in **Table 6.3** were reviewed.

Table 6.3: Regulations and Polices

REGULATION	RELEVANCE	APPLICABILITY TO THE PROJECT
The Environmental (Impact Assessment and Audit) Regulations, 2003	The regulation provides a framework under which Environment Impact Assessment for the Factory is prepared, Regulation 4(1) further states that: (a)“...no Proponent shall implement a project: likely to have a negative environmental impact. (b) for which an environmental impact assessment is required under the Act or these Regulations, unless an environmental impact assessment has been concluded and approved in accordance with these Regulations...”	Provisions of the regulations apply during preparation of this report.
Environmental Management and Coordination (Water Quality) Regulations, 2006	Regulation 9 of these regulations provides for water quality monitoring. It states that the “Authority in consultation with the relevant lead agency, shall maintain water quality monitoring for sources of domestic water at least twice every calendar year and such monitoring records shall be in the prescribed form as set out in the second schedule to these regulations”. The regulations provides for sustainable management of water resources including prevention of water pollution and protection of water sources (lakes, rivers, streams, ' springs, wells and other water sources). Construction of the dam provides for sustainable management of such water resources.	Provisions of the regulations apply during preparation of this report.
(Waste Management Regulations, 2006	Regulation 4 (1) states that “no person shall dispose of any waste on a public highway, street, road, recreational area or in any place except in a designated receptacle”. Regulation 4 (2) further states that “a waste generator shall collect, segregate and dispose such waste in the manner provided for under these regulations”.	CWWDA will use provisions of this regulation to ensure that waste is handled, stored, transported and disposed as per this regulation.

REGULATION	RELEVANCE	APPLICABILITY TO THE PROJECT
Noise and Excessive Vibration Pollution (Control) Regulations, 2009	The Contractor will be required to ensure compliance with the above regulations in order to promote a healthy and safe working environment throughout the Construction Phase. This shall include regular inspection and maintenance of equipment and prohibition of unnecessary hooting by vehicles. The regulations provides for a maximum of 60 dBA during the day and 35 dBA during the night for a construction site.	Provisions of the regulations apply during preparation of this report.
The Environmental Management and Coordination (Air Quality Regulations 2014)	These regulations provide a framework for management of plant and equipment emissions of hydrocarbons on site. The regulations require that all plant and equipment on site should be well serviced to manufacturers specifications to avoid air pollution, the regulation also require monitoring of baseline air quality within construction site and implementation of correction action where the standards are not complied to.	Water spray will be used at all times when working in dry areas to avoid risks associated with dust menace. Particulate matter (PM ₁₀), equipment's will be operated as provided by manufacturers specification to eliminate cases of Oxides (SOx), Nitrogen Oxides (NOx)) and Volatile Organic Compounds (VOC).
Fire Risk Reduction Rules, 2007	The rules require electrical equipment be installed in accordance with the respective hazardous area classification system, flammable materials are stored in appropriately designed receptacles, electrical equipment is inspected after six months by a competent person and the Proponent is required to keep records of such inspections, installation and maintenance of firefighting systems in workplaces, fire drills at least once a year, assembly points be marked, undertake annual fire safety audits etc.	The contractor will be required to store all flammable materials and liquids safely to avoid risk of fire.
Medical Examination Rules, 2005	It requires workers on site to undergo regular medical examination to identify the symptoms of hazardous exposures on the body, especially those who handle food or food products. This is with a sole purpose of monitoring exposure for remedial action.	The contractor will institute and implement regular medical examinations for its staff at the facility. These will include COVID 19 temperature checkup and drug abuse (at least alcohol on daily basis).
Safety and Health Committee Rules of 2004	These rules require the proponent and contractor (once they employ a more than twenty persons) to establish a committee to address the health, safety and welfare of workers. The Proponent and by extension the contractor, are required to provide space for meetings for the committee, training of the S&H Committee, appoint a S&H management representative, as well as allowing all staff to attend these meetings with no risk of loss of earnings, opportunities for promotion or advancement. They should also make legislation on occupational safety and health available to the Committee.	The contractor will develop a clearly defined safety and health policy, bring it to the notice of all employees at the workplace. They are also required to implement and review the policy when need arises. If construction workers exceed 20, the contractor will facilitate the formation of a S&H Committee and its operations.
First-Aid Rules, 1977	Rule 7 of First-Aid Rules, 1977 require that (No person shall be placed in charge of a first aid unless he has received adequate training and holds a certificate of competence	The contractor will conduct first aiders' training for the first time and a refresher training Bi-annually.

6.4 ENVIRONMENT AND SOCIAL STANDARDS

Review of Environment and Social Standards (ESS) of the World Bank was undertaken during preparation of the ESIA as summarized in **Table 6-5** below

Table 6-4: World Bank Environment and Social Standards

Standard	PROVISION	RELEVANCE TO THE PROJECT
(ESS1) Assessment and Management of Environmental and Social Risks and Impacts	(ESS1) Assessment and management of environmental and social risks and impacts which provides for (i) Environment Assessment (ii) Development of Environmental and Social Commitment Plan (ESCP), (iii) Project monitoring and reporting (iv) Stakeholder engagement and information disclosure. The main focus of the standard is to promote environmental and social sustainability in the Program design; avoid, minimize, or mitigate adverse impacts, and promote informed decision-making relating to the Program's environmental and social impacts;	An Environmental and Social Impact Assessment of Proposed Project Components is required and therefore the subject of this report.
(ESS2) Labor and Working Conditions	ESS2 recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. The standard objectives include among others; To promote safety and health at work, To promote the fair treatment, non-discrimination and equal opportunity of project workers, To protect project workers, including vulnerable workers such as women, persons with disabilities, children (of working age, in accordance with the (ESS) and migrant workers, contracted workers, community workers and primary supply workers, as appropriate among others	Section 8.4.3 that discussed Project related Social Impacts, appropriate provisions have been provided to mitigate impacts related to Worker and Community Health and Safety and Workers Management
(ESS3) Resource Efficiency Pollution prevention and Management	ESS3 recognizes that economic activity and urbanization often generate pollution to air, water, and land, and consume finite resources that may threaten people, ecosystem services and the environment at the local, regional, and global levels. The policy objective among other include; to promote the sustainable use of resources, including energy, water and raw materials and; To avoid or minimize adverse impacts on human Health and the environment by avoiding or minimizing pollution from project activities among others.	Chapter 8 of this ESIA has discussed in detail potential risks that the Project could pose to Biophysical resources ranging from Water, Soil and Air and Biological resources including Fauna and Flora. Appropriate ranking has been determined and mitigation measures provided.
(ESS4) Community Health and Safety	ESS4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration or intensification of impacts due to project activities. The policy objectives among others include; to anticipate and avoid adverse impacts on the health and safety of project-affected communities during the project life cycle from both routine and non-routine	Section 8.4.3 that discussed Project related Social Impacts, appropriate provisions have been provided to mitigate impacts related to Worker and Community Health and Safety and Workers Management

	circumstances and to promote quality and safety, and considerations relating to climate change, in the design and construction of infrastructure.	
(ESS5) land Acquisition, restrictions on land Use and involuntary resettlement.	ESS5 recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons .Project-related land acquisition or restrictions on land use may cause physical displacement (relocation, loss of residential land or loss of shelter), economic displacement (loss of land, assets or access to assets, leading to loss of income Sources or other means of livelihood), or both. The objectives of the standards include; To avoid involuntary resettlement or, when unavoidable, minimize involuntary resettlement by exploring project design alternatives, To avoid forced eviction and To mitigate unavoidable adverse social and economic impacts from land acquisition or restrictions on land use by: (a) providing timely compensation for loss of assets at replacement Cost and (b) assisting displaced persons in their efforts to improve, or at least restore, their livelihoods and living standards, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher among other objectives	In line with the Standard, a Separate Resettlement Action Plan (RAP) has been prepared. The RAP provides that the impact of water pipeline construction will result to both physical and economic displacement of the 281 Project Affected PAPs who include 129 Male PAPs and 152 Female PAPs and 1 community Church
(ESS6) Biodiversity Conservation and Sustainable Management of Living Natural Resources	ESS6 recognizes that protecting and conserving biodiversity and sustainably managing living natural resources are fundamental to sustainable development. The policy recognizes the importance of maintaining core ecological functions of habitats, including forests, and the biodiversity they support. The policy objectives include among others include; to protect and conserve biodiversity and habitats and to apply the mitigation hierarchy and the precautionary approach in the design and implementation of projects that could have an impact on biodiversity	Chapter 8 of this ESIA has discussed in detail potential risks that the Project could pose to Biophysical resources ranging from Water, Soil and Air and Biological resources including Fauna and Flora. The main receptor assessed included the Mwache Forest. Appropriate ranking has been determined and mitigation measures provided. As indicated in the receptor maps, the pipeline traverses mwache forest periphery wthat has sparse vegetation cover, additionally, table 3 documents trees species and numbers that might be affected by the pipeline with the forest.
(ESS8) Cultural Heritage	ESS8 recognizes that cultural heritage provides continuity in tangible and intangible forms between the past, present and future. The policy objectives include; to protect cultural heritage from the adverse impacts of Project activities and support its	The ESIA has provides chance find procedures to be adopted in the event such resources are encountered during Project construction phase.

	preservation; to address cultural heritage as an integral aspect of sustainable development; to promote meaningful consultation with stakeholders regarding cultural heritage; to promote the equitable sharing of benefits from the use of cultural heritage.	
(ESS10) Stakeholder Engagement and Information Disclosure	This ESS recognizes the importance of open and transparent engagement between the Borrower and project stakeholders as an essential element of good international practice. Effective stakeholder engagement can improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation. The policy objectives provide for; To establish a systematic approach to stakeholder engagement that will help Borrowers identify stakeholders and build and maintain a constructive relationship with them, in particular project-affected parties; To assess the level of stakeholder interest and support for the project and to enable stakeholders' views to be taken into account in project design and environmental and social performance	Chapter 7 of this report discusses stakeholder engagement and public baraza that were undertaken with the Project area of influence. Specifically public meetings were held in Gandini Chiefs Camp office, 21st October 2021, Gandini Chiefs Camp office, 22nd October 2021 and Kiteje Sub Location Office on 23rd October 2021. Further key interview were held with Kenya Forest Services with the Chief Conservator Kwale County with regards to wayleave application through Mwache Forest. Additionally, Mwached, Bonje Tsunza MU and CFA were consulted on 14 th June 2023

6.5 ENVIRONMENTAL AND SOCIAL RISK MANAGEMENT POLICY FOR AFD-FUNDED OPERATIONS

The policy provides that any development operation may involve potentially adverse risks, particularly in terms of environmental and social impacts.

Consequently, AFD's financing is conditional upon the implementation by the client of continuous and systematic environmental and social assessment procedures to (i) assess the environmental and social impacts of operations, (ii) propose appropriate measures to avoid the negative impacts or, when they are unavoidable, reduce or offset them in an appropriate manner, (iii) monitor the application of such measures during the implementation phase of the operation, and (iv) conduct an ex post evaluation of the effectiveness of the proposed measures.

The systematic environmental and social assessment of operations aims to ensure that they are environmentally and socially sustainable, contribute to integrating environmental and social considerations into the decision-making process of all the stakeholders, and provide a strong framework to manage financial and reputational risks run by AFD.

Further, the policy provides under ADF principles that the client is responsible for conducting the environmental and social assessment of its project. It mobilizes the expertise and environmental and social resources required at the various stages of the project implementation (feasibility, detailed design preparation, construction, operation, decommissioning) and contractually commits to respect the environmental and social performance targets agreed during the appraisal of the financing and set out in the financing agreement with AFD. The client monitors and documents the application of the

environmental and social management measures during the implementation of the project activities. It also implements the preventive actions required to remove the potential causes of a failure and the remedial actions required when a failure is identified. It regularly informs AFD about this through periodic progress reports.

AFD assists the client in defining its environmental and social objectives and verifies their implementation throughout the project cycle. The Environmental and social impact assessment (ESIA) for the Proposed Mwache trunk main and south mainland water transmission pipeline has been prepared to conform to this principle.

6.6 RELEVANT STANDARDS APPLICABLE TO BE PROJECT IMPACTS ON BIODIVERSITY WITHIN MWACHE FORET

6.6.1 World Bank ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

The World Bank's ESS6 requires a differentiated risk management approach to habitats based on their sensitivity and values and address all habitats, categorized as 'Modified Habitat', 'Natural Habitat', and 'Critical Habitat', along with 'legally protected and internationally and regionally recognized areas of biodiversity value' which may encompass habitat in any or all of these categories.

Categorising habitats as Natural or Modified based on their condition needs to recognise that in practice, Natural and Modified Habitats exist on a continuum ranging from largely untouched, 'pristine' Natural Habitats to intensively managed Modified Habitats. Critical Habitats can be represented by Modified or Natural habitats depending on whether biodiversity features are present that meet the relevant criteria and the thresholds for Critical Habitat. This categorisation of habitats provides an indication of the level of risk a project poses to biodiversity and then provides a basis for determining the level of mitigation required to compensate for impacts on habitats of different conservation value e.g. loss or fragmentation. Both ESS6 and the IFC's PS6 requires an ultimate outcome of no net loss of biodiversity for Natural Habitat and net gain for Critical Habitat.

Projects with significant risks and adverse impacts on biodiversity require a Biodiversity Management Plan. Where there is a lack of scientific certainty or where impacts on biodiversity are uncertain, a precautionary approach is required, including implementation of the mitigation hierarchy, application of cost-effective mitigation measures and adaptive management.

ESS6 (in summary) states that projects can only be undertaken in Critical Habitat if a number of criteria are satisfied e.g. there are no other viable alternatives for the project in habitats of lesser biodiversity value; all national laws and international obligations of the host country' approval for the project in or adjacent to the Critical Habitat has been complied with; there is no likelihood of measurable adverse impacts on the biodiversity values for which the Critical Habitat was designated; there is no anticipated net reduction in a population of any Critically Endangered, Endangered or restricted range species over a reasonable time period; the project will be designed to achieve a net gain of those biodiversity values for which the Critical Habitat was designated, and that a robust appropriately designed long term biodiversity monitoring and evaluation program is integrated in to the Borrower's management program.

6.6.2 International Finance Corporation’s Guidance Note 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

The International Finance Corporation (IFC) requires a client seeking funding for their proposed project to assess environmental and social risks using eight Performance Standards. Performance Standard 6 (PS6; IFC 2012a) and the associated Guidance Note 6 (GN6; IFC 2012b) focus on the protection and conservation of biodiversity. In most cases, the required conservation outcome under PS6 is no-net-loss of biodiversity value achieved using the “like-for-like” or better principle of biodiversity offsets. However, when a project occurs in critical habitat (CH) supporting exceptional biodiversity value, a net gain in biodiversity value is required.

Critical Habitat (CH) identification is required by PS6 to manage risks and avoid, mitigate, and offset impacts to areas with high biodiversity value including: 1) habitat of significant importance to Critically Endangered (CR) and/or Endangered (EN) species; 2) habitat of significant importance to endemic and/or restricted-range species; 3) habitat supporting significant global concentrations of migratory species and/or congregatory species; 4) highly threatened and/or unique ecosystems; and/or 5) areas associated with key evolutionary processes. Further, the standard provides that Critically Endangered (CR) and Endangered (EN) species potentially present in the area must be identified through a literature review (e.g., using IBAT). Field surveys should provide evidence to confirm their actual presence or absence. If these species are not detected during fieldwork, expert opinions and interviews with knowledgeable local stakeholders must be used to support their absence.

6.6.3 Key Biodiversity Area (KBA) Guidelines

The KBA Standard (IUCN, 2016) defines a set of criteria and associated quantitative thresholds for identifying KBAs in an objective, repeatable and transparent way. The general approach for identifying KBAs was informed by The IUCN Red List of Threatened Species™ (IUCN, 2012a, hereafter the IUCN Red List) and by the Red List of Ecosystems (RLE, Keith et al., 2013), which use criteria and quantitative thresholds to identify threatened species and ecosystem types respectively.

The KBA criteria are explicitly designed to cover all levels of biodiversity, including genetic diversity, species and ecosystems. The KBA criteria include both species-based criteria similar to those used in the above-mentioned schemes (e.g., AZE sites, IBAs), and ecosystem-based criteria designed to identify sites that are important for biodiversity at the ecosystem level. Collectively, the criteria aim to capture the various ways in which a site can be important for the global persistence of biodiversity. The eleven criteria are grouped into five high-level criteria (A-E). A site must contribute significantly to the global persistence of at least one of the following to qualify as a KBA:

- Threatened biodiversity (Criteria A1-2)
- Geographically restricted biodiversity (Criteria B1-4)
- Ecological integrity (Criterion C)
- Biological processes (Criteria D1-3)
- or, it must have:
- Very high irreplaceability, as determined through quantitative analysis (Criterion E).

A site needs to meet the thresholds for only one criterion or sub criterion to qualify as a KBA, but all sites should be assessed against as many KBA criteria and for as many taxonomic groups and ecosystem types as possible, given available data. Mwache Forest IUCN Management Categories of Protected Areas as elaborated below;

- **Ia Strict Nature Reserve:** NO, the 1.5km Section targeted for the pipeline does not fall under this category. The forest does not exhibit strictly protected areas set aside to protect biodiversity and also possibly geological/geomorphical features.
- **Ib Wilderness Area:** No, Mwache Forest is not designated as a Category Ib Wilderness Area. It is a gazetted forest reserve in Kwale County, while it is protected from human settlement and development, it does not have the specific wilderness area classification
- **II National Park:** No, Mwache Forest is not a National Park. It is a forest reserve, specifically a mangrove forest reserve, located in Kwale County, Kenya. It is one of the largest mangrove forests in Kenya. While it is a protected area, it is not designated as a National Park, which typically have a higher level of protection and management.
- **III Natural Monument or Feature:** No, the pipeline section is within a forest block that does not fall under Natural Monument or Feature. However, it is important to note that KAYA Mutswakara which is among the Mijikenda Kaya Forests denoted as UNESCO World Heritage site is located on the right side of Mwache River away from the targeted pipeline Section (See attached figure)
- **IV Habitat/Species Management Area:** No, Mwache Forest is not a Habitat/Species Management Area, but it is a part of the Mwache-Tanza-Mbuguni-Bonje forest ecosystem in Kwale County, which is known for its rich biodiversity and plays a crucial role in the local economy. The Kenya Forest Service, in collaboration with the Community Forest Association (CFA) and other partners, is developing a Participatory Forest Management Plan to promote sustainable practices within the ecosystem.
- **V Protected Landscape/ Seascape:** NO, although Mwache forest is gazette in Kenya as a government forest, there is no evidence of interaction of people and nature over time that could have resulted to distinct character with significant, ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting
- **VI Protected area with sustainable use of natural resources:** NO, although Mwache forest is gazette in Kenya, there is no evidence of sustainable natural resource management and where low-level non-industrial use of natural resources compatible with nature conservation is seen as one of the main aims of the area. As reported earlier, the only visible human activity is quarrying which is not a sustainable use of forest resources from a conservation perspective.

7 STAKEHOLDER CONSULTATION

7.1 STAKEHOLDER CONSULTATIONS

Project stakeholders are defined as individuals, groups or other entities who: (i) are impacted or likely to be impacted directly or indirectly, positively or adversely, by the Project (also known as ‘affected parties’); and (ii) may have an interest in the Project (‘interested parties’). They include individuals or groups whose interests may be affected by the Project and who have the potential to influence the Project outcomes in any way.

The objectives of stakeholder consultations were as follows;

- To identify and map all relevant stakeholders, their context, interests and concerns;
- To establish a two-way dialogue to understand concerns, management options and external perspectives;
- To manage stakeholders’ expectations;
- To facilitate the collection of quality primary and secondary information relevant; to the project processes including monitoring;
- To triangulate data collected and analysis done to inform decision making;
- To document information disclosed and public consultation efforts;
- To comply with regulations and requirements on disclosure and consultation;
- To provide information about the project and its potential impacts to those interested in or affected by the project, and solicit their opinion in this regard;
- To identify additional impacts/issues and possible mitigation measures;
- To inform the process of developing appropriate mitigation measures and facilitate consideration of alternatives and trade-offs (if any);
- To reduce chances of conflict through early identification of contentious issues;
- To ensure transparency and accountability of decision-making; and
- To increase public confidence in the project.

7.2 STAKEHOLDER MAPPING AND IDENTIFICATION

A stakeholder identification, mapping and analysis exercise was carried out to determine all organizations and individuals who may be directly or indirectly (positively or negatively) affected by the proposed Mwache Pipeline Project. All identified stakeholders were consulted at the ESIA stage with the motive of collecting their views in relation to the project and associated beneficial and adverse impacts. The identified stakeholders were grouped into two main categories depending on their various needs, interest, and potential influence to the project as follows:

Primary Stakeholders: These are stakeholders directly affected by the project such as the local community, local administration, institutions such as schools and health centers within locations along the pipeline alignment.

Secondary Stakeholders: These are stakeholders indirectly affected by the project but influence development through Project implementation. These include but not limited to: National and County Government, Government Parastatals among others.

An Inventory of the Stakeholder relevant to the Proposed Project is summarized in Table 7-1.

Table 7-1: Inventory of the Project Stakeholder

Stakeholder Category	Stakeholder Name
Primary Stakeholders	- Local community in, Kasemeni, Gandini, Mbuguni, Kaya Bombo and Dongo Kundu - Local administration, in, Kasemeni, Gandini, Mbuguni, Kaya Bombo and Dongo Kundu - Institutions such as schools and health centres, in, Kasemeni, Gandini, Mbuguni, Kaya Bombo and Dongo Kundu - Beach Management Units (BMU) and Community Forest Association (CFA) who include; Tsunza, Bonje and Mwache
Secondary Stakeholders	- GoK -Ministry of Water and Sanitation - Coast Water Works Development Agency (LVNWWDA) - Ministry of Environment and forestry - Water Resources Authority (WRA) - Mombasa and Kwale Water Companies - Kenya Forest Service (KFS) - National Environment Management Authority

7.3 STAKEHOLDER AND PUBLIC PARTICIPATION SCHEDULE

Kenya's Environmental Impact Assessment / Audit Regulations of 2003 require that in the process of Environmental Impact Assessment (EIA), the proponent shall, in consultation with the National Environment Management Authority (NEMA); seek the views of persons who may be affected by the Project. Stakeholder mapping was done by the help of local administration headed by area Deputy County Commissioner who provided the list of key stakeholders to be included in the assessment, section being revised appropriately to reflect consultations with, Kenya Forest Services, Beach Management Unit and Community Forest Association and Local Administration. The schedule of stakeholder and public barazas within the Gandini and Mbuguni Locations, and Kiteje Sub Location is summarized **Table 7.2**.

Table 7-2: Schedule of Stakeholder Public Participation

Local Administration Meeting

MEETING	VENUE	DATE
Meeting with Kasemeni Sub County DCC	DCC office in Mazeras	20 th October 2021
Meeting with Gandini Location Chief	Chiefs Office in Gandini	22 nd October 2021
Meeting with Mbuguni Location Chief	Chiefs Office in Mbuguni	23 rd October 2021
Meeting with Kiteje Sub Location Chief	Kiteje Sub Location Chief	24 th October 2021

Kenya Forest Services Consultation

STAKEHOLDER	VENUE	DATE
Kenya Forest Services (KFS)	Kenya Forest Services (KFS) offices – Kwale Offices	24 th October 2021

BMU / CFA Proposals to be Supported under the Project

#	BMU/ CFA	Proposals to be supported by the Project
1	Tsunza, Mwache and Bonje	• Tree planting and re- afforestation Programs • Stakeholder Sensitisation (Community) programs on conservation • Stakeholder Sensitisation programs (Kenya Ports Authority KPA) on conservation • Restoration Programs of Mangroves in Degraded areas • Beach Clean-up and Waste Management Programs • Bee Keeping Activities • Fish Ponds and fishing sites including; Kwasoa, Toneza, Maguzoni, Dongo Kundu, Chuyu, Ngare, Mkupe, Mbagani, Gutu, Mwinjala, Mshame, Mwekerwe Nyanje, Chiweni, Manzazani, Mwangowa, Mwishomo, Fungu ya Kati, Chilomoni, Hodi • Nursery Establishment within Kaya Chonyi, Kaya Mrera, Kaya Bombo, Kaya Mbuguni and Kaya Teleza

Stakeholder Workshop with Beach Management Units (BMU) and Community Forest Association (CFA)

BMU / CFA	VENUE	DATE
Tsunza BMU and CFA	Royal Star Resort Mazeras	14 th June 2023
Mwache BMU and CFA	Royal Star Resort Mazeras	14 th June 2023
Bonje BMU and CFA	Royal Star Resort Mazeras	14 th June 2023

Public Meetings

LOCATION/ SUB LOCATION	VENUE	DATE	ATTENDEES
Gandini Location	Gandini Chiefs Camp office	21st October 2021	38 Male 29 females
Mbuguni Location	Mbuguni Chiefs Camp office	22 nd October 2021	33 males 19 females
Kiteje Sub Location	Kiteje Sub Location Office	23 rd October 2021	26 males 17 females

Tables 7.3 below presents summary of concerns raised by stakeholders during the consultations.

Table 7-3: Stakeholders Concerns and Responses

Kenya Forest Services (KFS)

STAKEHOLDER	RESOLUTIONS
Kenya Forest Services (KFS)	- CWWDA to formally apply for approval to lay the pipeline within Mwache Forest. Application to be addressed to the Chief Conservator of Forest (CCF) – Kwale County. - The application should clearly indicate the Scope of Works planned to be undertaken within the forest. - The application should include a clear Layout Plan and indicate the proposed pipeline route - The CCF will review the application and communicate the decision of KFS officially to CWWDA. - After approval is granted by KFS, CWWDA will undertake survey of the pipeline route. - After Survey works is completed, CWWDA will further apply through the CCF for approval or authority to commence pipeline construction. - This application will be reviewed and approval granted to CWWDA by KFS for construction works. This will be through a lease permit that will be renewed on an annual basis. - CWWDA will ensure that the proposed pipeline is restricted within existing track and the existing water pipeline easement, this approach will ensure that no tree is cleared along the easement. However, at the truncation, any trees that will be affected will be valued and cost included in the permit fees
Local Administration	- The office of Sub County Commissioner supports CWWDA initiative of expanding water distribution networks within Mombasa and Kwale Counties - The office of Sub County Commissioner is ready to assist CWWDA to mobilise any stakeholder consultations that might be required through project implementation stage - Local administration would ask to be involved in any stakeholder workshops that might be organized by CWWDA with regards to the Project - The DCC office advises consultations with Kenya Forest Services (KFS) given that the pipeline section traverses through Mwache forest.

Table 7.4: Stakeholders Concerns and Response in Gandini Location

SUGGESTION / QUESTION	RESPONSE
Mr. Katsudzi Dziro wanted to know how cases of disputed land will be handled.	The meeting was informed that the consultant will establish a grievance Redress Committee that will look into disputes locally. Residents were encouraged to use the GRC to solves disputes instead of court process that might be lengthy and expensive.
Underson Beja Wanted to be informed on how damages to private property outside the acquired project wayleave will be handled.	The meeting was informed that the wayleave will include extra working space. Any property that falls within the wayleave corridor will be compensated. In the event that the contractor damages property outside the wayleave, they will have to be reinstated on fresh compensation done by the contractor.
Harrison Chiwala wanted to be informed on when the project will commence.	The meeting was informed that funding for the project which include construction of Mwache dam and the transmission lines is available. The project will commence immediately after all the pre-requisite reports including ESIA report and NEMA licence has been issued and also a resettlement action plan has been prepared for the affected persons.

Mr. Mbodze wanted to know what will happen in the event that the pipeline alignment passes through graveyards.	Residents were informed that the contractor will try as much as possible to avoid graves, in areas where it is not possible to avoid, the community will be allowed to apply their cultural procedures of relocating graves. The project client will facilitate the process.
Residents wanted to know if the contractor will source for workforce within the community where the works will be implemented.	Residents were informed that both unskilled labour and some skilled (if available) will be sourced from the local community. Youths were encouraged to organize themselves into groups and avail themselves for consideration.

Table 7.5: Stakeholders Concerns and Response in Mbuguni Location

SUGGESTION / QUESTION	RESPONSE
Mr. Sale Ali wanted to know if the water will benefit residents of Mbuguni	The meeting was informed that the pipeline is a transmission line and not for household connection, however residents can request to be given water kiosks within shopping centres for them to access water easily.
Mr. Juma Omar wanted to know what will happen to those property owners who not be available during enumeration.	The meeting was informed that the consultant will be walking along the proposed pipeline route accompanied by village elders, details of those that will not be on the ground during enumeration will be captured and follow up done to ensure any missing information about them is captured.
Residents wanted to be informed on when the project will commence.	The meeting was informed that funding for the project which include construction of Mwache dam and the transmission line is available. The project will commence immediately after all the pre requisite reports including ESIA report and NEMA licence has been issued and also a resettlement action plan has been prepared for the affected persons.
Residents wanted to know if the contractor will source for workforce within the community where the works will be implemented.	Residents were informed that both unskilled labour and some skilled (if available) will be sourced from the local community. Youths were encouraged to organize themselves into groups and avail themselves for consideration.

Table 7.6: Stakeholders Concerns and Response in Kiteje Sub Location

SUGGESTION / QUESTION	RESPONSE
Mr. Kasim Chame wanted to know what will happen to residents who have bought parcels of land but the subdivision process is yet to be completed.	The meeting was informed that the National Lands Commission will follow up and authenticate the land documents to ensure compensation is done to the right owner.
Mr. Abdul Kongoniga wanted to know if during compensation there will be any discussion between property owner and the client about the rates.	The meeting was informed that compensation rates will be provided by a registered government value to ensure accuracy. During RAP report disclosure, residents will be given a chance to make adjustments if need be.
Harrison Chiwala wanted to be informed on when the project will commence.	The meeting was informed that funding for the project which include construction of Mwache dam and the transmission line is available. The project will commence immediately after all the pre requisite reports including ESIA report and NEMA licence has been issued and also a resettlement action plan has been prepared for the affected persons.
Mr. Jiti Abdalla wanted to know what will happen in the event that the pipeline alignment passes through graveyards.	Residents were informed that the contractor will try as much as possible to avoid graves, in areas where it is not possible to avoid, the community will be allowed to apply their cultural

	procedures of relocating graves. The project client will facilitate the process.
Residents wanted to know if the contractor will source for workforce within the community where the works will be implemented.	Residents were informed that both unskilled labour and some skilled (if available) will be sourced from the local community. Youths were encouraged to organize themselves into groups and avail themselves for consideration.
Hadija Omar wanted to be informed if residents will be given sufficient notice before construction commences and also if they will be required to be at their premises throughout during construction.	Residents were informed that adequate time will be given to land owners before project commences, asset owners will be given sufficient time to salvage whatever they want along the pipeline corridor She was also informed that once owners have agreed and allowed works to proceed, they will not be required to be physically present during implementation.

7.4 STAKEHOLDER CONSULTATIONS DURING CRITICAL HABITAT ASSESSMENT WITHIN MWACHE FOREST

The assessment made use of traditional knowledge through engagement of local community elder from the local Dururma Community. The elder was in charge of interpreting biological resources that were observed by the assessment team including assistance in identifying local names and value of such resources. Additionally, stakeholder consultations were undertaken with relevant Beach Management Unit (BMU) and Community Forest Association (CFA). The forums were held as per indicated schedule as indicated in Table 7.7 below.

Table 7-7: Schedule of Stakeholder Consultations

#	Meeting Detail	Date and Venue
<u>1</u>	<u>Bonje Beach Management Unit (BMU) Meeting</u>	<u>13th March 2025 at Bonje</u>
<u>2</u>	<u>Mkupe Beach Management Unit (BMU) Meeting</u>	<u>14th March 2025 at Mkupe</u>

The community recognizes critical role that Mwache forest plays including habitats for diverse species, and contributes to the local economy through eco-tourism and sustainable resource management. The forest also provides materials like timber, fuel, local vegetables and other resources for the local population. Table 7.8 below presents a summary of discussions held with the community.

Table 7-8: Stakeholder Consultations Issues

#	Topic	Discussion
<u>1</u>	<u>Importance of Mwache Forest</u>	<u>It plays a crucial role in coastal protection, provides habitats for diverse species, and contributes to the local economy through eco-tourism and sustainable resource management</u> <u>They provide materials like timber, fuel, local vegetables and other resources for the local population.</u>
<u>2</u>	<u>Importance of Creek / Mangroves</u>	<u>Mangroves provide traditional ropes used in fishing sector</u> <u>Vegetation within mangrove provide medicinal value</u> <u>Provide breeding ground for fish, crabs, prawns, oysters, snails, Mollusca,</u> <u>Mangrove provide timber to the local for construction sector (residential structures and boat making)</u> <u>Tourist attracting</u> <u>Creek help in control of storm and ocean wave surge</u> <u>Provision of clean air</u>

#	Topic	Discussion
3	<u>Threats to the Creeks / Mangroves and Forest Ecosystem</u>	<u>Charcoal burning</u> <u>Over collection of firewood</u> <u>Clearing for farming</u> <u>Over fishing and bait collection</u> <u>Oil spills</u> <u>Sedimentation / erosion</u> <u>Human settlement</u> <u>Drought</u> <u>Plastic and other solid Wastes</u>
4	<u>Hot Spots</u>	<u>Gami Quarries Ltd is a locally incorporated Kenyan Company has continuously opened an active quarry within the forest for mining ballast, concrete blocks to pre-cast products.</u> <u>Mbele, Goro, Darajani, Difu, Mwanzenge, Maweni, Nqondi, Nianze, Mbagani, all affected by charcoal burning and deforestation</u>
5	<u>Suggested Mitigations Measures to Threats</u>	<u>Tree planting and re- afforestation Programs</u> <u>Stakeholder Sensitisation (Community) programs on conservation</u> <u>Restoration Programs of Mangroves in Degraded areas</u> <u>Beach Clean-up and Waste Management Programs</u> <u>Bee Keeping Activities</u> <u>Termination of quarrying activities within Mwache Forest</u>

7.47.5 GRIEVANCE REDRESS MECHANISM

The grievance redress mechanism will be a 3-tier arrangement as indicated below:

- The First Tier will allow for amicable review and settlement of the grievance at the village level with assistance of the village elders and the 'Nyumba Kumi' representative members who will discuss and agree on amicable resolutions. This level is called the Village Grievance Redress Committee (VGRC).
- The Second Tier will involve the Project Team from CWWDA and Local Administration in case the grievance cannot be solved at the first level.
- The Third Tier will be the option of allowing the grieved party to seek redress at the court of law.

Levels I and II are costs free. The legal redress option, however, may incur some costs for the parties involved.

Grievance Redress Steps

The procedure of receiving and resolution of complaints is summarized in **Table 7.9**.

Table 7.9: Grievance Redress Steps

STEPS	GRIEVANCE REDRESS STEPS DETAILS
Step 1: Receipt of complaint/grievance	A verbal or written complaint from a PAP or community member will be received by the Grievance Officer (GO) on behalf of the First Tier
Step 2: Determination of Corrective Action	If in their judgment, the grievance can be solved at this stage, the GO and VGRC will determine a corrective action in consultation with the aggrieved person. A description of the action, the time frame within which the action is to take place, and the party charged with implementing the action will be recorded in the grievance register
Step 3: Meeting with the complainant	The proposed corrective action and the time frame in which it is to be implemented will be discussed with the complainant within 14 days of receipt of the grievance. Acceptance of the agreement and corrective action will be documented
Step 4: Implementation of Corrective Action	Agreed corrective actions will be undertaken by the party agreed by SGRC within the agreed time frame. The date of the completed action will be recorded in the grievance register.
Step 5: Verification of corrective action	To verify satisfaction, the aggrieved person will be approached by the GO and SGRC to verify that the corrective action has been implemented. A signature of the complainant will be obtained and recorded in the grievance register

Grievance Redress Mechanism

The Project Team at CWWDA will establish a Village Grievance Redress Committee (VGRC) as detailed through the Three-Tier Grievance Redress Mechanism GRM. **Figure 7-1 below** gives a presentation of the Grievance Redress Mechanism.

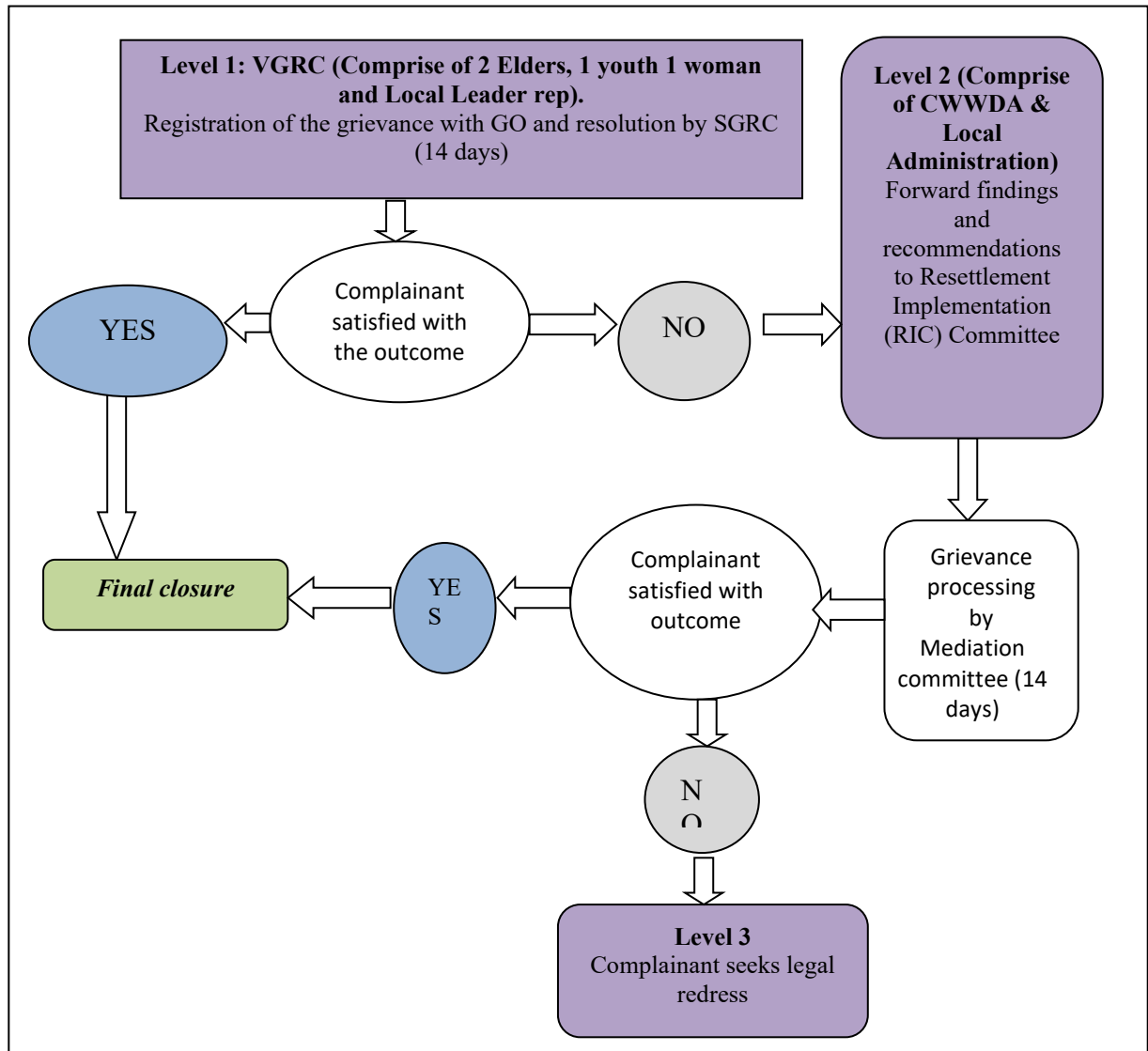


Figure 7.1. Grievance Redress Procedure

8 ASSESSMENT OF ENVIRONMENTAL AND SOCIAL IMPACTS

8.1 INTRODUCTION

This chapter presents the assessment of potential environmental (physical, biological), community health and safety and social impacts associated with Proposed Mwache Trunk Main and South Mainland Water Transmission Pipeline as discussed in **Chapter 2** of this report. Based on the impact assessment, mitigation for both construction and operation phases are specified with the goal to either avoid the impact, abate the impact at the source, minimize the impact at receptor and, if necessary, to offset the impact through compensation or other means.

Regarding the physical resources or receptors, the impacts are assessed in four areas: soils, water resources, air quality, and noise and vibration. For biological resources and receptors, impacts are assessed for flora and fauna. The social impacts are assessed for three areas: community health and safety, worker health and safety and land and livelihoods.

8.2 CONSTRUCTION PHASE POSITIVE IMPACTS

Project positive impacts during construction phase are summarized below.

- **Employment Creation:** At construction stage workers will be deployed to help in construction and land preparation activities. This will include both skilled and unskilled personnel especially from the local population with approximately 200 direct and indirect jobs.
- **Income/Revenue to Government:** Income to government will be realized in terms of taxes generated during the acquisition of relevant statutory licenses. Materials to be used during construction will also be taxable (16% VAT). Through revenues generated, the government will be capable of financing its responsibility to her citizens.
- **Income to Other Businesses:** During implementation of the project, there will be need for transporters, suppliers of raw materials and other service providers, who will benefit from the proposed development.

8.3 OPERATION PHASE POSITIVE IMPACTS

Positive project impacts during operation phase are summarized below.

- Availability of water for domestic use, the project will ensure a reduction in the distance between the various households and the water collection points as compared to the long distances initially covered from the homesteads to water points.
- Reduction in poverty levels of many households, this will be as a result of the availability of reliable water for domestic use, households will therefore engage more time in other income streams.
- Employment opportunities will be created both to those working directly along the pipeline route under Mombasa Water and Sewerage Company (MOWASCO)
- Improved public hygiene and sanitation and at home because of water availability.

8.4 CONSTRUCTION PHASE NEGATIVE IMPACTS

8.4.1 Impact on Physical Resources and Receptors

Water Resources

Project activities will interact with water resources within the project area in the following ways.

- There will be indirect interaction in the case of erosion of soils into seasonal streams along the pipeline alignment
- Site activities such as excavations during site levelling could result to loosening of soils that could result to sedimentation and siltation of storm water drainage channels and eventually flowing into seasonal streams along the pipeline alignment.
- There will be direct interaction from the abstraction of water from Mwache Creek for construction (e.g., for dust control).

Un-serviced plant and equipment on site could result to oil and fuel leaks that could contaminate Mwache Creek and Seasonal Streams raising the Biological Oxygen Demand (BoD) and affecting aquatic organism in the seasonal streams.

Pre- Mitigation Impact Assessment is presented in **Table 8.1**.

Table 8.1: Pre-Mitigation Impact Assessment

IMPACT	SILTATION AND POLLUTION OF SURFACE WATERS RESOURCES				
Nature of Impact	Negative		Positive		Neutral
	Eroded soil and leaked oils and fuels entering surface water bodies (seasonal streams along the Water Pipeline)				
Type of Impact	Direct		Indirect		Induced
	Impact is as a result of a direct interaction between Project activities and the environment along the footprint of the concrete dam				
Duration of Impact	Temporal	Short term	Long term		Permanent
	The impact is expected to be short term, however in the case of serious erosion the impacts of siltation of surface water may be experienced long term (into the operational phase).				
Impact Extent	Local		Regional		International
	The impact will be limited to the footprint of the concrete dam and immediate surrounds. The dilution of sediments in the river will render this impact negligible at the regional scale				
Impact scale	The impact is considered as small (local) scale. Limited at concrete dam Environs				
Frequency	Continuous				
Likelihood	Possible				
Impact magnitude	Positive	Negligible	Small	Medium	Large
	Based on the above the impact magnitude is considered small.				
Resource / receptor sensitivity	Low		Medium		High
	The sensitivity of the river along the proposed pipeline construction works to Siltation and pollution is considered to be medium to low.				
Impact significance	Negligible	Minor	Moderate		Major
	Considering the impact magnitude is small and the sensitivity is medium to low, the overall significance is considered to be minor.				

Mitigation

The following mitigation measures will be implemented to minimize the potential for siltation and sedimentation of seasonal streams along the water pipeline by soils eroded from construction sites. The measures will also apply for pollution control from hydro-carbons from plant and equipment.

- All waste water which may be contaminated with oily substances must be managed in accordance with an appropriate Waste Management Plan (WMP).
- No hydrocarbon-contaminated water may be discharged into seasonal streams
- At construction stage, the contractor will prepare Specific Construction Environment and Social Management Plan (C-ESMP) which included among other; Soil and Sedimentation Control Plan, Spoil Management Control Plan and Waste Management Plan.

Residual Impact

The implementation of the proposed mitigation measures reduces the significance of the residual impact to negligible from minor within seasonal Streams. **Table 8.2** presents residual impact significance following mitigation measures.

Table 8.2: Residual Impact Significance

IMPACT	PROJECT PHASE	SIGNIFICANCE (PRE-MITIGATION)	RESIDUAL IMPACT SIGNIFICANCE (POST-MITIGATION)
Availability and Quality of Water flowing through the seasonal streams along the water pipeline	Construction	Minor	Negligible

Soil Resources

Potential Impacts

Project activities will have direct physical impacts to soil within the project area, possible direct physical impacts to soil include erosion resulting from activities such as excavation and levelling works, clearing of vegetation for infrastructure such as access roads, laydown areas and construction zones among others.

The excavation of soil for the construction of protection works will disrupt the soil cohesion and also may result in surplus soil due to the installation of the gabions within the same excavated areas. If not properly restored or managed, such soils may erode and wash into nearby seasonal streams thereby increasing the sediment load. Temporary soil stockpiles established during construction of infrastructure will be at risk of erosion from wind and rainfall.

Soil contamination as a result of possible oil and fuel leaks from un-serviced plant and equipment on site.

Impact Assessment

The risk of erosion is likely to occur but the extent of the impact is likely to be limited to the footprint of the activities, particularly the construction and use of access roads, laydown areas (i.e., local extent).

The impacts of construction activities on soil erosion are anticipated to last for the duration of the construction phase only (i.e., short term). Given the subtropical location (Agro Ecological III) areas, cleared areas will revegetate naturally and relatively quickly (assuming rainfall patterns similar to the

current averages persist), minimizing the risk of erosion. **Table 8.3** presents Pre- mitigation Impact Assessment.

Table 8.3: Mitigation Impact Assessment

IMPACT	SOIL EROSION DURING CONSTRUCTION				
Nature of Impact	Negative		Positive	Neutral	
	Loss of soil cohesion contributing to erosion.				
Type of Impact	Direct		Indirect	Induced	
	Impact is a result as a direct interaction between project activities and the environment along the footprint of the project.				
Duration of Impact	Temporal	Short term	Long term	Permanent	
	The impact is expected to be short term, however in the case of serious erosion the impacts may be experienced long term.				
Impact Extend	Local		Regional	International	
	The impact will be limited to the footprint of the project and immediate surrounds.				
Impact scale	The impact is considered as small (local) scale.				
Frequency	Continuous				
Likelihood	Possible				
Impact magnitude	Positive	Negligible	Small	Medium	Large
	Based on the above the impact magnitude is considered small.				
Resource / receptor sensitivity	Low		Medium	High	
	The sensitivity of seasonal streams and gullies to erosion is considered to be medium to low.				
Impact significance	Negligible		Minor	Moderate	Major
	Considering the impact magnitude is small and the sensitivity is medium to low, the overall significance is considered to be minor				

Mitigation

The following mitigation measures will be implemented to minimize the potential for soil erosion:

- Vegetation clearing and topsoil disturbance will be confined and minimized.
- Contour temporary and permanent access roads / laydown areas so as to minimize surface water runoff and erosion.
- Sheet and rill erosion of soil shall be prevented where necessary through the use of sand bags, diversion berms, culverts, or other physical means.
- Topsoil shall be stockpiled separate from subsoil. Stockpiles shall not exceed 2 m height, shall be located away from drainage lines, shall be protected from rain and wind erosion, and shall not be contaminated.
- Wherever possible construction work will take place during the dry season.
- Topsoil shall be evenly spread across the cleared areas when reinstated.
- Accelerated erosion from storm events during construction shall be minimized through managing storm water runoff (e.g., velocity control measures).
- Soil backfilled into excavations shall be replaced in the order of removal in order to preserve the soil profile.
- Spread mulch generated from indigenous cleared vegetation across exposed soils after construction
- At construction stage, the contractor will prepare Specific Construction Environment and Social Management Plan (C-ESMP) which included among other; Soil and Sedimentation Control Plan, Spoil Management Control Plan and Waste Management Plan.

Residual Impact

The implementation of the proposed mitigation measures reduces the significance of the residual impact to negligible from minor within the project area. **Table 8.4** presents residual impact significance following mitigation measures.

Table 8.4: Residual Impact Significance

IMPACT	PROJECT PHASE	SIGNIFICANCE (PRE-MITIGATION)	RESIDUAL IMPACT SIGNIFICANCE (POST-MITIGATION)
Loss of soil resources due to erosion	Construction	Minor	Negligible

Air Quality

Potential Impacts

Project activities that have potential to impact air quality would be associated with construction from emissions of air pollutants from temporary power generators, construction equipment, and vehicles. Construction activities will also create dust.

The following would be expected during construction.

- Emissions of oxides of nitrogen (NO₂ in particular) mainly from construction-related vehicles (and to a lesser degree from construction generators and other hydrocarbon powered equipment); and
- Dust and particulate matter (as PM₁₀) created by construction-related vehicle traffic on unpaved roads.

Once the Transmission Pipelines and reservoirs are built and operational and the site is reinstated, no significant effects on air quality are anticipated.

Impact Assessment

Exhaust Emissions

No detailed traffic data is available at this stage. However, the numbers of Heavy-Duty Vehicles (HDV) and Light Duty Vehicles (LDVs) are expected to be well below the thresholds for potentially significant impacts. On this basis, the magnitude of impacts associated road traffic exhaust emissions are predicted to be Negligible. Combined with the Medium and Low receptor sensitivities identified, the overall significance of impacts is Negligible at all locations.

Dust and PM₁₀

These are the potential for impacts expected to arise from; plant and equipment traffic on unpaved roads, trench excavation works and general construction activities. The Project will generate traffic on unpaved roads close to dwellings. As this is expected to be less than five HDVs/day, and at some locations for more than four weeks, the magnitude is medium.

The Project works will include stripping vegetation, excavation and backfilling of trenches, etc., during Pipe Laying Works, as well as at the reservoir sites and Contractor's Camps. Due to the scale of these activities, the Magnitude is medium.

Combined with the Medium and Low receptor sensitivities identified, the significance of unmitigated impacts are: Traffic on unpaved roads are Major where there are receptors within 50m of unpaved

roads used by construction plant and equipment traffic, or the haul route within Gandini, Mbuguni and Ng'ombeni Shopping Centres.

On this basis there is a need for mitigation to be implemented to reduce dust emissions/ impacts as presented in Pre- Mitigation Impact Assessment in **Table 8.5**.

Table 8.5: Pre-Mitigation Impact Assessment

IMPACT	DEGRADATION OF THE AIR-SHED DURING CONSTRUCTION				
Nature of Impact	Negative	Positive		Neutral	
	Increase in airborne pollution.				
Type of Impact	Direct	Indirect		Induced	
	Impact is a result as a direct interaction between project activities and the environment along the proposed works.				
Duration of Impact	Temporal	Short term	Long term	Permanent	
	The impact is expected to be temporary as emissions arise throughout the construction phase.				
Impact Extend	Local	Regional		International	
	The impact will be limited to the footprint of the project and immediate surrounds.				
Impact scale	The impact is considered as small (local) scale.				
Frequency	Intermittent – impacts will typically only arise during working hours				
Likelihood	Inevitable				
Impact magnitude	Positive	Negligible	Small	Medium	Large
	Based on the above the impact magnitude is considered medium.				
Resource / receptor sensitivity	Low	Medium		High	
	The sensitivity of human receptors is Medium in dwellings and settlements				
Impact significance	Negligible	Minor	Moderate		Major
	Dust emissions have the potential to have Moderate significant impacts at nearby sensitive human receptors.				

Mitigation

Exhaust Emissions

No mitigation is required. We assume that the project will use only vehicles that are operated and maintained according to manufacturer specifications as provided in the ESMP.

Dust and PM10

The impact assessment identified Major impacts associated with plant and equipment traffic on unpaved roads and earthworks. The following mitigation are therefore recommended to manage these impacts. Mitigation measures should be implemented in locations where there are receptors within the relevant distance.

As general measures for all locations:

- Develop a Dust Management Plan (DMP);
- Record all dust and air quality complaints, identify cause(s), take appropriate measures;
- Liaise with local communities to forewarn of potentially dusty activities;
- Undertake monitoring close to dusty activities, noting that this may be daily visual inspections, or passive/active monitoring as parameter
- Undertake inspections to ensure compliance with the Dust Management Plan;
- Plan potentially dusty activities so that these are located as far from receptors as feasible;
- Erect solid screens if feasible around stockpiles and concrete batching;

- Avoid run off of mud and water and maintain drains in a clean state;
- Remove dusty materials from site as soon as possible if not being re-used. If being re-used, cover or vegetate if possible;
- Impose speed limits on haul routes and in construction compounds to reduce dust generation;
- Minimize drop heights when loading stockpiles or transferring materials; and
- Avoid waste or vegetation burning.

For traffic on unpaved roads:

- Undertake watering to attenuate dust near sensitive receptors. The duration and frequency of this should be set out in the Dust Management Plan and will consider water availability and any stakeholder grievances; and
- On unpaved roads in use for more than 1 month, consider use of surface sealants to reduce the use of water and water trucks. Use of lignin-based sealants recommended due to low environmental toxicity.

For excavations and leveling works

- Revegetate exposed areas as soon as feasible;
- Revegetate or cover stockpiles if feasible;
- Expose the minimum area required for the works, and undertake; and exposure on a staged basis to minimize dust blow.

Residual Impact

The residual impacts associated with road traffic exhaust emissions are Negligible.

With the implementation of suitable mitigation and with adequate monitoring, residual impacts associated with dust and PM10 from construction activities are Negligible as presented in **Table 8.6**.

Table 8.6: Residual Impact Significance

IMPACT	PROJECT PHASE	SIGNIFICANCE (PRE-MITIGATION)	RESIDUAL IMPACT SIGNIFICANCE (POST-MITIGATION)
Road Traffic Exhaust Emissions	Construction	Negligible	Negligible
Dust and PM from construction activities	Construction	Moderate	Negligible

Noise and Vibration

Potential Impact

Potential noise impacts may arise as a result of the construction activities associated with the construction of the protection works.

Construction activities and equipment are not expected to result in significant levels of vibration. Therefore, equipment that might produce high levels of vibration (such as impact piling or vibratory compaction) will not be used. Therefore, vibration effects have been scoped out of further assessment. The project will not be associated with deep excavation or rock breaking that result to excessive vibrations resulting from equipment's such rock drillers. Therefore, risk related to the works will be limited to occupational health and safety scope. World Bank Group General EHS Guidelines provide guidance on acceptable noise levels based on WHO standards and these are set out in **Table 8.7**.

Table 8.7: World Bank Group Noise Level Guidelines

	MAXIMUM ALLOWABLE AMBIENT NOISE LEVELS, LAEQ,1HR, DBA FREE FIELD	
	DAYTIME	NIGHT-TIME
	07:00 – 22:00	22:00 – 07:00
Residential, institutional, educational	55	45
Industrial, commercial	70	70

National Environment Management Authority (NEMA) noise levels, maximum permissible noise levels for construction sites (Measurement taken within the facility) are shown **Table 8.8**.

Table 8-8: NEMA Noise Level Guidelines

SITE	DAY	NIGHT
Health facilities, educational institutions, homes for disabled	60dBA	35dBA
Residential	60dBA	35dBA
Other areas	75dBA	65dBA

The equipment and plant used during construction will generate noise during construction activities that might affect communities living and working near to the works. However, this impact will not be significant.

Pre mitigation Impact Assessment is presented in **Table 8.9**.

Table 8.9: Pre-Mitigation Impact Assessment

IMPACT	NOISE DURING CONSTRUCTION				
Nature of Impact	Negative		Positive		Neutral
	Elevated noise levels from operation of construction equipment.				
Type of Impact	Direct		Indirect		Induced
	Impact is a result of noise generated by construction activities.				
Duration of Impact	Temporal	Short term		Long term	Permanent
	Impacts are expected to be short term				
Impact Extend	Local		Regional		International
	The impact will be limited to the footprint of the project and immediate surrounds.				
Impact scale	The impact is considered as small (local) scale.				
Frequency	Impacts may occur during daytime periods over a short term.				
Likelihood	Inevitable				
Impact magnitude	Positive	Negligible	Small	Medium	Large
	Based on the above the impact magnitude is considered negligible to small.				
Resource / receptor sensitivity	Low		Medium		High
	Dwellings are considered to have a high sensitivity to noise				
Impact significance	Negligible	Minor		Moderate	Major
	Considering the impact magnitude is small to negligible and the sensitivity is high, the overall significance is considered to be minor				

Mitigation

Mitigation measures are set out below, which have been assumed for the base case assessment. They are assumed to result in a 5 dB (A) reduction in the overall noise from construction plant teams.

The following standard mitigation measures will be employed

- Siting noisy plant and equipment as far away as possible from human settlement, and use of barriers (e.g., site huts, acoustic sheds or partitions) to reduce the level of construction noise at receptors wherever practicable;
- Where practicable noisy equipment will be orientated to face away from the nearest human settlement and other receptors;
- Working hours for significant noise generating construction work (including works required to upgrade existing access roads), will be daytime only;
- Alternatives to diesel and petrol engines and pneumatic units, such as hydraulic or electric-controlled units, will be used, where practicable;
- Where practicable, stationary equipment will be located in an acoustically treated enclosure;
- For machines with fitted enclosures, doors and door seals will be checked to ensure they are in good working order; also, that the doors close properly against the seals;
- Throttle settings will be reduced and equipment and plant turned off, when not being used;
- Equipment will be regularly inspected and maintained to ensure it is in good working order. The condition of mufflers will also be checked; and fitting of mufflers or silencers of the type recommended by manufacturers.

Residual Impact

Standard mitigation measures listed above have been assumed for the base case noise assessment. No impacts above small are predicted and therefore no further mitigation is required. Consequently, the residual impacts are the same as those presented above. Residual Impact Significance is presented in **Table 8.10**.

Table 8.10: Residual Impact Significance

IMPACT	PROJECT PHASE	SIGNIFICANCE (PRE-MITIGATION)	RESIDUAL IMPACT SIGNIFICANCE (POST-MITIGATION)
Noise from construction activities affecting nearby dwellings	Construction	Minor	Negligible

8.4.2 Impact on Biological Resources and Receptors

Impact on Flora and Fauna

Impacts of the pipeline within Mwache forest will be along the forest periphery with sparsely vegetated as shown in figure 1.1. the pipeline result to stripping a 15m corridor comprising of assorted tree species including; *coconut trees, Tamarind tree, Neem tree, Flame Tree, Acacia ssp, Diospyros ssp, Cynometra-Manilkara type*.

For the section close to Mwache creek impact will be on mangrove species namely; *Aricennia marina, Bruguera gymnorhiza, Rhizophora mucronata, Ceriops tagal and Sonnerata alba. Rhizophora mucronata, Ceriops taga. Other species will include in local languages Mwawa, Mwanga, Mkanju (Cashew nuts), Mporojo, Kikwata, Mkone, Mnyubu, Mkilifi (neem tree), Mbuyu (Boabab), Mfune, Mchonge Mahana and Mkwakwa*.

The impact is related to removal of vegetation cover along the pipeline corridor from Water Treatment Plant (WTP) through Mwache Forest to Mwache Creek, Gandini through to Mbuguni to Ng'ombeni. However, as discussed before, the magnitude of the impact is considered to be medium, this is because the site is sparsely vegetated and that the pipeline section within mwache forest is designed along the periphery of the forest that is less vegetated. The remaining pipeline section of is designed along existing road reserve that is adjacent to an existing pipeline corridor. .

Pre mitigation Impact Assessment is presented in **Table 8.11**.

Table 8.11: Pre-Mitigation Impact Assessment

IMPACT	FLORA AND VEGETATION DURING CONSTRUCTION				
Nature of Impact	Negative		Positive		Neutral
	Disturbance to vegetation cover within the water pipeline alignment and reservoirs sites				
Type of Impact	Direct		Indirect		Induced
	Impact is as a result of a direct interaction between the project (i.e. Construction activities) and the existing vegetation at the protection sites along the pipeline corridor from WTP through Mwache Forest to proposed Water Reservoir in Dongo Kundu				
Duration of Impact	Temporal	Short term	Long term		Permanent
	The effect is considered permanent as the areas where vegetation will be removed along the Water pipeline alignment will have to be permanently kept with vegetation for maintenance purposes				
Impact Extend	Local		Regional		International
	The impact will be limited to the footprint of the project and immediate surrounds.				
Impact scale	The impact is considered as small (local) scale.				
Frequency	Once off				
Likelihood	Inevitable				
Impact magnitude	Positive	Negligible	Small	Medium	Large
	Based on the above the impact magnitude is considered small				
Resource / receptor sensitivity	Low		Medium		High
	The works will not be constructed within disturbed or modified environment. However considering that a stretch of 1.7km traverse Mwache forest and that trees species such as <i>Manilkara-Acacia Savannah</i> and <i>Acacia Euphorbia bushes and dominant mangrove species such as Heritiera littoralis. R. mucronata, C. tagal and A. marina</i> are the dominant species <i>might be cleared</i>				
Impact significance	Negligible	Minor	Moderate		Major
	Considering the impact magnitude is small and the sensitivity is medium, the overall significance is considered to be moderate.				

Mitigation

The following standard mitigation measures will be employed

- In liaison with KFS, Planting of compensatory trees, approximately 500 different species within listed in column (2), a budget is Kshs 1,500,000 is provided for purchase, planting and naturing of the trees for 6months from the time of planting
- Synergize findings from the ecological impacts assessment commissioned by Ministry of Water to the downstream users, the findings of this study will be used to enhance mitigation measures for the pipeline impacts within the Mwache forest
- Avoidance of impacts should be prioritized. However, if not possible then compensatory planting of trees that will be cut by the contractor during works will be undertaken.
- Areas to be cleared shall be agreed and demarcated before the start of the clearing operations to minimize exposure.

- The use of existing cleared or disturbed areas for the Contractor's office, stockpiling of materials etc. shall be encouraged.
- Whenever possible, all damaged areas shall be reinstated and rehabilitated upon completion of the contract to as near pre-construction conditions as possible.
- Rehabilitation of temporary construction sites and pioneer camps (if needed) should be done as swiftly as possible and always with suitable native grasses and other plants.
- Where necessary, new trees shall be planted to compensate for affected ones.

Impact on Flora and Fauna within Mwache Forest

The trunk main section 1.5km will traverse through Mwache forest which is Mwache is a gazetted forest reserve located in Kwale County, and covers approximately 417 hectares. The pipeline alignment was adopted after analysis of 3Nr. different Pipeline route options as discussed in sub section (1.5) of this report.

From the analysis, route Option 2 where the Pipeline within 4m wide corridor of the Mwache forest adjacent to the SGR Reserve involves:

- **Section 1:** Initial 400m section of the pipeline within the forest to be laid fully within the forest due to hydraulic considerations. The width of forest affected under this option will be 8m. The area of forest land affected on this 400m long section is 0.33Ha. - **Section 2:** 1.1km section of the pipeline along the alignment of the SGR. The pipeline on this section will be laid within a 4m wide corridor adjacent to the existing SGR reserve, hence affecting only a 4m wide section of the forest for the 1.1km section of pipeline along the railway. The area of forest land affected on this 1.1km long section is 0.44Ha.

Biodiversity likely to be impacted is presented in sub section 3.6 of this report and also presented in detail under the critical Habitat Assessment Report (CHA) prepared separately as part of the consultancy study. Detailed mitigation measures for project likely impact for the pipeline section through Mwache Forest is presented below.

Administrative Measures

- Service Level Agreement (SLA) between Kenya forest Service (KFS) and Coast Water Works Development Agency (CWWDA). The SLA will describe details agreements related to applicable permit procedures and measures of ensuring Ecological Equivalence for the selected off set in terms of (i) Habitat Type, (ii) Species Composition, (iii) Ecological Condition, (iv Long-term Protection) and (v) Monitoring CWWDA to take lead
- Implementation of provisions of Biodiversity Plan, in relation to budgets and staff to be hired (i) Environmental and biodiversity / Ecology advisor at the supervising engineer side and (ii) Ecological clerk of works at the Contractor side (Estimated Costs)
- To address data gap triggered by lack seasonality data considering that the Critical Habitat Assessment conducted once during the Month of April – May 2025. The ESIA recommends series of 3nr other additional assessments including; (i) supplementary monitoring in October to November 2025 during the short rains. (ii) January to February 2026 During Dry Season and finally (iii) April to May 2027 during long rains. CWWDA will be responsible for hiring an ecologist to undertake the assignment to be financed under the Budget prepared as part of Biodiversity Management Plan presented in the CHA report.

Avoidance Measures

- Avoid placing construction equipment, stockpiles, locating contractors' camps, lay bay areas
- Avoid disturbance to priority nocturnal fauna from project-related light, noise and vibration impacts.
- Avoid adversely impacting flora through the open-burning of wastes and forest fires.

- Avoid adversely impacting wildlife species (recorded in the CHA through illegal hunting and trafficking from project-related employees or contractors
- Avoid introduction of invasive species and pests

Minimization Measures

- Minimize clearance of forest flora listed under table 4.1 of this report of natural habitats and more specifically vulnerable tree species discussed under section (4.1).
- Minimize impacting fauna, flora within the forest through spills of hazardous materials
- Minimize the impact of an accidental spill of hazardous materials on into the environment.
- Minimize introduction of invasive species and pests
- Minimize the indirect impacts to natural habitats with exploitation of natural resources and illegal hunting from Project-related facilitated access.

Rehabilitation / Restoration Measures

- Restore the physical landscapes that have been impacted by Project activities.
- Establish and implement a Tree Planting Scheme for the Project
- Undertake regular watering and monitoring to minimize the risk of poor species establishment following planting.

Offset Measures through KFS

- CWWDA to formally apply for approval to lay the pipeline within Mwache Forest, the application to be addressed to the Chief Conservator of Forest (CCF), Kwale County.
- The application will clearly indicate the scope of works planned to be undertaken within the forest.
- The application will include a clear Layout Plan and indicate the proposed pipeline route
- The CCF will review the application and communicate the decision of KFS officially to CWWDA.
- After approval is granted by KFS, CWWDA will undertake survey of the pipeline route.
- After Survey works is completed, CWWDA will further apply through the CCF for approval or authority to commence pipeline construction.
- KFS will undertake a census of trees that will be affected the pipeline corridor and bill CWWDA. From our estimate is that the tree carrying density per 1 acre is approximated at 177, this implies that for the 3.33acres of Mwache pipeline wayleave a total of 589 trees at an estimated cost of Ksh 17,670,000 or Euro 121,862 will be required to offset the loss.
- This application will be reviewed and approval granted to CWWDA by KFS for construction works upon CWWDA paying the cost of offsetting the trees that shall be fell along the alignment. This will be through issuance of a special user's license that will be renewed on an annual basis.

updated budget and Gantt chart showing resource allocation and scheduling for CHA-related monitoring and forest restoration measures is presented in **Table 8-12 on Page 81,**

Table 8.12: Scheduling for CHA-related monitoring Activities

#	Item	Implementation Stage			Budget
		Prior to Mobilisation of Contractor	During Project Implementation Phase	Post Project Implementation Phase	Estimated Budget (Euros)
1	<u>Supplementary Biodiversity Assessment and monitoring in October to November 2025 during the short rains.</u>	<u>N/A</u>	<u>Upon Mobilisation of Contractor</u>	<u>N/A</u>	<u>10,000</u>
2	<u>Supplementary Biodiversity Assessment and monitoring in January to February 2026 During Dry Season</u>	<u>N/A</u>	<u>At Project Implementation Stage</u>	<u>N/A</u>	<u>10,000</u>
3	<u>Supplementary Biodiversity Assessment and monitoring in April to May 2027 during long rains</u>	<u>N/A</u>	<u>At Project Implementation Stage</u>	<u>N/A</u>	<u>10,000</u>
4	<u>Service Level Agreement (SLA) between Kenya forest Service (KFS) and Coast Water Works Development Agency (CWWDA)</u>	<u>To be finalised prior to commencement of Civil Works</u>	<u>N/A</u>	<u>N/A</u>	<u>No Cost Associated</u>
5	<u>Hiring of Biodiversity Advisor (At the Supervising Engineer) for 12 months</u>	<u>Prior to commencement of works</u>	<u>N/A</u>	<u>N/A</u>	<u>60,000</u>
6	<u>Hiring of Biodiversity Clerk (At the Contractor) for 12 months</u>	<u>Prior to commencement of works</u>	<u>N/A</u>	<u>N/A</u>	<u>60,000</u>
7	<u>Capacity Building and Training of CWWDA safeguards team</u>	<u>At Mobilization Stage</u>	<u>Refresher to be undertaken</u>	<u>N/A</u>	<u>14,000</u>
8	<u>Implementation of Mitigation Measures listed in the Biodiversity Management Plan</u>	<u>To commence at Mobilization Stage</u>	<u>To continue into project implementation stage</u>	<u>To continue into project finalisation stage</u>	<u>206,862</u>
9	<u>Community Engagement and Grievance Resolution</u>	<u>Throughout all Project Phases</u>	<u>Throughout Project Phases</u>	<u>Throughout Project Phases</u>	<u>10,000</u>
#	Sub Total 1				370,862.00
#	Contingencies 5%				18,543.10
#	GRAND TOTAL				389,405.10

8.4.3 Impact on Social Resources and Receptors

Community Health Safety and Security

Impact Assessment

During construction there will be an increase in traffic movements of heavy machinery and light vehicles on roads within the project area. This will include, pipeline delivery trucks, cement trucks, transport of construction material, excavation machinery, etc. which is expected to increase the risk of road traffic accidents and potential injuries or fatalities to other road users within Gandini, Mbuguni and Ng'ombeni.

The increase in movement of vehicles during the construction phase may result in greater disturbance and decreased wellbeing for those communities adjacent to the water pipeline. Also, open un-barricaded trenches or without warning tapes could fill up with water during rainy seasons and expose the community to the risk of drowning as well as trip and fall.

The construction phase activities will result in changes to the physical environment, with the potential to affect the health and welfare, of communities. There will be temporary increases in dust during the duration of the construction phase, which will be mostly localized to the active sites working areas and access roads. There are no impacts on local air quality over the long term and therefore unlikely to result in a recordable increase in respiratory diseases in the population.

Similarly, the construction works are likely to result in temporary increased noise levels for residents close to the working areas. The increase in noise is likely to result in disturbance and decreased wellbeing for those closest to the construction activities. However, this will be limited to construction hours and sleep disturbance is unlikely assuming construction work will be undertaken during daytime hours.

Project construction will also entail some temporary, localized, ground works that will generate vibrations. Depending on the soil characteristics and on the distance to the nearest building, these activities could produce vibrations for houses in the vicinity. Impacts could range from the level of temporary nuisance and disturbance, up to actual damage to buildings.

Waste production as a result of the construction activities is unlikely to impact on the health of communities since most of the waste will be placed in the appropriate covered waste containers, and transported periodically to licensed landfills, and therefore opportunities for communities to come into contact with waste will be minimal.

The Project workforce will be housed in open accommodation camps allowing free movements of workers. Interaction with nearby communities is therefore very likely and could potentially lead to an increased transmission of communicable diseases and sexually transmitted diseases within these communities such as HIV and Aids, Hepatitis B and now COVID -19 among others. Pre mitigation Impact Assessment is presented in **Table 8.13 on Page 84**.

Table 8.13: Pre-Mitigation Impact Assessment

IMPACT	COMMUNITY SAFETY AND ENVIRONMENT HEALTH							
Nature of Impact	Negative		Positive		Neutral			
	Increased traffic during the construction period may result in increased risk to road traffic accidents from plant and equipment and exposure to open un-barricaded trenches or without warning tapes.							
	Impacts that result from a direct interaction between the Project (i.e., and noise emissions, vibrations, and generation of waste) and the population new the active sites.							
	The presence of Project Workforce will lead to interaction with the local communities which will potentially result in increased transmission of communicable diseases and sexually transmitted diseases							
Type of Impact	Direct		Indirect		Induced			
	Impact that result from a direct interaction between the Project (i.e., increased plant and equipment traffic) and the local population within Gandini, Mbuguni and Ng’ombeni							
Duration of Impact	Temporal		Short term		Long term	Permanent		
	The increased traffic effect and risks to injuries is temporary, as construction activities will take place in a sequential manner during the length of the construction period							
Impact Extend	Local		Regional		International			
	The impact will be limited to the footprint of the project and immediate surrounds.							
Impact scale	The impact is considered as small (local) scale.							
Frequency	The frequency is considered to be occasional or one time at each temporary over the duration of the construction phase.							
Likelihood	Inevitable							
Impact magnitude	Positive		Negligible		Small		Medium	Large
	Based on the above the impact magnitude is considered negligible to small.							
Resource / receptor sensitivity	Low		Medium		High			
	The sensitivity of the receptors (local population and road users including vehicle users, pedestrians and cyclists) is considered medium.							
Impact significance	Negligible		Minor		Moderate		Major	
	Considering the magnitude and sensitivity are medium, the impact on the community safety during construction activities is considered to be of moderate significance.							

Mitigation

The following mitigation measures will be implemented during the construction phase to reduce any impacts on community health and safety.

- Contractor will develop and monitor implementation of a Community Health and Safety Management Plan (CHSMP) which will include the following measures:
 - ✓ Ensure all workers including contractors and subcontractors undergo pre-employment screening and regular health screening including voluntary screening for STDs.
 - ✓ Ensure any trucking companies employed to work on the Project will have policies around health screening of their workers in line with Project requirements.
 - ✓ Ensure all workers including subcontractors receive education around transmission and symptoms of communicable diseases of concern and STDs.
 - ✓ Provide access to health care for those injured by its activities.
 - ✓ Ensure that work sites are fenced and that signs are put up around work fronts and construction sites advising people of the risks associated with trespass. When work fronts are less than 10 metres from a community or house, employ security guards from the local community to prevent trespass.

- ✓ Undertake a programme of stakeholder engagement and consultation to educate local communities of the risks of trespassing onto sites, the meaning of signs, and the dangers of playing on or near equipment or entering fenced areas. Special attention to be paid on residential areas, primary and secondary schools.
- ✓ Contractor will develop and implement a *Traffic Management Plan* covering aspects such as vehicle safety, driver and passenger behaviour, use of drugs and alcohol, operating hours, rest periods, community education on traffic safety and accident reporting and investigations
- ✓ Contractor will put in place measures geared towards prevention of spread on Covid 19 between community members and the project workers. Such measures will be aligned to prevention protocol as per the prevailing ministry of health directives including (i) Ensuring social distance among workers, (ii) provision of face masks to workers and (iii) provision of hand washing dispensers and soap or alcohol-based sanitizers at work places.
- Contractor will develop Emergency Response Plans (ERPs) in cooperation with local emergency authorities and hospitals.
- Contractor will extend the Worker Code of Conduct to include guidelines on worker –community interactions and will provide training on the worker code of conduct to all employees including subcontractors and truck drivers as part of the induction process.
- Contractor will provide primary health care and first aid at construction site to avoid pressure on local healthcare infrastructures.
- Contractor will implement a Community Grievance Mechanism.
- At construction stage, the contractor will prepare Specific Construction Environment and Social Management Plan (C-ESMP) which included among other; Health, Hygiene and Safety Plan, Labour Management Plan and Gender-based Violence Action Plan

Residual Impact

The significance of the residual impacts on community health and safety after the implementation of mitigation measures is presented in **Table 8.14**.

Table 8.14: Residual Impact Significance

IMPACT	PROJECT PHASE	SIGNIFICANCE (PRE-MITIGATION)	RESIDUAL IMPACT SIGNIFICANCE (POST-MITIGATION)
Community Safety (Road Accidents, Site Trespass)	Construction	Moderate	Minor
Environmental Health (Noise and Air)	Construction	Moderate	Minor
Interaction with Project Workforce	Construction	Moderate	Minor

Worker Health and Safety and Workers Management

Potential Impacts

Workers' rights including occupational health and safety need to be considered to avoid accidents and injuries, loss of man-hours, labour abuses and to ensure fair treatment, remuneration and working conditions. These issues should be considered not only for those who are directly employed on the Project.

The Project could potentially lead to workforce-related social and health issues throughout the life cycle of the Project if worker management and rights do not meet Kenyan law or international best practice.

Table 8.15 presents the potentially significant impacts associated with occupational health and safety and worker management during the construction phase. The potential for occupational health and safety incidents throughout the life cycle of the project is higher during construction phase.

Table 8.15: Potential Impacts on Occupational Health and Safety and Worker Management

CONSTRUCTION PHASE	
Impacts on workers' health and safety, in particular from road accidents, slip, and trip and falls hazards during trench excavations and inconsistent use of PPEs.	
Impacts on workers' rights from violations of labour laws in particular with respect to enforcement of health and safety measures by the employer such as the use of appropriate PPEs during construction of the proposed works.	

Impact Assessment

Worker's Health and Safety and Labour Rights

Considering that construction is identified as one of the sectors of employment (formal and informal), the locally hired workforce may have some experience in traditional / basic construction activities. However, work practices and consideration for health and safety may fall short of international standards and best practice, such as the use of personal protective equipment (PPE), which will increase the severity of hazards to which the workforce are exposed.

Equipment and worker transport along the access roads may also result in road accidents in the absence of a proper traffic management plan or if traffic safety rules are not enforced. The often-poor conditions of the existing roads may also increase the risk of accidents. Pre mitigation Impact Assessment is presented in **Table 8.16**.

Table 8.16: Pre-Mitigation Impact Assessment

IMPACT	WORKERS HEALTH AND SAFETY AND RIGHTS DURING CONSTRUCTION				
Nature of Impact	Negative		Positive		Neutral
	Poor planning, non-compliance with health and safety best practice and labour rights can result in injuries or fatalities				
Type of Impact	Direct		Indirect		Induced
	Impact that result from a direct interaction between the Project activities which include clearance of the RoW in vegetated areas, excavation work, laying of gabions				
Duration of Impact	Temporal	Short term		Long term	
	Injuries and fatalities could have permanent impacts on workers and their families.				
Impact Extend	Local		Regional		International
	The workforce will be primarily contracted from local Shopping Centre (Gandini, Mbuguni and Ng’ombeni)				
Impact scale	As mentioned above the workers will be working on different sections of the line at different times. The impact scale is therefore medium.				
Frequency	The frequency is considered to be infrequent as the workforce and drivers are expected to be trained and the employer is expected to enforce the use of PPEs and health and safety measures.				
Likelihood	Inevitable				
Impact magnitude	Positive	Negligible	Small	Medium	Large
	Based on the parameters above, and considering the embedded measures in place the magnitude is considered to be medium				
Resource / receptor sensitivity	Low		Medium		High
	The sensitivity of the receptors) is considered medium as some workers may not be aware of their rights.				
Impact significance	Negligible	Minor		Moderate	Major
	Since the magnitude is considered medium and sensitivity is medium, the impact on workers’ health and safety during construction activities is considered to be of moderate significance				

Mitigation Measures

The following mitigation measures will be implemented during the construction phase to reduce any impacts on workers' health and safety and labour rights.

Contractor will develop and implement a Workers' Health and Safety Management System covering all workers and subcontractors including the following measures:

- Contractor will develop a Human Resources Policy, which will outline worker rights to be included in all contracts including restrictions on working hours in line with applicable ILO standards, compensation including consideration of overtime, holidays etc. contractor will require its subcontractors to put in place policies in line with national legislation and applicable international legislation and contractor Code of Conduct and Policies.
- Contractor will establish contractual clauses to be embedded in the contracts of the all sub-contractors that require adherence to Kenyan law and international standards to be upheld related to worker rights.
- Contractor will prohibit the use of alcohol or drugs, which could adversely affect the ability the employee to perform the work safely or adversely affect the health and safety of other employees, community members or the environment.
- Contractor and self-employed contractors will assess the H&S risks related with the tasks to be performed during the construction phase.
- Pre-employment medical assessments will be put in place as a workforce risk management tool to screen individuals for risk factors that may limit their ability to perform a job safely and effectively. Expected benefits of conducting pre-employment medical assessments include a safer working environment, reduction in workplace injuries, minimized downtime, matching the capacity of the employee with the role, and overall recruitment cost and risk reduction.
- Contractor will ensure that training on health and safety measures is provided to all construction workers prior to starting to work on the Project and that supervisors have adequate experience to deliver on their responsibilities.
- Contractor will implement regular health and safety checks and audits of workers, and subcontractors and implementing sanctions in case of breaches of national standards and the Project's specific standards. Such audits to include workplace H&S; worker contracts, working hours, pay and conditions; housing and food standards.
- Contractor will develop and implement a Workers Grievance Mechanism for the Project workforce including workers and subcontractors.
- Contractor will establish a procedure for the recording and analysis of incidents and lessons learned such that additional actions can be implemented to avoid or minimize occupational health and safety risks.
- Contractor will ensure that facilities and work sites are designed and maintained such that robust barriers are in place to prevent accidents.
- Contractor will ensure that its Code of Conduct is followed to regulate the performance and behaviour of all workers, including provision for disciplinary action for anti-social behaviour and non-compliance with health and safety regulations such as lack of use of PPE.
- Contractor will ensure that World Bank Health and Safety guidelines regarding the construction and management of worker accommodation and the provisions of medical facilities at worker accommodation are followed.
- Contractor will ensure that adequate clean water, adequate food and access to medical care is provided to all workers on the worksite and at accommodation.
- Contractor will develop and implement a Traffic Management Plan covering aspects such as vehicle safety, driver and passenger behaviour, use of drugs and alcohol, operating hours, rest periods, community education on traffic safety and accident reporting and investigations.

- Contractor will develop a Waste Management Plan for the construction phase with clear guidelines for the safe storage and disposal of hazardous waste and handling of hazardous materials.

Residual Impacts

The implementation of mitigation measures will contribute to reducing occupational health and safety risks and the risk of labour rights abuses significantly. However, the risk of potential accidents still exists and may potentially lead to injuries or fatalities for the workforce during construction. This risk will be short-term during the construction phase (24months) and long-term during operations.

With the implementation of mitigation measures the remaining impact significance is considered minor significance during construction. Residual Impact Significance is presented in **Table 8.17**.

Table 8.17: Residual Impact Significance

IMPACT	PROJECT PHASE	SIGNIFICANCE (PRE-MITIGATION)	RESIDUAL IMPACT SIGNIFICANCE (POST-MITIGATION)
Worker health and safety	Construction	Moderate	Minor
Worker labour rights	Construction	Moderate	Minor

Gender Based violence and Sexual Harassment

GBV constitutes acts of gross misconduct and are therefore grounds for sanctions, penalties and/or termination of employment. All forms of GBV including grooming are unacceptable be it on the work site, the work site surroundings, or at workers' camps. Prosecution of those who commit to be pursued.

This impact triggered during Project Construction Phase is likely to occur. Therefore, below listed provisions are provided in order to mitigate against such GBV related Project induced impacts.

Mitigation Measures

- The contractor will mainstream Gender Inclusivity in hiring of workers and entire Project Management as required by Gender Policy 2011 and 2/3 Gender Rule.
- The existing community structures headed by location chiefs should be involved in local labour hire, emphasize the requirement of hiring women, youth and people with disability and VMGs.
- Protecting Human Risk Areas Associated with Disadvantaged Groups, Interfering with Participation Rights and interfering with Labour Rights:
- Treat women and children (persons under the age of 18) with respect regardless of race, color, language, religion, political or other opinion, national, ethnic or social origin, property, disability, birth or other status.
- Do not use language or behavior towards women or children that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate.
- Sexual activity with children under 18—including through digital media is prohibited. Mistaken belief regarding the age of a child and consent from the child is not a defense.
- Exchange of money, employment, goods, or services for sex, including sexual favors or other forms of humiliating, degrading or exploitative behavior is prohibited.
- Sexual interactions between contractor's and consultant's employees at any level and member of the communities surrounding the workplace that are not agreed to with full consent by all parties involved in the sexual act are prohibited. This includes relationships involving the withholding, promise of actual provision of benefit (monetary or non-monetary) to community members in exchange for sex – such sexual activity is considered "non-consensual" within the scope of this Code.

- Where an employee develops concerns or suspicions regarding acts of GBV by a fellow worker, whether in the same contracting firm or not, he or she must report such concerns in accordance with Standard Reporting Procedures.
- All employees are required to attend an induction-training course prior to commencing work on site to ensure they are familiar with the GBV Code of Conduct.
- All employees must attend a mandatory training course once a month for the duration of the contract starting from the first induction training prior to commencement of work to reinforce the understanding of the institutional GBV Code of Conduct.

Children Protection

The possibility of contractor children abuse is through hiring of child labour, also labour force on site might abuse children within the Project area through sexual advances that could lead to early pregnancies and school dropout, including exposure to communicable diseases such as HIV and AIDS. The contractor will undertake the below listed mitigation measures.

Mitigation Measures

- The contractor will develop and implement a Children Protection Strategy that will ensure minors are protected against negative impacts associated by the Project including SEA.
- All staff of the contractor must sign, committing themselves towards protecting children, which clearly defines what is and is not acceptable behaviour
- Children under the age of 18 years should be hired on site as provided by Child Rights Act (Amendment Bill) 2014
- Wherever possible, ensure that another adult is present when working in the proximity of children.
- Not invite unaccompanied children to workers home, unless they are at immediate risk of injury or in physical danger.
- Refrain from physical punishment or discipline of children
- Refrain from hiring children for domestic or other labor, which is inappropriate given their age, or developmental stage, which interferes with their time available for education and recreational activities, or which places them at significant risk of injury.
- Comply with all relevant local legislation, including labor laws in relation to child labor specifically provisions of Kenya's Employment Act Cap 226 of 2007 Part VII on protection of children against exploitation

Sexual Exploitation and Abuse (SEA)

This impact refers to sexual exploitation and abuse committed by Project staff against communities and represents a risk at all stages of the Project, especially when employees and community members are not clear about prohibitions against SEA in the Project.

Mitigation Measures

- Develop and implement a SEA action plan with an Accountability and Response Framework as part of the C-ESMP. The SEA action plan will follow guidance on the World Bank's Good Practice Note for Addressing Gender-based Violence in Investment Project Financing involving Major Civil Works (Sept 2018).
- The SEA action plan will include how the project will ensure necessary steps are in place for:
 - ✓ Prevention of SEA: including COCs and ongoing sensitization of staff on responsibilities related to the COC and consequences of non-compliance; project-level IEC materials;
 - ✓ Response to SEA: including survivor-centered coordinated multi-sectoral referral and

- assistance to complainants according to standard operating procedures; staff reporting mechanisms; written procedures related to case oversight, investigation and disciplinary procedures at the project level, including confidential data management;
- ✓ Engagement with the community: including development of confidential community-based complaints mechanisms discrete from the standard GRM; mainstreaming of Sexual Exploitation and Abuse (SEA) awareness-raising in all community engagement activities; community-level IEC materials; regular community outreach to women and girls about social risks and their SEA-related rights;
- ✓ Management and Coordination: including integration of SEA in job descriptions, employments contracts, performance appraisal systems, etc.; development of contract policies related to SEA, including whistle-blower protection and investigation and disciplinary procedures; training for all project management; management of coordination mechanism for case oversight, investigations and disciplinary procedures; supervision of dedicated PSEA focal points in the project and trained community liaison officers.

Land Acquisition and Resettlement

Construction of the Proposed Mwache Trunk Main and South Mainland Water Transmission Pipeline will in some instances result to negative impacts on Project Affected Persons (PAPs) own private land and residential or none residential structures, crops and trees, as well as graves along the pipeline route from Mwache Creek to proposed Dongo Kundu Tank.

The impact of construction of the water Transmission Pipelines and Dongo Kundu Reservoir will include both physical and economic displacement of **343 Project Affected Persons (PAPs)** who include **191 Male PAPs and 152 Female PAPs and 1 community Church**. The total number of PAPs include; **4Nr. vulnerable PAPS** who are 1Nr. disabled male PAP located in Gandini, 1Nr. Elderly female PAP in Gandini, 1Nr. Elderly female PAP in Ng'ombeni and 1Nr. Elderly female PAP in Mbuguni. Further. A summary of Impacts is documented in **Table 8-18**.

Table 8.18: Summary of Resettlement Impact (Pipeline and Dongo Kundu Reservoir Site)

TYPE OF LOSS	NO.
PAPs losing more than 20% of Land (pipeline)	Nil
PAPs losing more than 20% of Land (Dongo Kundu Reservoir)	8
PAPs losing Primary Residential structures on their land (Pipeline)	59
PAPs losing Primary Residential structures on their land (Dongo Kundu Reservoir)	10
Sub-Total Fully affected	77
Less than 20% of land (Pipeline)	186
Less than 20% of land (Dongo Kundu Reservoir)	2
PAPs losing trees and crops on their land (Pipeline)	67
PAPs losing trees and crops on their land (Dongo Kundu Reservoir)	10
PAPs losing graves	1
Sub-Total Partially Affected PAPs	266
Total Impact on PAPs	343
Public Infrastructure Fully Impacted	Nil
Community Infrastructure (Church)	1
Sub-Total Community Institutions to be affected	1
Total Number of PAPs and Institutions affected	344

RAP BUDGET

RAP Budget for the Pipeline

Table 8.19 provides a summary cost estimate for the Resettlement Action Plan implementation and a high-level implementation schedule, also listing the assumptions that underpin both the Cost Estimate and the schedule.

Table 8.19: RAP Budget (Pipeline)

TOTAL RAP COST	AMOUNT (KSH)
Land (Easement)	9,529,722.00
Affected Structures	16,304,000.00
Affected Crops and Trees	6,228,886
Sub Total 1	32,062,608.00

RAP Budget for the Dongo Kundu Reservoir

Table 8.20 provides a summary cost estimate for the proposed Land acquisition at Dongo Kundu Reservoir site computed at Kshs 2.5m per acre.

Table 8.20: RAP Budget (Dongo Kundu Reservoir)

Parcel number	Size (Acres)	Cost of Acquisition (Ksh)
NGOMBENI/ADJ/442 / SHEET NO 9	3.012	7,530,000.00
NGOMBENI/ADJ/1140/ SHEET NO 9	0.110	275,000.00
Total 1		7,805,000.00
Add Cost of Structures	1	324,000.00
Add Cost for Trees	Ls	735,000.00
Total 2		1,059,000.00
Total 3		8,864,000.00

RAP Budget for Mazeras reservoir (Bonje)

Table 8.21 below provides a summary cost estimate for the proposed Land acquisition at Mazeras Reservoir site (Bonje) computed at Kshs 2.5m per acre

Table 8.21: RAP Budget (Bonje Mazeras Reservoir)

Parcel number	Unit	Cost of Acquisition (Ksh)
Cadastral map not available at SoK	or 5.19acres at Ksh 2.5m per acre	12,975,000.00
Add Cost of Structures	Number	Nil
Add Cost for Trees	Ls	5,000,000.00
Total		17,975,000.00

Grand RAP Budget

Table 8.22 below provides a grand budget for compensation of Project impact along the pipeline, Dongo Kundu and Bonje reservoir sites. Additional costs including; Livelihood Restoration Programs, facilitation of Grievance, Redress and Resettlement Committees, Monitoring and Evaluation and Contingency Costs are also provide.

Table 8.22: RAP Budget (Bonje Mazeras Reservoir)

TOTAL RAP COST	AMOUNT (KSH)
Pipeline	32,062,608.00
Dongo Kundu Reservoir	8,864,000.00
Mazeras reservoir (Bonje)	17,975,000.00
Sub Total 1	40,926,608.00
Livelihood Restoration Programs (Lump sum)	5,000,000.00
Facilitation of Grievance Redress and Resettlement Committees (5%)	1,557,630.40

TOTAL RAP COST	AMOUNT (KSH)
Monitoring and Evaluation 5%	1,557,630.40
Contingency Costs (15%) to deal with unforeseen costs.	4,672,891.20
Sub Total 2	9,788,152.00
Grand Total (1+2)	50,714,760.00

Operation impacts

The most significant challenges currently facing water distribution systems are aging infrastructure, increasing demand for potable water, maintaining potable water quality, weakened infrastructure as a result of system inefficiencies, Microbial Growth, Biofilms and Sediments, Disinfectants and Disinfection Byproducts, Nitrification, Corrosion, Permeation and Leaching and Water Losses and Main Breaks which will be addressed by the Mombasa and Kwale Water Companies at the operation stage of the Project.

8.4.4 Cumulative Impact Assessment

Definition

The assessment of cumulative impacts is a long-established requirement for any comprehensive ESIA. For the purposes of this Proposed Project, the IFC Performance Standards and IFC Good Practice Note: Cumulative Impact Assessment and Management Guidance for the Private Sector in Emerging Markets have been used as a primary reference source. IFC PS12 defines cumulative impacts as:

“...impacts that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted”.

The impacts of the Proposed Project thus need to be considered in conjunction with the potential impacts from other future developments or activities that are existing, planned or reasonably defined, and are located within a geographical scope where potential environmental and social interactions could act together with the Proposed Project to create a more or less significant overall impact.

The concept of Valued Environmental and Social Components (VECs)

The Cumulative Impact Assessment Good Practice Handbook⁴ was issued by the IFC in August 2013. This Handbook supplements the IFC PS1 and its Guidance Note, providing further guidance on the practical assessment of cumulative impacts, recognising some of the uncertainties and constraints faced by private sector proponents. It also introduces the concept of Valued Environmental and Social Components (VECs), which are environmental and social attributes that are considered to be important in assessing risk and can include:

- Physical features;
- Wildlife populations;
- Environmental processes;
- Ecosystem conditions (e.g. biodiversity);
- Social conditions (e.g. health, economics); or
- Cultural aspects.

Existing, Planned or Reasonably Defined Developments

A number of sources were reviewed to establish whether there is existing, planned or reasonably defined developments that are located within a geographical scope where potential environmental and social interactions could act together with the Proposed Project to create a more or less significant overall impact.

Table 8.23: Project within the Geographical Area of Influence

Project	Project Details
Mwache Multi-Purpose Dam Project	The Multipurpose Mwache Dam was identified by the Government of Kenya (GoK) as a flagship project under the Kenya Vision 2030 mission and also as a necessary facility to supplement water supply for Mombasa City and the adjacent areas in Kinango Sub County in Kwale County. It has been given high priority by Ministry of Water and Sanitation and Irrigation (MOWSI), the Coast Development Authority (CDA), and the Coast Water Works Agency (CWWA) and the National Treasury. The dam is proposed to be located immediately upstream of Mwache Creek (~4km) on Mwache River in Kasemeni and Mwavumbo Wards, Kinango Sub County of Kwale County. The Dam site is located on the Mwache River at Fulugani village in Kwale County, Kasemeni Location of Kinango Sub County about 22 km west of the city of Mombasa. Status: Progress of works to date is 40.46% complete. Project Proximity to Pipeline: The project is approximately 300m from the pipeline.
Mombasa Southern Bypass Highway Project	Dongo Kundu Bypass Highway also referred to as Mombasa Southern Bypass, is a highway under construction in Mombasa County. The highway will link Mombasa Mainland West with Mombasa Mainland South, without getting into Mombasa Island. The project roads are comprised of two roads, namely Mombasa Southern Bypass and Kipevu Link Road. Mombasa Southern Bypass branches off from Nairobi-Mombasa Road (A109) at Miritini then runs down to Tsunza Peninsula and Dongo Kundu, and finally emerges with Mombasa-Tanzania Road (A14). The Kipevu Link Road branches off from Mombasa Southern Bypass at Mwache then runs to Mombasa New Port Container Terminal. Mombasa Southern Bypass is about 20.0km and Kipevu Link Road is about 5.7 km. Project Status: Currently ongoing
the special economic zone development project at dongo kundu	Dongo Kundu SEZ is approximately 3,000 acres large, adjacent to the Mombasa Port in Likoni Subcounty of Mombasa County. The zone is located in a strategic location with a high potential for development and high competitiveness in terms of logistics and facilities. It is in close proximity to the Mombasa Port, Mombasa Southern Bypass, Standard Gauge Railway (SGR), and Moi International Airport. The project is part of Kenya's Industrial Plan, boosted by the revised draft SEZ regulations (2019) which offer incentives to companies operating in the zone. The SEZ is restricted to the KPA owned property in Dongo Kundu which falls under the administrative jurisdiction of the Likoni sub-County of County 001 (Mombasa). Within Likoni, the two villages covered by the proposed project area fall under the Mtongwe Ward of Likoni Constituency. Status: Project is ongoing
800mw Liquefied Natural Gas (Lng) Power Plant At Dongo Kundu	Kenya is turning to LNG due to its clean-burning, lower emission qualities and cheaper cost compared to traditional fossil fuels like diesel which is expensive with high levels of carbon dioxide emission. The government through the ministry of energy and petroleum therefore has proposed to set up LNG power plant at Dongo Kundu. The proposed project will be funded by the Ministry of Energy and Petroleum. Investment in LNG plants is also meant to cut reliance on hydroelectricity which is susceptible to weather changes such as drought. The project will be financed through a Public Private Partnership arrangement and is one of the several projects that are aimed at injecting 5,000 MW of power into the national grid. Project Proximity to Pipeline: The project will be done approximately 1km from the west mainland pipeline project Status: The project is still proposed

Project	Project Details
Storm Water Drainage System That Will Cover Mvita, Changamwe, Jomvu, Kisauni, Nyali and Likoni Sub Counties	The proposed project will be funded by the Government of Kenya (GoK) through a Public Private Partnership arrangement. Insufficient drainage, often causing floods, are considered a major problem in some of the settlements in Changamwe and Jomvu. A storm water drainage system project has therefore been planned for construction within these two sub counties. Status: The project is still proposed
North Mainland Transmission Line Project	This project is financed by the World Bank and entails transmission of water from Mwache Dam to North Mainland. Status: The project is still proposed

Evaluation of Cumulative Effects on VECs

Evaluation of cumulative effects takes into consideration the potential impacts that could be generated by the Project and adds those generated by identified past, existing and future projects. This evaluation will be realized through the analysis of the various projects' effects on each of the VECs.

Water Resources

Potential impacts of the Project on these VECs are defined by:

- Transport of exposed or disturbed soils towards water courses during rain events
- Accidental spills and leaks from machinery and vehicle operations or associated with inadequate management of hazardous products and wastes
- Contamination risk through excavation site exposing groundwater
- Groundwater extraction for construction and operation requirements

With the design principles applied and the implementation of the proposed mitigation measures, the resulting residual impacts were evaluated to be moderate to minor.

The various identified projects will affect these VECs as follows:

- All the Projects in table 8-23 will essentially affect local groundwater quantity as they may require water intakes for its construction. These projects especially those that are linear (road projects) cross existing watercourses and could be affected by these projects.
- All the projects above will potentially affect these VECs and will have similar effects as with the water transmission pipeline project, that is: risk of loose soil and contaminant transport towards surface water, potential contamination of groundwater through excavation activities and groundwater extraction for construction and operation activities. For surface water potential effects, only the road infrastructure Projects cross watercourses and is also traversed by the water pipeline transmission Project.

Considering that:

- Past, present and future projects are either currently in construction (not in operation) as shown in table 8-23 or to be initiated at an undisclosed date.
- These project activities are expected to have similar **moderate to minor impacts** on these VECs;

Some cumulative effect may be anticipated. However, with the application of the standard and specific mitigation measures presented in this chapter, the overall residual cumulative impact should remain **moderate to minor**.

Soils

Potential impacts of the water pipeline transmission line project on this VEC are essentially associated with pre-construction and construction and operation activities and are defined by:

- Affecting soil stability in steep areas during land clearing, soil movements which could generate or accentuate existing erosion.

With the design principles applied and the implementation of the proposed mitigation measures, the resulting residual impacts were evaluated to be **moderate to minor**. The various identified projects will affect this VEC as follows:

- The road infrastructure projects, Mwache Dam, household development project are located in areas with a steep slope and could generate soil instability and erosion. These project sites are located close to the water supply project.
- These linear projects are also located or traverse sections on relatively flat land but may imply work near watercourse crossings thus potentially affecting the slopes of their embankments.

Considering that:

- Project potentially affecting existing slopes are located near the proposed water transmission pipeline Project);
- The road infrastructure projects are likely to affect the same watercourse crossings as that of the water transmission pipeline Project

With the application of the standard measures presented in this section overall cumulative effect would be **no greater than moderate**.

Terrestrial Habitat

Potential impacts of the water pipeline transmission Project on this VEC are essentially associated with pre-construction and construction activities and are defined by:

- Loss of non-critical terrestrial habitat through development of the project within the existing right-of way and implementation of temporary construction facilities and new borrow pits;
- Potential spread of invasive species and alteration of local conditions that will alter vegetation composition;

Considering the limited loss of vegetation to be affected within the road reserve and its existing degraded condition, with the implementation of the mitigation measures identified, the magnitude of the residual impact on terrestrial habitat was assessed as **minor**.

The past, present and future projects identified in the vicinity of the project will mostly affect terrestrial habitat by generating further habitat loss in the project area and contributing to additional fragmentation of the terrestrial landscape. Further road infrastructure and developments in the area can also lead to population growth, creating additional land conversions and loss of terrestrial habitat. As for the housing developments, the sites are located in built up areas with no terrestrial habitats.

Considering that:

- Past, present and future projects are expected to cause additional terrestrial habitat loss and fragmentation.
- These projects activities are expected to have variable impacts on these VECs.

Cumulative effect is anticipated. However, considering the existing level of degradation of terrestrial habitat, the overall residual cumulative impact should be **minor**.

Terrestrial Fauna

The terrestrial VEC includes effects on avifauna, herpetofauna and small and large mammals within the Project area. Potential impacts of the proposed water transmission pipeline Project on these VECs are defined by:

- Habitat degradation or modification through construction work.
- With the mitigation measures, the magnitude of the residual impacts was identified as **minor**.

The past, present and future projects identified in the vicinity of the project will mostly affect terrestrial habitat by generating further habitat loss in the project area and contributing to additional fragmentation of the terrestrial landscape. Further road infrastructure and developments in the area can also lead to population growth, creating additional land conversions and loss of terrestrial habitat. As for the housing developments, the sites are located in built up areas with no terrestrial habitats.

Considering that:

- Past, present and future projects are expected to cause additional disturbance on terrestrial fauna; this may cause them to avoid areas where construction works are carried out and areas where there is high road traffic noise.
- These projects activities are expected to have variable impacts on these VECs.

Cumulative effect is anticipated. However, considering the existing level of degradation of terrestrial habitat, the overall residual cumulative impact should be **minor**. Past, present and future projects are expected to cause additional disturbance on terrestrial fauna; this may cause them to avoid areas where construction works are carried out and areas where there is high road traffic noise. Cumulative effect is anticipated. The multiplication of linear infrastructure and increased traffic will likely have significant effect on wildlife. Nonetheless, impact of this project on wildlife will be minor due to the absence of wildlife in project Aol.

Community Relations and Social Justice

This VEC includes effects on gender and community relations. While some impacts in this section intersect with physical well-being, they are also addressed here because they will increase affected peoples' marginalization. Potential impacts of the proposed Project on community integrity and social justice are essentially associated with pre-construction and construction activities (unless indicated otherwise) and defined by:

- Gender imbalance in employment which contributes to perpetuating women economic dependency and further entrench gender-based roles;
- Land leasing and purchase of natural resources that may benefit socially recognized men at the expense of marginalized groups including women, especially widows, single mothers and youth. These effects are especially acute for women and youth in patriarchal communities under community land tenure;
- Increased gender-based violence (including sexual abuse) brought by outside workers and job seekers or by local workers triggered by poor labour conditions. Women and girls are especially vulnerable due to their marginalization and the fact that they walk often and on long distances;
- Workers and job seekers fathering children and abandoning mothers after conclusion of construction work;
- Rising prevalence of HIV/AIDS and sexually transmitted infections (STIs) following the influx of workers and job seekers
- Increased crime in surrounding communities either through crimes directly perpetrated by newcomers (e.g., assault, theft, etc.) or indirectly through their engagement in illicit activities such as drug use and prostitution. Increased crime can exacerbate inequities, furthering the marginalization of vulnerable people, and affect local communities' sense of security;
- Indigenous culture erosion brought by increased interactions with outsiders
- Land use and compensation disputes (e.g., land resources and power conflict);
- Tensions and conflicts over the awarding of jobs and contracts;
- Increased inequities that risk further marginalizing vulnerable groups; and
- Degraded community relations caused by inadequate communication with communities and stakeholders.

With the implementation of mitigation measures, the magnitude of the residual impact on gender and community relations were assessed as moderate. All identified projects will have similar effects on this VEC as the Project.

Considering that:

- Past, present and future projects may contribute to perpetuating women economic dependency, increase gender-based violence, heighten the number of single mothers, increase the prevalence of HIV/AIDS and STIs, and cause or exacerbate land use and compensation disputes. In addition, they may trigger community tensions and conflict.

Cumulative effect is anticipated.

The application of mitigation measures outlined in this section 8.4.3 should ensure that most residual cumulative impacts on gender, and community relations remain of moderate magnitude. These include a Community Engagement Plan, a Code of Conduct for workers and measures favouring women and local employment. Where possible, a regional strategy for interaction with and integration of outsiders including, but not limited to, the standard and specific mitigation measures related to the influx of workers presented in Sections 8.4.3 should be developed in partnership with affected counties to minimize impacts. While the application of the above standard and specific measures will not reduce the consequences for victims of crime and GBV brought by newcomers, they will greatly reduce the risks posed by the different projects. As a result, the residual cumulative impact should be of moderate magnitude. Overall, the residual cumulative impact on community relations and social justice is expected to be **moderate**.

8.4.5 Climate Risks Vulnerability Assessment

The National Climate Change Response Strategy (2010) provides that climate change is one of the greatest challenges facing humanity this century. In Kenya, this phenomenon is already unmistakable and intensifying at an alarming rate as is evident from countrywide temperature increases and rainfall irregularity and intensification. Climate change impacts on water infrastructure will be caused by either excessive rainfall that destroys that these impacts are discussed below.

Table 8.24: Consideration on Climate Change Resilience

#	Impact Trigger	Impact details	Water Pipelines Design Consideration
1	Impacts of increased rainfall on water utility infrastructure is related to storm and flooding	The most significant impact of climate change related to increased rainfall that leads to flooding will be destruction of water infrastructure including washing away of water transmission pipelines.	Include in the design Flood barriers to protect critical infrastructure include levees and dikes. A related strategy is flood proofing, which involves elevating critical equipment or placing it within waterproof containers or foundation systems.

9 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN (ESMP)

9.1 PURPOSE AND OBJECTIVES OF ESMP

The specific objectives of the ESMP are to:

- Serve as a commitment and reference for the Contractor to implement the ESMP including conditions of approval by NEMA.
- Serve as a guiding document for the environmental and social monitoring activities during construction and operation of the water pipeline.
- Provide detailed specifications for the management and mitigation of activities that have the potential to impact negatively on the environment, health and safety of workers and community.
- Provide instructions to relevant project personnel regarding procedures for protecting the environment and minimizing environmental effects, thereby supporting the operator's goal of minimal or zero incidents.
- Document environmental concerns and appropriate protection measures while ensuring that appropriate actions are completed promptly.

The Environmental, Social Management and Monitoring Plan (ESMP) prepared for proposed Mwache Trunk Main and South Mainland Water Transmission Pipeline is presented in **Tables 9.1**.

Table 9.1: Environment and Social Management Monitoring Plan

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
Impacts on Water Resource	- Site activities such as excavations and levelling could result to loosening of soils that could result to sedimentation and siltation of storm water drainage channels and eventually into seasonal Streams along the water pipeline. - Un-serviced plant and equipment on site could result to oils and fuels leaks that could contaminate water resources rising the BoD and adversely affecting aquatic organism in seasonal Streams along the water pipeline.	- All waste water which may be contaminated with oily substances must be managed in accordance with an appropriate Waste Management Plan (WMP). - No hydrocarbon-contaminated water may be discharged to the environment. - At construction stage, the contractor will prepare Specific Construction Environment and Social Management Plan (C-ESMP) which included among other; Soil and Sedimentation Control Plan, Spoil Management Control Plan and Waste Management Plan.	Contractor	- State of natural storm water drainage channels - Quality of water flowing within seasonal Streams along the water pipeline the monitoring frequency shall be quarterly	Preliminary Sum of Ksh 1,000,000 to be allowed for water pollution control
Impacts on Soil Resource	- Soil include erosion resulting from activities such as excavation and levelling, clearing of vegetation for infrastructure such as access roads, laydown areas and construction zones - Soil contamination as a result of possible oil and fuel leaks from un serviced plant and equipment on site.	- Vegetation clearing and topsoil disturbance will be minimized. - Contour temporary and permanent access roads / laydown areas so as to minimize surface water runoff and erosion. - Sheet and rill erosion of soil shall be prevented where necessary through the use of sand bags, diversion berms, culverts, or other physical means. - Topsoil shall be stockpiled separate from subsoil. Stockpiles shall not exceed 2 m height, shall be located away from drainage lines, shall be protected from rain and wind erosion, and shall not be contaminated. - Wherever possible construction work will take place during the dry season. - Topsoil shall be evenly spread across the cleared areas when reinstated. - Accelerated erosion from storm events during construction shall be minimized through managing	Contractor	- State of natural storm water drainage channels - Quality of water flowing within seasonal Streams along the water pipeline the monitoring frequency shall be quarterly	Preliminary Sum of Ksh 500,000 to be allowed for soil erosion control

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
		storm water runoff (e.g., velocity control measures). • Soil backfilled into excavations shall be replaced in the order of removal in order to preserve the soil profile. • Spread mulch generated from indigenous cleared vegetation across exposed soils after construction • At construction stage, the contractor will prepare Specific Construction Environment and Social Management Plan (C-ESMP) which included among other; Soil and Sedimentation Control Plan, Spoil Management Control Plan and Waste Management Plan.			
Impacts on Air Quality	• Emissions of oxides of nitrogen (NO₂ in particular) mainly from construction-related vehicles (and to a lesser degree from construction generators and other hydrocarbon powered equipment); and • Dust and particulate matter (as PM₁₀) created by construction-related vehicle traffic on unpaved roads.	As general measures for all locations: • Develop a Dust Management Plan (DMP); • Record all dust and air quality complaints, identify cause(s), take appropriate measures; • Liaise with local communities to forewarn of potentially dusty activities; • Undertake monitoring close to dusty activities, noting that this may be daily visual inspections, or passive/active monitoring as parameter • Undertake inspections to ensure compliance with the Dust Management Plan; • Plan potentially dusty activities so that these are located as far from receptors as feasible; • Erect solid screens if feasible around stockpiles and concrete batching; • Avoid run off of mud and water and maintain drains in a clean state; • Remove dusty materials from site as soon as possible if not being re-used. If being re-used, cover or vegetate if possible; • Impose speed limits on haul routes and in construction compounds to reduce dust generation; • Minimize drop heights when loading stockpiles or	Contractor	• Compliance level Dust Management Plan • Services and inspection reports of plant and equipment • Air quality monitoring report findings • Number of complaints from community related to dust menace	Preliminary Sum of Ksh 500,000 to be allowed for air pollution control

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
		transferring materials; and - Avoid waste or vegetation burning. For traffic on unpaved roads: - Undertake watering to attenuate dust near sensitive receptors. The duration and frequency of this should be set out in the Dust Management Plan and will consider water availability and any stakeholder grievances; and - On unpaved roads in use for more than 1 month, consider use of surface and sealants to reduce the use of water and water trucks. Use of lignin-based sealants recommended due to low environmental toxicity. For excavations and levelling - Revegetate exposed areas as soon as feasible; - Revegetate or cover stockpiles if feasible; - Expose the minimum area required for the works, and undertake; and exposure on a staged basis to minimize dust blow.			
Noise and Vibrations Impacts	Construction activities and equipment are not expected to result in significant levels of vibration. Equipment that might high levels of vibration (such as impact piling or vibratory compaction) will not be used	- Siting noisy plant and equipment as far away as possible from human settlement, and use of barriers (e.g., site huts, acoustic sheds or partitions) to reduce the level of construction noise at receptors wherever practicable; - Where practicable noisy equipment will be orientated to face away from the nearest Human settlement and other receptors; - Working hours for significant noise generating construction work (including works required to upgrade existing access roads or create new ones), will be daytime only; - Alternatives to diesel and petrol engines and pneumatic units, such as hydraulic or electric-controlled units, will be used, where practicable; - Where practicable, stationary equipment will be located in an acoustically treated enclosure; - For machines with fitted enclosures, doors and door	Contractor	Serviced plant and equipment to manufacturers specification	Best Management practices with no direct cost

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
		seals will be checked to ensure they are in good working order; also, that the doors close properly against the seals; - Throttle settings will be reduced and equipment and plant turned off, when not being used; - Equipment will be regularly inspected and maintained to ensure it is in good working order. The condition of mufflers will also be checked; and fitting of mufflers or silencers of the type recommended by manufacturers.			
Impacts on vegetation cover	Stripping of vegetation cover will be on isolated cases only limited the trees and will have minimal impact to soil structure.	- Avoidance of impacts should be prioritized. However, if not possible then compensatory planting of trees that will be cut by the contractor during works will be undertaken. - Vegetation shall only be within the well field's only if the vegetation and will interfere with Project construction and/or present a hazard. - Areas to be cleared shall be agreed and demarcated before the start of the clearing operations to minimize exposure. - The use of existing cleared or disturbed areas for the Contractor's office, stockpiling of materials etc. shall be encouraged. - Whenever possible, all damaged areas shall be reinstated and rehabilitated upon completion of the contract to as near pre-construction conditions as possible. - In liaison with KFS, Planting of compensatory trees, approximately 500 different species within listed in column (2), a budget is Kshs 1,500,000 is provided for purchase, planting and naturing of the trees for 6months from the time of planting - Synergize findings from the ecological impacts assessment commissioned by Ministry of Water to the downstream users, the findings of this study will be used	Contractor	- Number of trees replanted as compensatory trees - Status of reinstatement of completed sites	Provisional Sum of Ksh 2,500,000 to allowed for procurement and planting of compensatory tree seedling

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
		to enhance mitigation measures for the pipeline impacts within the Mwache forest Rehabilitation of temporary construction sites and pioneer camps (if needed) should be done as swiftly as possible and always with suitable native grasses and other plants			
<u>Biodiversity Impacts within Mwache forest</u>	<u>Loss of floral and fauna listed under section (3.6) of this report within the trunk main section 1.5km that will traverse through the forest</u>	<u>Administrative Measures</u> <u>Service Level Agreement (SLA) between Kenya forest Service (KFS) and Coast Water Works Development Agency (CWWDA). The SLA will describe details agreements related to applicable permit procedures and measures of ensuring Ecological Equivalence for the selected off set in terms of (i) Habitat Type, (ii) Species Composition, (iii) Ecological Condition, (iv) Long-term Protection) and (v) Monitoring CWWDA to take lead</u> <u>Implementation of provisions of Biodiversity Plan, in relation to budgets and staff to be hired (i) Environmental and biodiversity / Ecology advisor at the supervising engineer side and (ii) Ecological clerk of works at the Contractor side (Estimated Costs)</u> <u>To address data gap triggered by lack seasonality data considering that the Critical Habitat Assessment conducted once during the Month of April – May 2025. The ESIA recommends series of 3nr other additional assessments including; (i) supplementary monitoring in October to November 2025 during the short rains. (ii) January to February 2026 During Dry Season and finally (iii) April to May 2027 during long rains. CWWDA</u>	<u>CWWDA, KFS, Contractor and Supervision Engineer</u>	<u>SLA in place and implementation status</u> <u>Implementation status activities listed under Biodiversity Plan presented as Table 8-12</u> <u>Biodiversity Assessment report prepared for 3 distinct seasons listed</u> <u>Competent Environmental and biodiversity / advisor hired by contractor and Supervising engineer</u> <u>Number of training and staff trained on Biodiversity Management</u> <u>Number of Biodiversity related grievances received and resolved under</u>	<u>Euros 389,405.10</u>

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
		<u>will be responsible for hiring an ecologist to undertake the assignment to be financed under the Budget prepared as part of Biodiversity Management Plan presented in the CHA report.</u> <u>Avoidance Measures</u> <u>Avoid placing construction equipment, stockpiles, locating contractors' camps, lay bay areas</u> <u>Avoid disturbance to priority nocturnal fauna from project-related light, noise and vibration impacts.</u> <u>Avoid adversely impacting flora through the open-burning of wastes and forest fires.</u> <u>Avoid adversely impacting wildlife species (recorded in the CHA through illegal hunting and trafficking from project-related employees or contractors</u> <u>Avoid introduction of invasive species and pests</u> <u>Minimization Measures</u> <u>Minimize clearance of forest flora listed under table 4.1 of this report of natural habitats and more specifically vulnerable tree species discussed under section (4.1).</u> <u>Minimize impacting fauna, flora within the forest through spills of hazardous materials</u> <u>Minimize the impact of an accidental spill of hazardous materials on into the environment.</u> <u>Minimize introduction of invasive species and pests</u>		<u>the project</u>	

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
		- Minimize the indirect impacts to natural habitats with exploitation of natural resources and illegal hunting from Project-related facilitated access. Rehabilitation / Restoration Measures - Restore the physical landscapes that have been impacted by Project activities. - Establish and implement a Tree Planting Scheme for the Project - Undertake regular watering and monitoring to minimize the risk of poor species establishment following planting. Offset Measures through KFS - CWWDA to formally apply for approval to lay the pipeline within Mwache Forest, the application to be addressed to the Chief Conservator of Forest (CCF), Kwale County. - The application will clearly indicate the scope of works planned to be undertaken within the forest. - The application will include a clear Layout Plan and indicate the proposed pipeline route - The CCF will review the application and communicate the decision of KFS officially to CWWDA. - After approval is granted by KFS, CWWDA will undertake survey of the pipeline route. - After Survey works is completed, CWWDA will further apply through the CCF for approval or authority to commence pipeline construction.			

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
		• <u>KFS will undertake a census of trees that will be affected the pipeline corridor and bill CWWDA. From our estimate is that the tree carrying density per 1 acre is approximated at 177, this implies that for the 3.33acres of Mwache pipeline wayleave a total of 589 trees at an estimated cost of Ksh 17,670,000 or Euro 121,862 will be required to offset the loss.</u> • <u>This application will be reviewed and approval granted to CWWDA by KFS for construction works upon CWWDA paying the cost of offsetting the trees that shall be fell along the alignment. This will be through issuance of a special user's license that will be renewed on an annual basis.</u>			
Community Health Safety and Security Impacts	Increased Project-related traffic, civil works for site preparation including site clearance and excavation and levelling, change to the environment due to increased noise, decreased air quality, inappropriate waste handling or disposal, and accidental leaks and spills, and the presence of the Project workforce all present potential hazards for the health and safety of local communities	• Contractor will develop and monitor the implementation of a Community Health and Safety Management Plan (CHSMP) • Contractor will develop Emergency Response Plans (ERPs) in cooperation with local emergency authorities and hospitals. • Contractor will extend the Worker Code of Conduct to include guidelines on worker –community interactions and will provide training on the worker code of conduct to all employees including drivers as part of the induction process. • Contractor will provide primary health care and first aid at construction office sites to avoid pressure on local healthcare infrastructures.	Contractor	• Number of incidences recorded on site and within communities • Community satisfactory reports with regards to health and safety • Reported and addressed grievances on site and from communities	Preliminary Sum of Ksh 1,000,000 to allowed for addressing Community health and security impacts

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
		- Contractor will implement a Community Grievance Mechanism. - Contractor will develop and implement a Traffic Management Plan covering aspects such as vehicle safety, driver and passenger behaviour, use of drugs and alcohol, operating hours, rest periods, community education on traffic safety and accident reporting and investigations.			
Worker Health and Safety and Workers Management impacts	Workers' rights including occupational health and safety need to be considered to avoid accidents and injuries, loss of man-hours, labour abuses and to ensure fair treatment, remuneration and working conditions. These issues should be considered not only for those who are directly employed on the Project. The Project could potentially lead to workforce-related social and health issues throughout the life cycle of the Project if worker management and rights do not meet Kenyan law or international best practice.	- Contractor will develop a Human Resources Policy, which will outline worker rights to be included in all contracts including restrictions on working hours in line with applicable ILO standards, compensation including consideration of overtime, holidays etc. contractor will require its subcontractors to put in place policies in line with national legislation and applicable international legislation and contractor Code of Conduct and Policies. - Contractor will establish contractual clauses (signed code of conduct) to be embedded in the contracts of the workers and sub-contractors that require adherence to Kenyan law and international standards to be upheld related to worker rights. - Contractor will prohibit the use of alcohol or drugs, which could adversely affect the ability the employee to perform the work safely or adversely affect the health and safety of other employees, community members or the environment. - Contractor and self-employed contractors will assess the H&S risks related with the tasks to be performed during the construction phase. - Pre-employment medical assessments will be put in place as a workforce risk management tool to screen individuals for risk factors that may limit their ability to perform a job safely and effectively. Expected benefits of conducting pre-employment medical assessments	Contractor	- Number of incidences recorded on site and within workers - Workers satisfactory reports with regards to health and safety - Reported and addressed grievances on site and from workers - Signed code of conduct	Preliminary Sum of Ksh 1,000,000 to allowed for addressing Worker's health and security impacts

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
		include a safer working environment, reduction in workplace injuries, minimized downtime, matching the capacity of the employee with the role, and overall recruitment cost and risk reduction. • Contractor will ensure that training on health and safety measures is provided to all construction workers prior to starting to work on the Project and that supervisors have adequate experience to deliver on their responsibilities. • Contractor will implement regular health and safety checks and audits of workers, and subcontractors and implementing sanctions in case of breaches of national standards and the Project's specific standards. Such audits to include workplace H&S; worker contracts, working hours, pay and conditions; housing and food standards. • Contractor will develop and implement a Workers Grievance Mechanism for the Project workforce including workers and subcontractors. • Contractor will establish a procedure for the recording and analysis of incidents and lessons learned such that additional actions can be implemented to avoid or minimize occupational health and safety risks. • Contractor will ensure that facilities and work sites are designed and maintained such that robust barriers are in place to prevent accidents. • Contractor will ensure that its Code of Conduct is followed to regulate the performance and behaviour of all workers, including provision for disciplinary action for anti-social behaviour and non-compliance with health and safety regulations such as lack of use of PPE. • Contractor will ensure that IFC/World Bank Health and Safety guidelines regarding the construction and management of worker accommodation and the provisions of medical facilities at worker			

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
		accommodation are followed. - Contractor will ensure that adequate clean water, adequate food and access to medical care is provided to all workers on the worksite and at accommodation. - Contractor will develop and implement a Traffic Management Plan covering aspects such as vehicle safety, driver and passenger behaviour, use of drugs and alcohol, operating hours, rest periods, community education on traffic safety and accident reporting and investigations. - Contractor will develop a Waste Management Plan for the construction phase with clear guidelines for the safe storage and disposal of hazardous waste and handling of hazardous materials.			
	Protection of Children	- The contractor will develop and implement a Children Protection Strategy that will ensure minors are protected against negative impacts associated by the Project including SEA. - All staff of the contractor must sign, committing themselves towards protecting children, which clearly defines what is and is not acceptable behaviour - Children under the age of 18 years should be hired on site as provided by Child Rights Act (Amendment Bill) 2014 - Wherever possible, ensure that another adult is present when working in the proximity of children. - Not invite unaccompanied children to workers home, unless they are at immediate risk of injury or in physical danger. - Refrain from physical punishment or discipline of children - Refrain from hiring children for domestic or other labor, which is inappropriate given their age, or developmental stage, which interferes with their time	Contractor Supervising Engineer	Number of cases reported involving abuse of children	Budget as presented above

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
		available for education and recreational activities, or which places them at significant risk of injury. Comply with all relevant local legislation, including labor laws in relation to child labor specifically provisions of Kenya's Employment Act Cap 226 of 2007 Part VII on protection of children against exploitation			
	Gender-based violence and Sexual Harassment	- Ensure clear human resources policy against sexual harassment that is aligned with national law - Integrate provisions related to sexual harassment in the employee COC - Ensure appointed human resources personnel to manage reports of sexual harassment according to policy - The Contractor shall require his employees, sub-contractors, and any personnel thereof engaged in construction works to individually sign and comply with a Code of Conduct with specific provisions on protection from sexual exploitation and abuse - The contractor will implement provisions that ensure that gender-based violence at the community level is not triggered by the Project, including: - effective and on-going community engagement and consultation, particularly with women and girls; - Review of specific project components that are known to heighten GBV risk at the community level, e.g., compensation schemes; employment schemes for women; etc. - the contractor shall develop specific plan for mitigating these known risks, e.g., sensitization around gender-equitable approaches to compensation and employment; etc. - The contractor will ensure adequate referral mechanisms are in place if a case of GBV at the community level	Contractor	- Mitigation plan for GBV occurring at the community level as a result of project implementation - Number of GBV cases happening at the community level that receive survivor-centered referral and care	Budget as presented above

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
	Sexual Exploitation and Abuse by project workers against community members	- Develop and implement a SEA action plan with an Accountability and Response Framework as part of the C-ESMP. The SEA action plan will follow guidance on the World Bank's Good Practice Note for Addressing Gender-based Violence in Investment Project Financing involving Major Civil Works (Sept 2018). - The SEA action plan will include how the project will ensure necessary steps are in place for: - Prevention of SEA: including COCs and ongoing sensitization of staff on responsibilities related to the COC and consequences of non-compliance; project-level IEC materials; - Response to SEA: including survivor-centered coordinated multi-sectoral referral and assistance to complainants according to standard operating procedures; staff reporting mechanisms; written procedures related to case oversight, investigation and disciplinary procedures at the project level, including confidential data management; - Engagement with the community: including development of confidential community-based complaints mechanisms discrete from the standard GRM; mainstreaming of PSEA awareness-raising in all community engagement activities; community-level IEC materials; regular community outreach to women and girls about social risks and their PSEA-related rights; - Management and Coordination: including integration of SEA in job descriptions, employments contracts, performance appraisal systems, etc.; development of contract policies related to SEA, including whistle blower protection and investigation and disciplinary procedures; training for all project management; management of coordination mechanism for case		- SEA Action Plan - Code of Conduct - Number of staff trainings - SEA FP - Community Liaison trained in PSEA - IEC materials for workers sites and community - Discrete SEA reporting pathway - Relevant policies, e.g., investigations and discipline and whistle blower protection - Monthly minutes from SEA coordination meetings	Budget as presented above

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
		oversight, investigations and disciplinary procedures; supervision of dedicated PSEA focal points in the project and trained community liaison officers.			
HIV/AIDs	Spread of communicable diseases and HIV/AIDs	- Sensitize workers and the surrounding communities on awareness, prevention and management of HIV/AIDs and sexual health and rights through staff training, awareness campaigns, multimedia and workshops or during community Barazas. - Use existing clinics to provide VCT services to construction crew and provision of ARVs for vulnerable community members - Ensure safety of women and girls in provision of VCT services. - Work to minimize or altogether eliminate mosquito-breeding sites.	Contractor and CWWDA	- Number of cases of diseases reported - Rate of absenteeism due to diseases - No of workers trained on HIV/ AIDs - Number of gender-disaggregated toilets constructed	Preliminary and General Sum of Ksh 200,000 for awareness and purchase of condoms
COVID 19	Spread of COVID -19 amongst workers	- The Contractors will develop a SOPs for managing the spread of Covid-19 during project execution and submit them for the approval of the Supervision Engineer and the Client before mobilization. The SOPs shall be in line with the World Bank guidance on COVID-19, Ministry of Health Directives and site-specific project conditions; - Mandatory provision and use of appropriate Personal Protective Equipment (PPE) shall be required for all project personnel including - Avoid concentrating of more than 15 workers at one location. Where there are two or more people gathered, maintain social distancing at least 2 meters. All workers and visitors accessing worksites every day or attending meetings shall be subjected to rapid Covid-19 screening which may include temperature check and other vital signs; - Install handwashing facilities with adequate running water and soap, or sanitizing facilities at entrance to work sites including consultation venues and meetings	Contractor and CWWDA	- Availability of SOP(s), Training material, PPE, sanitizing facilities - No of workers sensitized on COVID-19 - No of hand-washing facilities installed; facemasks and temperature monitors secured, etc.	Preliminary and General Sum of Ksh 200,000 for awareness and purchase of soap, sanitizers, temperature screening gadgets and face masks for workers.

RISK	ANTICIPATED IMPACT	MITIGATION	RESPONSIBILITY	MONITORING PARAMETER	BUDGET (Kshs.)
		- and ensure they are used; • Ensure routine sanitization of shared social facilities and other communal places routinely including wiping of workstations, door knobs, hand rails etc;			
	Spread of COVID-19 amongst community members during consultations processes	• Electronic means of consulting stakeholders and, holding meetings, whenever possible, shall be encouraged whenever feasible. One-on-one engagements for the PAPs while observing social distance and adhering to PPE wearing shall be enforced; • Avoid concentrating of more than 15 community members at one location. Where there are two or more people gathered, maintain social distancing at least 2 meters • The team carrying out engagements within the communities on one-on-one basis will be provided with appropriate PPE for the number of people they intend to meet; • Use traditional channels of communications (TV, newspaper, radio, dedicated phone-lines, public announcements and mail) when stakeholders do not have access to online channels or do not use them frequently. Ensure to provide and allow participants to provide feedback and suggestions; • Hold meetings in small groups, mainly in form of FGDs if permitted depending on restrictions in place and subject to strict observance of physical distancing and limited duration. • In situations where online interaction is challenging, disseminate information through digital platform (where available) like Facebook and WhatsApp & Chat groups. • Ensure online registration of participants, distribution of consultation materials and share feedback electronically with participants.	Contractor and CWWDA	• Number of participants invited for meetings • Availability of SOP(s), Training material, PPE, sanitizing facilities • No of workers sensitized on COVID-19 • No of hand-washing facilities installed; facemasks and temperature monitors secured, etc.	Budget as presented above
Sub Total ESMP					5,900,000.00

10 FINDINGS AND PROVISIONS

10.1 FINDINGS

A summary of ESIA findings as a result of construction of the proposed Water Transmission Pipelines and Reservoirs on biophysical and social receptors within the target locations is given below.

- Mwache Trunk Main traverses south-east, through undeveloped land and small scale cultivated lands to the Mwache Forest. Within the Mwache Forest, the trunk main (1.7km from Ch. 1+000 to Ch. 2+700) is proposed to be laid between the newly constructed Standard Gauge Railway (SGR) and the Mwache River.
- CWWD will require to apply for Way leave permit from Kenya Forest Services Kwale Office. During ESIA stage KFS officers from Kwale indicated that layout plans of the section traversing the forest should be attached to the application
- The South Mainland Transmission Main (Kaya Bombo Pipeline) branches off from the Mwache trunk main at Ch. 2+900 of the Trunk Main and traverses in the S.W direction, through the Mwache Forest to the Mwache / Bonje Creek. The ESIA has mapped this creek as a sensitive receptor, appropriate mitigation measures are provided for project likely impacts to water and soil resources within this ecosystem.
- The Kaya Bombo Transmission Pipeline then follows the alignment of the existing Marere Pipeline for approx. 6.4km up to Ch. 9+586 at Lutsangani. At this location, the proposed pipeline turns S.W. to join the existing DN 200 Kaya Bombo Pipeline wayleave for 12.2km up to the existing Kaya Bombo reservoir site at Ch. 21+744. A separate RAP has been prepared for project impacts related to loss of land and likely project impacts to peoples assets and sources of livelihood
- The impact of water pipeline construction will result to both physical and economic displacement of the 281 Project Affected PAPs who include 129 Male PAPs and 152 Female PAPs and 1 community Church. The total number of PAPs includes; 4Nr. vulnerable PAPS who are 1Nr. disabled male PAP located in Gandini, 1Nr. Elderly female PAP in Gandini, 1Nr. Elderly female PAP in Ng'ombeni and 1Nr. Elderly female PAP in Mbuguni.
- The Pipeline on this section will cross the Pemba River at Ch. 11+090. It will then traverse through Mteza, Mbuguni, Majera and Kaya Bombo villages to the existing Kaya Bombo reservoir site. Again the ESIA has mapped this creek as a sensitive receptor, appropriate mitigation measures are provided for project likely impacts to water and soil resources within this ecosystem
- The ESIA also identified social receptors along the pipeline corridor which included ; Amani Nursery School Dzivani, Dzivani B Mosque, Dzivani Primary School, Mwandegwa Gospel Church, Grave site in Gandini, , Lutsangani Primary, Lutsangani Dispensary, Tsunza Shopping Centre, Mbuguni Mosque, Ningawa Primary School, Kiteje Shopping Center. The receptors might be exposed to health and safety risks associated with the Project activities, the ESIA has provided appropriate mitigation measures risks associated with community health and safety at such establishments

10.2 PROVISIONS

The ESIA Make Provisions as Listed below

- The Environment and Social Management Plan (ESMP) prepared under this ESIA assessment provides a budget of **Kenya Shillings Four Million, Six Hundred Thousand (Kshs 4,600,000)** for mitigation of environment and social impacts identified in this Report. The Bid Documents to be prepared for the project should incorporate the Environment, Social provisions discussed under Chapter 8 (Environment and Social Impact Assessment and Mitigation Measures).
- The RAP report prepared separately as part of this ESIA present the **Total RAP budget to be Kenya Shillings Forty Seven Million, Three Hundred and Eighty Thousands, and Seven Hundred and Sixty Kshs. 47,380,760.00**. This budget should be secured by CWWDA and PAPs compensated, pipeline corridor secured before implementation commencement of civil works under the Project.
- Project Contract Document include provisions for the contractor to Prepare and Implement Construction Environment and Social Management Plan (C-EMSP), annexes to the C-EMSP will include but not limited to: Soil and Sedimentation Control Plan, Spoil Management Control Plan, Dust Management Plan, Health, Hygiene and Safety Plan, Labour Management Plan, Child Protection Strategy, Gender-based Violence Action Plan, Waste Management Plan, Contractors Code of Conduct, Gender Inclusivity Strategy, HIV/Aid Prevention Strategy. The contractors will be required to engage services of a qualified Environment, Health and Safety Officers and Social Safeguards Officer at the time of Project implementation
- At Project implementation stage, the contractor, with approval of the supervising engineer, will prepare periodic Environmental and Social Implementation Report. The reports will provide status of implementation of risks & impacts management measures to date from the project start to the end the reporting period. From an occupational Health and Safety approach, the contractors will ensure they under the following; OSH risk assessment, Registration of workplaces, Safety and Health (OSH) Audit, Fitness to work assessment of employees, Training of all workers or workers' representatives in basic Occupational Safety and Health, Accident and incident reporting, Compensation of injured workers who die or get injured and disabled and Examination of Safety Plants and Equipment.
- At Project completion stage, within the Defects Liability Period, Coast Water Works Development Agency (CWWDA) will initiate an Initial Environment and Social Audit for the Project as required by EIA/EA Audit Regulations (2003) and subsequent annual self-audits. The Audit will develop an Environment and Social Audit Action Plan (ESAAP) that will be used to track Project Environment and Social Compliance during Project operation phase.
- Secure Euros 389,405.10 detailed in the CHA report that will be utilized for implementing biodiversity Management measures detailed in this EIA and CHA, the budget will facilitate initiatives including listed below;
 - ✓ Implement supplementary Biodiversity Assessment and monitoring in October to November 2025 during the short rains, January to February 2026 During Dry Season and April to May 2027 during long rains
 - ✓ Service Level Agreement (SLA) between Kenya forest Service (KFS) and Coast Water Works Development Agency (CWWDA). The SLA will describe details agreements related to applicable permit procedures and measures of ensuring Ecological Equivalence for the selected off set in terms of (i) Habitat Type, (ii) Species Composition, (iii) Ecological Condition, (iv Long-term Protection) and (v) Monitoring - CWWDA to take lead
 - ✓ Implementation of provisions of Biodiversity Plan, in relation to budgets and staff to be hired (i) Environmental and biodiversity / Ecology advisor at the supervising engineer side and (ii) Ecological clerk of works at the Contractor side

✓ Capacity Building and Training of CWWDA safeguards team and Community Engagement and Grievance Resolution

References

Characterization of mangrove forest types in view of conservation and management — M. Cunha-Lignon, C. Coelho Jr., R. Almeida, R.P. Menghini, Y. Schaeffer-Novelli, G. Cintrón and F. Dahdouh-Guebas 2011

<https://www.worlddata.info/africa/kenya/climate-coast.php> State of Coast Report for Kenya (Enhancing Integrated Management of Coastal and Marine Resources in Kenya) – NEMA 2017

Environmental Impact Assessment Report for Mwache Roads Project (2016)

https://www.biodev2030.org/wpcontent/uploads/2021/07/Annexe-33_Rapport-Final_National-Biodiversity-Threat-Assessment_Kenya.pdf

Kenya National Biodiversity Threat Assessment Direct Human Threats Impacting Kenya's Biodiversity Masumi S. Gudka for IUCN – BIODEV2030 – September 2020

https://wedocs.unep.org/bitstream/handle/20.500.11822/25890/Kenya_MEDA.pdf?sequence=1&isAllowed=y

The Effects and Impacts of Quarrying on Forest Land: The Case of Gami Quarries, Mwache Forest, Kwale County, Kenya -2015

Mangroves in peril: unprecedented degradation rates of peri-urban mangroves in Kenya - Biogeosciences May 2014

National Marine Ecosystem Diagnostic Analysis (MEDA) GeF, UNDP

APPENDICES





APPENDIX 1

TERMS OF REFERENCE APPROVED BY NEMA



NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY

Mobile Lines: 0724-253 398, 0723-363 010, 0735-013 046
Telkom Wireless: 020-2101370, 020-2183718
Incident Lines: 0786-101100, 0741-101100

P.O. Box 67839, 00200
Popo Road, Nairobi, Kenya
E-mail: dgnema@nema.go.ke
Website: www.nema.go.ke

NEMA/TOR/5/2/358

29th November, 2021

The Chief Executive Officer,
Coastal Water Works Development Agency,
P.O Box 90417-80100,
MOMBASA.

**RE: ACKNOWLEDGEMENT AND APPROVAL OF TERMS OF REFERENCE
(TOR) FOR ENVIRONMENTAL IMPACT ASSESSMENT.**

We acknowledge the receipt of TOR for the above subject.

Pursuant to the Environmental Management and Coordination Act, 1999 the second schedule and the Environmental (Impact Assessment and Audit) Regulations 31 and 35, your terms of reference for the Environmental Impact Assessment (EIA) for the proposed **MWACHE TRUNK MAIN AND SOUTH MAINLAND WATER TRANSMISSION PIPELINE** has been approved.

You shall submit ten (10) copies, a soft copy summarised version of the **ESMP** in **WORD** form and one electronic copy of your report prepared by a registered expert to the Authority.

MARRIAN KIOKO
HEAD EIA SECTION



APPENDIX 2

ENVIRONMENTAL AND SOCIAL SCREENING CHECKLIST AND CHANCE FIND PROCEDURES

Environmental and Social Screening Checklist

Part B: Details of Site Location	Yes/No	Description / Remarks
- Is the site or proposed investment a protected or reserved site Provide proximity in kms - Biosphere Reserve - National park - Wildlife / Bird Sanctuary - Wetland - Important Bird Areas - Coastal area with corals - Mangrove areas (or Estuary with, mangroves) - Natural lakes - Habitat of migratory birds (outside protected areas) - Migratory Route of Wild Animals/Birds - Area with threatened/ rare/endangered fauna (outside protected areas) - Area with threatened/rare/ endangered flora (outside protected areas) - Reserved/Protected Forest - Zoological Park /Botanical Garden	NO	However 1.7 km of Trunk main will traverse through gazetted Mwache forest
Are there vulnerable or endangered species (terrestrial or aquatic) in the area?	NO	
Are there natural habitats in the site? Or in its proximity	YES	Bonte creek
If there are natural habitats, are they fragile, unique, limited in size? Are these world heritage / Ramsar sites	NO	-mwache forest
Are there wetlands, areas of saturated soils (permanent or temporary), or evidence of ponding (cracks, high clay content in soils, dead vegetation, water marks)	YES	
Is the site already degraded (low groundwater, poor soil quality)	NO	
Are there steep slopes in the proximity of the investment site	YES	
Do people live on the proposed site?	YES	
List existing land uses (ranching, farming)	YES	
Is there existing site access (roads)?	YES	
Is the site vulnerable to natural hazards (in floodplain, near volcano, on seismic fault, near coastline in hurricane zone)?	NO	
Are there land title conflicts?	NO	
Are there known archaeological, historical or other cultural property? Are any of these world heritage/ UNESCO designated etc	NO	
Do indigenous peoples live on or near the site?	NO	
(i) Scope of proposed activities		
Will the investment generate an increase in solid wastes or machine wastes (oil, etc)?	YES	however limited from construction equipment
(ii) Water Resource Impacts		
Could the investment result in a modification of groundwater levels by altering flows, paving surfaces or increasing water extraction?	NO	
Could it affect quality (through sediment, wastewater, storm discharge or solid waste) of nearby surface waters (lake, rivers, streams)?	YES	however minimum quantities
Will it affect water quantity in nearby water bodies (lake, river, stream)	NO	

Scanned by TapScanner

Are there nearby potable water sources that need to be protected?	yes	pumba stream
(iii) Ecosystem Impacts		
Could the investment affect natural habitats or areas of high ecological value?	no	
Could it affect natural characteristics of adjacent or nearby sites?		
Could it affect wildlife or natural vegetation?		
(iv) Drainage Impacts		
Will the investment in storm water drainage affect existing drainage patterns?	no	
Will it cause standing water, which could cause public health risks?	no	
Will erosion result in sediment discharge to nearby water bodies	yes	although minimal quantities
Will surface drainage patterns be affected in borrow pits and quarries?	no	
Will infiltration patterns be affected?	no	
Socio-economic impacts		
Will the project entail resettlement of population?	✓	RAP required
Will the project affect indigenous peoples?	✓	
Will it limit access to natural resources to local populations?	no	
Will it have an impact on land use?	no	
Will it induce further encroachment of nearby areas?	no	
Will it cause any health impacts?	no	
Will it disturb nearby communities during construction?	yes	
Could cultural resources be affected?	yes	1cay
Could it affect nearby properties?	no	

Part D Analysis of Resettlement Impacts			
Criteria	Yes	No	Remarks/identified problem
Acquisition of private land?	yes		RAP prepared
Alienation of any type of government land including that owned by urban local body	no		
Clearance of encroachment from government/ urban local body land?	no		
Number of structures, both authorized and/or unauthorized to be acquired/cleared?	yes		
Number of household to be displaced?	yes		
Details of village common properties to be alienated, Pasture land(acres)cremation /burial ground and others specify?	no		
Describe existing land uses on and around the project area(e.g Community facilities, agriculture, tourism, private property)	no		
Will the project result in construction of workers or other people moving into or having access to the area (for a long period and in large numbers compared to permanent residents) ?	yes		

Are financial compensation measures expected to be needed?	yes		
Loss of Crops, fruit, household infrastructure and livelihood			
Criteria	Yes	No	Remarks/identified problem
Will the project result in the permanent or temporary loss of			
• Crops?	no		
• Fruit trees/coconut palms? Specify with numbers			
• Household infrastructure? Specify with numbers	yes		RAP required
• Loss of agriculture land? specify with numbers	no		
Welfare , employment and gender			
Is the project likely to provide local employment opportunities, including employment opportunities for women?	yes		
Is the project being planned with sufficient attention to local poverty alleviation objectives?	yes		
Is the project being designed with sufficient local participation of women in the planning design and implementation process?	yes		
Historical, Archaeological, or cultural Heritage sites			
Criteria	Yes	No	Remarks/identified problem
Based on available sources, consultation with local Authorities, local knowledge and/ or observation could the project alter?			
Historical heritage site(s) or require excavation near the same	no		
Archaeological heritage site(s) or require excavation near the same?	no		
Cultural heritage site(s) or require excavation near the same	no		
Graves or sacred locations or require excavation near the same	yes		
Part D (i) : Result/Outcome of Environmental/ Social and Resettlement Screening Exercise			
No Environment Impact Assessment Required	ESIA required		
Environment Impact Assessment Required			
OP4.12 category (S1, S2, S3)			
RAP category required	RAP required		
Any special conditions			
Part E : Authorisation			

CHANCE FIND PROCEDURES

Policy and Legal Provision

National Museums and Heritage Act 2006 laws of Kenya provides for; *'if you believe that you may have encountered any archaeological materials or any material national importance stop work in the area and follow the procedure box below'*

Chance Find Procedures

- (i) All construction activity in the vicinity of the remains is to cease immediately.
- (ii) The Supervising engineer or Environment Officer shall contact Kenya National Museums Immediately

Public relations:

E-mail: publicrelations@museums.or.ke

Director General:-

Email: dg@museums.or.ke

Fax: +254 -20-3741424

Tel:+254-20-8164134/35/36

- (iii) The find location will be recorded and all remains will be left in place.
- (iv) Potential significance of the remains will be assessed and mitigative options will be identified.
- (v) If the significance of the remains is judged to be sufficient to warrant further action and they cannot be avoided, then the Director of Kenya National Museums will determine the appropriate course of action
- (vi) In the case of human remains, if the remains are assessed to be archaeological, then Director of Kenya National Museums will determine how to handle them.
- (vii) Options could include avoidance or respectful removal and reburial.
- (viii) If human remains are encountered and they are not archaeological, then Kwale County Government will be contacted immediately for appropriate reburial.



APPENDIX 3

PUBLIC PARTICIPATION MINUTES AND ATTENDANCE LIST

Meeting 1:
Gandini Public Participation Meeting

**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) AND RESETTLEMENT ACTION PLAN (RAP) FOR MWACHE
WATER TRANSMISSION PIPELINE AND TERMINAL RESERVOIRS**

MINUTES OF PUBLIC PARTICIPATION FORUM HELD ON THE 21ST OCTOBER 2021 AT GANDINI CHIEF'S OFFICE.

PRESENT:

Local Administration

Chief

Gandini Location.

Village Elders – see attached list

Mangat, I. B. Patel– Consultant

Obra Mmaitsi

MIBP Consultant

Resident of Gandini Location - see attached list

KEY PROJECT DATA

Client/Employer	Coast Water Works Development Agency (CWWDA)
Financing Agency	AFD

MINUTES

<u>Item</u>	<u>Minutes</u>	<u>Action By</u>
1.	<u>Introduction</u> The meeting was called to order by the Chief Gandini location at 10 am, she invited one Villager to start off the forum with a word of prayer. In her opening remarks, the area chief thanked those that had created time to attend the meeting. Village elders were encouraged to always make sure they reach each and every homestead when mobilizing for such forums. She informed residents that the meeting was organised to discuss issues regarding the proposed Mwache pipeline project which is a government project, those with questions and concerns were encouraged to raise them for deliberation. Finally, she invited the consultant representative Mr. Obra Mmmaitsi to proceed with the remaining agenda.	Chief Gandini Location
2.	<u>Project Information</u> The Consultant representative Obra Mmmaitsi thanked stakeholders for creating time to come and participate in the ESIA and RAP public participation forum. He gave a brief of the proposed Project scope which include; Construction of Mwache Dam on Mwache River, Water Treatment Plant (WTP), 4Nr. Terminal Reservoirs; one for each of the target supply areas (NML, WML, SML and Island); namely - Nguu Tatu terminal reservoir, Changamwe Reservoir, Dongo Kundu Reservoir, proposed to be constructed within Dongo Kundu area in Mtongwe, serving the South Mainland, West Mainland reservoir and A system of Treated Water Transmission Pipelines, transmitting treated water from the Mwache WTP to the proposed Reservoirs The Consultant representative informed the meeting that MWSI has secured funds from the Word Bank (WB) and the Agence Francaise de Développement (AFD), for financing	MIBP Obra Mmaitsi

Item	Minutes	Action By
	implementation of the various component of the Mwache Dam Water Supply Project. The WB component is scheduled to finance the Dam and possibly the Nguu Tatu and Changamwe transmission pipelines and their corresponding reservoirs. The AFD component will finance the WTP & associated facilities, the West Mainland and Dongo Kundu reservoirs, the trunk transmission pipeline.	
3.	<u>Environment and Social Safeguard Report</u> The Consultant representative informed the meeting that they were going to prepare <i>Environmental and Social Impact Assessment Report</i> (ESIA) that will capture all the environmental and social impacts of the project and provide mitigation measures. They were assured that all their opinions and concerns will be captured in the report so as to ensure the Project is acceptable by the community and also sustainable development is achieved. Residents were also informed that the consultant will prepare a Resettlement Action Plan (RAP) that will ensure that all assets affected by the project are documented for purposes of Compensation.	MIBP Obra Mmaitsi
4.	<u>Project Positive Impacts</u> The Consultant representative pointed out to the meeting that the water supply project has enormous benefits as summarized below. a) Improvement of sanitation within the targeted supply area by providing clean reliable domestic water this will go a long way in reducing water borne ailments such as cholera Typhoid and Diarrhoea. Respiratory ailments like COVID 19 can also be controlled through regular hand wash with soap and water. b) Reduced time taken for residents while fetching water. This valuable time can be used to do other economical activities like farming and small-scale businesses. c) Availability of clean reliable domestic water will also reduce cases of gender-based Violence towards women and children in their quest to search for water in far flanked areas. d) Improve the value of land through provision of sanitation infrastructure, better housing will be developed in the area. e) The Project will provide employment opportunities, at construction stage, opportunities will be direct employment for both skilled and unskilled labour while during operation phase, and employment opportunities will be available for water operators.	MIBP Obra Mmaitsi
5.	<u>Impacts to Environment (Natural and Social)</u> The consultant representative informed the meeting that this being a water supply project, it will have minimal negative impacts likely to be triggered. Some of the impacts are as indicated below. • Cutting down of trees especially the Neem tree, Mangroves around Bonje Creek and Coconuts which are predominant in the area. • Dust generated during construction that is likely to affect air quality within the project area. • Noise and Excessive Vibrations. This is likely to result during the construction phase from the equipment involved in the Project.	MIBP Obra Mmaitsi

Item	Minutes	Action By												
	He further added that all these impacts would be addressed comprehensively by the ESIA study report and appropriate mitigation measure provided.													
6.	Question and Answer Session After discussion summarized above, the community were invited to a question-and-answer session. Detailed questions and suggestion of the plenary session are presented in Table 1 below Table 1: Plenary Session <table><tr><th>Suggestion / Question</th><th>Response</th></tr><tr><td>Mr. Katsudzi Dziro wanted to know how cases of disputed land will be handled.</td><td>The meeting was informed that the consultant will establish a grievance Redress Committee that will look into disputes locally. Residents were encouraged to use the GRC to solves disputes instead of court process that might be lengthy and expensive.</td></tr><tr><td>Underson Beja Wanted to be informed on how damages to private property outside the acquired project wayleave will be handled.</td><td>The meeting was informed that the wayleave will include extra working space. Any property that falls within the wayleave corridor will be compensated. In the event that the contractor damages property outside the wayleave, they will have to be reinstated on fresh compensation done by the contractor.</td></tr><tr><td>Harrison Chiwala wanted to be informed on when the project will commence.</td><td>The meeting was informed that funding for the project which include construction of Mwache dam and the transmission line is available. The project will commence immediately after all the pre requisite reports including ESIA report and NEMA licence has been issued and also a resettlement action plan has been prepared for the affected persons.</td></tr><tr><td>Mr. Mbodze wanted to know what will happen in the event that the pipeline passes were graves are.</td><td>Residents were informed that the contractor will try as much as possible to avoid graves, in areas where it is not possible to avoid, the community will be allowed to their cultural procedures of relocating graves. The project client will facilitate the process.</td></tr><tr><td>Residents wanted to know if the contractor will source for workforce within the community where the works will be implemented.</td><td>Residents were informed that both unskilled labour and some skilled will be sourced from the local community. Youths were encouraged to organize themselves into groups and avail themselves for consideration.</td></tr></table>	Suggestion / Question	Response	Mr. Katsudzi Dziro wanted to know how cases of disputed land will be handled.	The meeting was informed that the consultant will establish a grievance Redress Committee that will look into disputes locally. Residents were encouraged to use the GRC to solves disputes instead of court process that might be lengthy and expensive.	Underson Beja Wanted to be informed on how damages to private property outside the acquired project wayleave will be handled.	The meeting was informed that the wayleave will include extra working space. Any property that falls within the wayleave corridor will be compensated. In the event that the contractor damages property outside the wayleave, they will have to be reinstated on fresh compensation done by the contractor.	Harrison Chiwala wanted to be informed on when the project will commence.	The meeting was informed that funding for the project which include construction of Mwache dam and the transmission line is available. The project will commence immediately after all the pre requisite reports including ESIA report and NEMA licence has been issued and also a resettlement action plan has been prepared for the affected persons.	Mr. Mbodze wanted to know what will happen in the event that the pipeline passes were graves are.	Residents were informed that the contractor will try as much as possible to avoid graves, in areas where it is not possible to avoid, the community will be allowed to their cultural procedures of relocating graves. The project client will facilitate the process.	Residents wanted to know if the contractor will source for workforce within the community where the works will be implemented.	Residents were informed that both unskilled labour and some skilled will be sourced from the local community. Youths were encouraged to organize themselves into groups and avail themselves for consideration.	MIBP Obra Mmaitsi MIBP Obra Mmaitsi MIBP Obra Mmaitsi MIBP Obra Mmaitsi MIBP Obra Mmaitsi
Suggestion / Question	Response													
Mr. Katsudzi Dziro wanted to know how cases of disputed land will be handled.	The meeting was informed that the consultant will establish a grievance Redress Committee that will look into disputes locally. Residents were encouraged to use the GRC to solves disputes instead of court process that might be lengthy and expensive.													
Underson Beja Wanted to be informed on how damages to private property outside the acquired project wayleave will be handled.	The meeting was informed that the wayleave will include extra working space. Any property that falls within the wayleave corridor will be compensated. In the event that the contractor damages property outside the wayleave, they will have to be reinstated on fresh compensation done by the contractor.													
Harrison Chiwala wanted to be informed on when the project will commence.	The meeting was informed that funding for the project which include construction of Mwache dam and the transmission line is available. The project will commence immediately after all the pre requisite reports including ESIA report and NEMA licence has been issued and also a resettlement action plan has been prepared for the affected persons.													
Mr. Mbodze wanted to know what will happen in the event that the pipeline passes were graves are.	Residents were informed that the contractor will try as much as possible to avoid graves, in areas where it is not possible to avoid, the community will be allowed to their cultural procedures of relocating graves. The project client will facilitate the process.													
Residents wanted to know if the contractor will source for workforce within the community where the works will be implemented.	Residents were informed that both unskilled labour and some skilled will be sourced from the local community. Youths were encouraged to organize themselves into groups and avail themselves for consideration.													
7.	Closing Remarks The area Village elder urged those in attendance to accept the project since it was meant to improve their quality of life, he requested them to be good will ambassadors for the project and spread information to those who could not make it to the meeting. Finally, the elder adjourned the meeting at 11.30AM, a closing prayer was conducted by a village elder in attendance.	Village Elder												

MINUTES AUTHENTICATION

MINUTES AUTHENTICATION

CHIEF GANDINI LOCATION

Name MUNGA NDEGWA

Date 10/11/2021

Signature [Signature] FOR CHIEF GANDINI LOCATION
ABBY CHIEF
MUNGA NDEGWA
GANDINI LOCATION
10/11/2021

Consultant's Representative

Name Obra Mwatsi

Date 10/11/2021

Signature [Signature]

SAMPLE PHOTOS OF THE MEETING

The area chief starting off the meeting



Residents following proceedings of the meeting



ATTENDANCE LIST – GANDINI LOCATION MEETING

MIBP
 CONSULTING ENGINEERS

DETAILED DESIGNS, TENDER DOCUMENTS, SAFEGUARD REPORTS AND CONSTRUCTION SUPERVISION OF
 MWACHE WATER TRANSMISSION PIPELINES AND TERMINAL RESERVOIRS

PUBLIC / INSTITUTIONAL CONSULTATIVE FORUM

ATTENDANCE LIST

S/No	Name	Institution / Estate / Village	Telephone	Sign
1	ALU KASHANGA KASIMAT	DZIVANI 'B'	0727542373	[Signature]
2	MWASAMUNIGA CHISAMBA	DZIVANI 'A'	0721928641	[Signature]
3	MWANGI MUKHA	DZIVANI 'A'	0725638569	[Signature]
4	ONEARI RAGADI AUCSANT	DZIVANI 'A'	0768809507	[Signature]
5	JOSEPH KOMBO	DZIVANI 'B'	0724103369	[Signature]
6	RAJAB BEJA CHILELE	BODO	0707944442	[Signature]
7	CHOGA GOTTOLA KUFASA	MITANGANI 'A'	0799484657	[Signature]
8	HAMISI M. BEKAMBA	BZIVANI 'A'	073669788	[Signature]
9	CHAI LUALGANTI	MITANGANI 'A'	0711111111	[Signature]
10	MAZERA BEJA MWATEMO	LUTSANGANI 'C'	0706455928	[Signature]
11	BAMATI DZELI KASIMAT	BODO	07	[Signature]
12	MGAZA ZUMA TSUMA	BODO	0707269392	[Signature]
13	KWAVA MUKLUNGO GORUFU	MITANGANI 'A'	0704447680	[Signature]
14	BATI NGAO BATI	MITANGANI 'A'	0713912607	[Signature]

Activity: Public Participation Forum Date: 21/10/2021 Venue: Gandini Chief's Office

MIBP

CONSULTING ENGINEERS

DETAILED DESIGNS, TENDER DOCUMENTS, SAFEGUARD REPORTS AND CONSTRUCTION SUPERVISION OF
 MWACHE WATER TRANSMISSION PIPELINES AND TERMINAL RESERVOIRS
 PUBLIC / INSTITUTIONAL CONSULTATIVE FORUM

ATTENDANCE LIST

Activity: Public Participation Forum Date: 21/10/2021 Venue: GARDINIA CHIEF'S OFFICE

S/No	Name	Institution / Estate / Village	Telephone	Sign
44	TANDA MUNISA MANGALE	DZIVANI A	0799642806	Fawad
45	DZOMBO KUVINA MINDATU	DZIVANI B	0713245658	Paul
46	HASSAN CHAKATA SIMBA	TAKANA	0726586954	SEL
47	MBEYU DZOMBO MKENO	DZIVANI (B)	0745761776	ND
48	MKONGO CHIRHOGO KASTIMAT	DZIVANI (B)	0715005288	RE
49	MBEDE MINDAU KUVINA	DZIVANI (B)	0799557524	MIB
50	MOTA MUNISA KUVINA	DZIVANI (B)	0745173231	TI
51	TANDA MANGALE NZUKI	MAGWAGWAGU	—	FI
52	ADARCA NYAMANI DZUWANGENI DZIVANI (A)	DZIVANI (A)	0713077204	AB
53	CHIRUNGA DZOMBO MKENO	DZIVANI (B)	0729521209	LD
54	MASHAKA NBARO MBEYU	DZIVANI B	07022030346	AB
55	MKONGO DZOMBO MKENO	DZIVANI B	0711653047	MIB
56	MWATAYA NBUKE SHAMAKANI CHIRUNGUNI	CHIRUNGUNI	0714910484	FI
57	DZUHA DZOMBO MKENO	DZIVANI (B)	—	AB

MIBP CONSULTING ENGINEERS

DETAILED DESIGNS, TENDER DOCUMENTS, SAFEGUARD REPORTS AND CONSTRUCTION SUPERVISION OF
 MWACHE WATER TRANSMISSION PIPELINES AND TERMINAL RESERVOIRS

PUBLIC/INSTITUTIONAL CONSULTATIVE FORUM

ATTENDANCE LIST

S/No	Name	Institution / Estate / Village	Telephone	Sign
30	CHIMPOKO BORA CHUMBO	LUTSANGANI	0114952206	
31	HAMISI KOMBO (HUMANI)	BZIVANI (B)	—	
32	NDEGEA KOMBO MIRONO	BZIVANI (B)	—	
33	MAVUNE KOMBO KULALA	LUTSANGANI (A)	0723424855	
34	HUSEIN CHIRUNGA	BZIVANI (A)	0713798034	
35	ALI HAMISI MUMISA	BZIVANI (B)	—	
36	LUPINDO MANGACE MABUGU	LUTSANGANI (A)	—	
37	NYAMVULA MWACHONDO MIRONO	BZIVANI (B)	—	
38	JONATHAN DZERI MONGORO	BZIVANI B	—	
39	KUPHA (HENGU) ZUMA	L/MILANGANI	—	
40	MABUGU MZIRIGA TSUMA	LUTSANGANI (A)	0757037394	
41	MBODE KOMBO MAMANI	L/MILANGANI	0715202521	
42	CHIRIMA NGAMANI	L/MILANGANI	—	
43	JUMAA KOMBO MUGORO	L/MITANGANI (A)	0704223490	

Activity: PUBLIC PARTICIPATION FORUM Date: 21/10/2021 Venue: GANDINI CHIEF'S OFFICE

MIBP

Consulting Engineers

DETAILED DESIGNS, TENDER DOCUMENTS, SAFEGUARD REPORTS AND CONSTRUCTION SUPERVISION OF
 MWACHE WATER TRANSMISSION PIPELINES AND TERMINAL RESERVOIRS

PUBLIC / INSTITUTIONAL CONSULTATIVE FORUM

ATTENDANCE LIST

Activity Public Participation Meeting Date 21/10/2023 Venue GARDINI CHIEF'S OFFICE

S/No	Name	Institution / Estate / Village	Telephone	Sign
58	MUNGO BETA CHAZO	DZIVANI (B)	0716617026	MCA
59	DZAME MKALA MICHUHA	DZIVANI (B)	0717693200	DM
60	NGOKA MWACHINDO	DZIVANI "B"	0725988178	NDA
61	CHITZI MWAMBENYU	DZIVANI "B"	11600078	CM
62	QASIM Mwachendo MENDO	DZIVANI B	0716581256	DM
63	SANDI JUMA RUWA	DZIVANI B	0762900716	SB
64	KASIMU RUWA	DZIVANI B	0726772002	#
65	NILU NDUYA BEMANBO	DZIVANI B	—	—
66	LIMAZI MACHANGELA	GARDINI (CHIEF)	0717077004	DM
67	OBRA MNETSI	Environmental	0729716004	DM

Meeting 2:
Mbuguni Location Meeting

**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) AND RESETTLEMENT ACTION PLAN (RAP) FOR MWACHE
WATER TRANSMISSION PIPELINE AND TERMINAL RESERVOIRS**

MINUTES OF PUBLIC PARTICIPATION FORUM HELD ON THE 22ND OCTOBER 2021 AT MBUGUNI CHIEF’S OFFICE.

PRESENT:

Local Administration

Chief

Mbuguni Location.

Village Elders – see attached list

Mangat, I. B. Patel– Consultant

Obra Mmaitsi

MIBP Consultant

Resident of Mbuguni Location - see attached list

KEY PROJECT DATA

Client/Employer	Coast Water Works Development Agency (CWWDA)
Financing Agency	AFD

MINUTES

<u>Item</u>	<u>Minutes</u>	<u>Action By</u>
8.	<u>Introduction</u> The meeting was called to order by the Chief Mbuguni location at 10 am, he invited one Villager to start off the forum with a word of prayer. In his opening remarks, the area chief thanked those that had created time to attend the meeting. He thanked the consultant for arriving on time, this he said will allow the meeting to end early enough so that most of the residents can go to attend Friday prayers. He informed residents that the meeting was organised to discuss issues regarding the proposed Mwache pipeline project which is a government project, those with questions and concerns were encouraged to raise them for deliberation. Finally, he invited the consultant representative Mr. Obra Mmmaitsi to proceed with the remaining agenda.	Chief Mbuguni Location
9.	<u>Project Information</u> The Consultant representative Obra Mmmaitsi thanked stakeholders for creating time to come and participate in the ESIA and RAP public participation forum. He gave a brief of the proposed Project scope which include; Construction of Mwache Dam on Mwache River, Water Treatment Plant (WTP), 4Nr. Terminal Reservoirs; one for each of the target supply areas (NML, WML, SML and Island); namely - Nguu Tatu terminal reservoir, Changamwe Reservoir, Dongo Kundu Reservoir, proposed to be constructed within Dongo Kundu area in Mtongwe, serving the South Mainland, West Mainland reservoir and A system of Treated Water Transmission Pipelines, transmitting treated water from the Mwache WTP to the proposed Reservoirs	MIBP Obra Mmaitsi

Item	Minutes	Action By
	The consultant representative informed the meeting that the WSI has secured funds from the World Bank (WB) and the Agence Francaise de Développement (AFD), for financing implementation of the various component of the Mwache Dam Water Supply Project. The WB component is scheduled to finance the Dam and possibly the Nguu Tatu and Changamwe transmission pipelines and their corresponding reservoirs. The AFD component will finance the WTP & associated facilities, the West Mainland and Dongo Kundu reservoirs, the trunk transmission pipeline.	
10.	<u>Environment and Social Safeguard Report</u> The consultant representative informed the meeting that they were going to prepare <i>Environmental and Social Impact Assessment Report</i> (ESIA) that will capture all the environmental and social impacts of the project and provide mitigation measures. They were assured that all their opinions and concerns will be captured in the report so as to ensure the Project is acceptable by the community and also sustainable development is achieved. Residents were also informed that the consultant will prepare a Resettlement Action Plan (RAP) that will ensure that all assets affected by the project are documented for purposes of Compensation.	MIBP Obra Mmaitsi
11.	<u>Project Positive Impacts</u> The consultant representative pointed out to the meeting that the water supply project has enormous benefits as summarized below. f) Improvement of sanitation within the targeted supply area by providing clean reliable domestic water this will go a long way in reducing water borne ailments such as cholera Typhoid and Diarrhoea. Respiratory ailments like COVID 19 can also be controlled through regular hand wash with soap and water. g) Reduced time taken for residents while fetching water. This valuable time can be used to do other economical activities like farming and small-scale businesses. h) Availability of clean reliable domestic water will also reduce cases of gender-based Violence towards women and children in their quest to search for water in far flanked areas. i) Improve the value of land through provision of sanitation infrastructure, better housing will be developed in the area. j) The Project will provide employment opportunities, at construction stage, opportunities will be direct employment for both skilled and unskilled labour while during operation phase, employment opportunities will be available for water operators.	MIBP Obra Mmaitsi
12.	<u>Impacts to Environment (Natural and Social)</u> The consultant representative informed the meeting that this being a water supply project, it will have minimal negative impacts likely to be triggered. Some of the impacts are as indicated below. • Cutting down of trees especially the Neem tree, Mangroves around Bonje Creek and Coconuts which are predominant in the area. • Dust generated during construction that is likely to affect air quality within the project area. • Noise and Excessive Vibrations. This is likely to result during the construction phase from the equipment involved in the Project.	MIBP Obra Mmaitsi

Item	Minutes	Action By										
	He further added that all these impacts would be addressed comprehensively by the ESIA study report and appropriate mitigation measure provided.											
13.	Question and Answer Session After discussion summarized above, the community were invited to a question-and-answer session. Detailed questions and suggestion of the plenary session are presented in Table 1 below Table 1: Plenary Session <table><tr><th>Suggestion / Question</th><th>Response</th></tr><tr><td>Mr. Sale Ali wanted to know if the water will benefit residents of Mbuguni</td><td>The meeting was informed that the pipeline is a transmission line and not for household connection, however residents can request to be given water kiosks within shopping centres for them to access water easily.</td></tr><tr><td>Mr. Juma Omar wanted to know what will happen to those property owners who not be available during enumeration.</td><td>The meeting was informed that the consultant will be walking along the proposed pipeline route accompanied by village elders, details of those that will not be on ground during enumeration will be captured and follow up done to ensure any missing information about them is captured.</td></tr><tr><td>Residents wanted to be informed on when the project will commence.</td><td>The meeting was informed that funding for the project which include construction of Mwache dam and the transmission line is available. The project will commence immediately after all the pre requisite reports including ESIA report and NEMA licence has been issued and also a resettlement action plan has been prepared for the affected persons.</td></tr><tr><td>Residents wanted to know if the contractor will source for workforce within the community where the works will be implemented.</td><td>Residents were informed that both unskilled labour and some skilled will be sourced from the local community. Youths were encouraged to organize themselves into groups and avail themselves for consideration.</td></tr></table>	Suggestion / Question	Response	Mr. Sale Ali wanted to know if the water will benefit residents of Mbuguni	The meeting was informed that the pipeline is a transmission line and not for household connection, however residents can request to be given water kiosks within shopping centres for them to access water easily.	Mr. Juma Omar wanted to know what will happen to those property owners who not be available during enumeration.	The meeting was informed that the consultant will be walking along the proposed pipeline route accompanied by village elders, details of those that will not be on ground during enumeration will be captured and follow up done to ensure any missing information about them is captured.	Residents wanted to be informed on when the project will commence.	The meeting was informed that funding for the project which include construction of Mwache dam and the transmission line is available. The project will commence immediately after all the pre requisite reports including ESIA report and NEMA licence has been issued and also a resettlement action plan has been prepared for the affected persons.	Residents wanted to know if the contractor will source for workforce within the community where the works will be implemented.	Residents were informed that both unskilled labour and some skilled will be sourced from the local community. Youths were encouraged to organize themselves into groups and avail themselves for consideration.	MIBP Obra Mmaitisi MIBP Obra Mmaitisi MIBP Obra Mmaitisi MIBP Obra Mmaitisi
Suggestion / Question	Response											
Mr. Sale Ali wanted to know if the water will benefit residents of Mbuguni	The meeting was informed that the pipeline is a transmission line and not for household connection, however residents can request to be given water kiosks within shopping centres for them to access water easily.											
Mr. Juma Omar wanted to know what will happen to those property owners who not be available during enumeration.	The meeting was informed that the consultant will be walking along the proposed pipeline route accompanied by village elders, details of those that will not be on ground during enumeration will be captured and follow up done to ensure any missing information about them is captured.											
Residents wanted to be informed on when the project will commence.	The meeting was informed that funding for the project which include construction of Mwache dam and the transmission line is available. The project will commence immediately after all the pre requisite reports including ESIA report and NEMA licence has been issued and also a resettlement action plan has been prepared for the affected persons.											
Residents wanted to know if the contractor will source for workforce within the community where the works will be implemented.	Residents were informed that both unskilled labour and some skilled will be sourced from the local community. Youths were encouraged to organize themselves into groups and avail themselves for consideration.											
14.	Closing Remarks The area Chief urged those in attendance to accept the project since it was meant to improve their quality of life, he requested them to be good will ambassadors for the project and spread information to those who could not make it to the meeting. Finally, the Chief adjourned the meeting at 11.30AM, a closing prayer was conducted by a village elder in attendance.	Chief Mbuguni Location										

MINUTES AUTHENTICATION

MINUTES AUTHENTICATION

CHIEF MBUGUNI LOCATION

Name..... ABDALLA SALIM

Date..... 10/11/2021

Signature..... [Signature]

CHIEF
MBUGUNI
LOCATION
Box
TITLE

Consultant's Representative

Name..... Obra Mwangi

Date..... 10/11/2021

Signature..... [Signature]

SAMPLE PHOTOS OF THE MEETING

The area chief starting off the meeting



A resident asking Questions.



ATTENDANCE LIST – MBUGUNI LOCATION MEETING

MIBP
Coastal Water Works Development Agency

DETAILED DESIGNS, TENDER DOCUMENTS, SAFEGUARD REPORTS AND CONSTRUCTION SUPERVISION OF
 MWACHE WATER TRANSMISSION PIPELINES AND TERMINAL RESERVOIRS

PUBLIC / INSTITUTIONAL CONSULTATIVE FORUM

ATTENDANCE LIST

Activity: Public Participation Forum Date: 22/10/2021 Venue: Mbuguni Chief's Office

S/No	Name	Institution / Estate / Village	Telephone	Sign
1	Omar Hamisi EMBANE	MWACHIPANGA	014 883140	[Signature]
2	Abdullah Juma Sunia	MWACHIPANGA	-	[Signature]
3	Mwanambwa Omar Bundo	MWACHIPANGA	-	M.D.
4	Ali Abdulla Mwanambwa	MBUGUNI CENTRAL	-	Ab
5	Rana Said Jambwa	MBERA	-	[Signature]
6	Hamisi Juma Mwasaniti	BANGA	0798535648	[Signature]
7	Said Abdulla KALELE	MBUGUNI CENTRAL	0719621402	[Signature]
8	Chimera Mzungu Masubi	BANGA	0- -	[Signature]
9	Said Ramadhani Kadung'e	MBUGUNI CENTRAL	-	CA
10	Christopher Muddoa MUDASI	MWACHIPANGA	0759318219	[Signature]
11	Ali Mkarabi Omar	MWACHIPANGA	0758806974	[Signature]
12	Juma Omar Mwakizikwa	MBUGUNI CENTRAL	-	[Signature]
13	Dollar Ali NASSER	MWACHIPANGA	0728211806	[Signature]
14	Mwarasi Abdulla Juma	"	0799757433	[Signature]

MIBP
Mwache Water Transmission Pipeline

DETAILED DESIGNS, TENDER DOCUMENTS, SAFEGUARD REPORTS AND CONSTRUCTION SUPERVISION OF
MWACHE WATER TRANSMISSION PIPELINES AND TERMINAL RESERVOIRS

PUBLIC / INSTITUTIONAL CONSULTATIVE FORUM

ATTENDANCE LIST

S/N	Name	Institution / Estate / Village	Telephone	Sign
15	RAMWENDO SWALEHE MUKAMUI	MWACHIPANGA	0726965217	
16	ALI MWASIRI	MWACHIPANGA	0707044494	
17	KIANJE TSANGARI	MTEZA	0113942435	
18	ABDALLAH BAHATI RANDANI	MWACHIPANGA	0794005104	
19	KADUNGE SAPA RAMADHANI	MBUGUNI CENTRAL	0757565934	
20	MANGAGE NDEGWA NGALA	MBUGUNI CENTRAL	—	
21	KADUNCIL MAREMB SAPI	MBUGUNI CENTRAL	—	
22	OMARI ABDALLAH	MWACHIPANGA	—	
23	RIZIKI MWADUMBA	MTEZA	—	
24	MWANGODYA TSANGARI	MTEZA	—	
25	BINGHAMS MIBANDA	MWACHIPANGA	074472000	
26	REHEMA A. RANDANI	"	—	
27	MWANAJUMA ALI	MWANDURU	—	
28	BEDZANGI CHOMBO MUMBA	MTEZA	—	

MIBP
CONSULTING ENGINEERS

**DETAILED DESIGNS, TENDER DOCUMENTS, SAFEGUARD REPORTS AND CONSTRUCTION SUPERVISION OF
 MWACHE WATER TRANSMISSION PIPELINES AND TERMINAL RESERVOIRS**

PUBLIC / INSTITUTIONAL CONSULTATIVE FORUM

ATTENDANCE LIST

Activity Public Participation Forum Date 22/10/2021 Venue Mwache Chief's Office

S/N	Name	Institution / Estate / Village	Telephone	Sign
29	OMARI MWATA JUMA	MWACHIPANGA	—	[Signature]
30	MUKARO KALIMBO	BANGA	—	[Signature]
31	JUMA MABANDA	MWACHIPANGA	071209256	[Signature]
32	BORA MISONIA	MTEZA	—	BORA
33	MAVUNE KOMBO	MTEZA	—	Mavune
34	HAMISI DIMAN	MBUGUTI Central	—	H.G.
35	VOYA MASUDI	MTEZA	—	V.M
36	ALI NDZIT MASIDI	"	0723760139	A.N
37	HAMAD ABD. MWAHARUMBO	"	07176774950	H.A
38	MATEMBO BORA	"	0741895878	M.B
39	RAMADHAN ABDALLAH	MBUGUTI	—	Ramadhan
40	MWINTI HAMISI BAKARI	MBUGUTI	—	Mwinti
41	MWANGI MANGALE MWADIGBO	MTEZA	0758605535	M.W
42	MWACHANJE ISANGAR	MTEZA	0713260050	M.W

Meeting 3:
Kiteje Sub Location Meeting

**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) AND RESETTLEMENT ACTION PLAN (RAP) FOR MWACHE
WATER TRANSMISSION PIPELINE AND TERMINAL RESERVOIRS**

**MINUTES OF PUBLIC PARTICIPATION FORUM HELD ON THE 23RD OCTOBER 2021 AT KITEJE ASSISTANT CHIEF'S
OFFICE.**

PRESENT:

Local Administration

Assistant Chief

Kiteje Sub Location.

Village Elders – see attached list

Mangat, I. B. Patel– Consultant

Obra Mmaitisi

MIBP Consultant

Resident of Kiteje Sub Location - see attached list

KEY PROJECT DATA

Client/Employer	Coast Water Works Development Agency (CWWDA)
Financing Agency	AFD

MINUTES

<u>Item</u>	<u>Minutes</u>	<u>Action By</u>
15.	<u>Introduction</u> The meeting was called to order by the Assistant Chief Kiteje Sub location at 10 am, she invited one Villager to start off the forum with a word of prayer. In her opening remarks, the area chief thanked those that had created time to attend the meeting. She informed residents that the meeting was organised to discuss issues regarding the proposed Mwache pipeline project which is a government project, those with questions and concerns were encouraged to raise them for deliberation. Finally, she invited the consultant representative Mr. Obra Mmmaitisi to proceed with the remaining agenda.	Assistant Chief Sub Location
16.	<u>Project Information</u> The Consultant representative Obra Mmmaitisi thanked stakeholders for creating time to come and participate in the ESIA and RAP public participation forum. He gave a brief of the proposed Project scope which include; Construction of Mwache Dam on Mwache River, Water Treatment Plant (WTP), 4Nr. Terminal Reservoirs; one for each of the target supply areas (NML, WML, SML and Island); namely - Nguu Tatu terminal reservoir, Changamwe Reservoir, Dongo Kundu Reservoir, proposed to be constructed within Dongo Kundu area in Mtongwe, serving the South Mainland, West Mainland reservoir and A system of Treated Water Transmission Pipelines, transmitting treated water from the Mwache WTP to the proposed Reservoirs The consultant representative informed the meeting that the The MWSI has secured funds from the Word Bank (WB) and the Agence Francaise de Développement (AFD), for financing implementation of the various component of the Mwache Dam Water Supply Project. The WB component is scheduled to finance the Dam and possibly the Nguu Tatu and Changamwe transmission pipelines and their corresponding reservoirs. The AFD	MIBP Obra Mmaitisi

Item	Minutes	Action By
	component will finance the WTP & associated facilities, the West Mainland and Dongo Kundu reservoirs, the trunk transmission pipeline.	
17.	<u>Environment and Social Safeguard Report</u> The consultant representative informed the meeting that they were going to prepare <i>Environmental and Social Impact Assessment Report</i> (ESIA) that will capture all the environmental and social impacts of the project and provide mitigation measures. They were assured that all their opinions and concerns will be captured in the report so as to ensure the Project is acceptable by the community and also sustainable development is achieved. Residents were also informed that the consultant will prepare a Resettlement Action Plan (RAP) that will ensure that all assets affected by the project are documented for purposes of Compensation.	MIBP Obra Mmaitsi
18.	<u>Project Positive Impacts</u> The Consultant representative pointed out to the meeting that the water supply project has enormous benefits as summarized below. - Improvement of sanitation within the targeted supply area by providing clean reliable domestic water this will go a long way in reducing water borne ailments such as cholera Typhoid and Diarrhoea. Respiratory ailments like COVID 19 can also be controlled through regular hand wash with soap and water. - Reduced time taken for residents while fetching water. This valuable time can be used to do other economical activities like farming and small-scale businesses. - Availability of clean reliable domestic water will also reduce cases of gender-based Violence towards women and children in their quest to search for water in far flanked areas. - Improve the value of land through provision of sanitation infrastructure, better housing will be developed in the area. - The Project will provide employment opportunities, at construction stage, opportunities will be direct employment for both skilled and unskilled labour while during operation phase, employment opportunities will be available for water operators.	MIBP Obra Mmaitsi
19.	<u>Impacts to Environment (Natural and Social)</u> The Consultant representative informed the meeting that this being a water supply project, it will have minimal negative impacts likely to be triggered. Some of the impacts are as indicated below. - Cutting down of trees especially the Neem tree, Mangroves around Bonje Creek and Coconuts which are predominant in the area. - Dust generated during construction that is likely to affect air quality within the project area. - Noise and Excessive Vibrations. This is likely to result during the construction phase from the equipment involved in the Project. He further added that all these impacts would be addressed comprehensively by the ESIA study report and appropriate mitigation measure provided.	MIBP Obra Mmaitsi
20.	<u>Question and Answer Session</u> After discussion summarized above, the community were invited to a question-and-answer session. Detailed questions and suggestion of the plenary session are presented in Table 1	

Item	Minutes	Action By																
	<table><tr><th colspan="2">Table 1: Plenary Session</th></tr><tr><th>Suggestion / Question</th><th>Response</th></tr><tr><td>Mr. Kasim Chame wanted to know what will happen to residents who have bought parcels of land but the subdivision process is yet to be completed.</td><td>The meeting was informed that the National lands will follow up and authenticate the land documents to ensure compensation is done to the right owner.</td></tr><tr><td>Mr. Abdul Kongoniga wanted to know if during compensation there will be any discussion between property owner and the client about the rates.</td><td>The meeting was informed that compensation rates will be provided by a registered government value to ensure accuracy. During RAP report disclosure, residents will be given a chance to make adjustments if need be.</td></tr><tr><td>Harrison Chiwala wanted to be informed on when the project will commence.</td><td>The meeting was informed that funding for the project which include construction of Mwache dam and the transmission line is available. The project will commence immediately after all the pre requisite reports including ESIA report and NEMA licence have been issued and Resettlement Action Plan has been prepared for the affected persons.</td></tr><tr><td>Mr. Jiti Abdalla wanted to know what will happen in the event that the pipeline passes were graves are.</td><td>Residents were informed that the contractor will try as much as possible to avoid graves, in areas where it is not possible to avoid, the community will be allowed to their cultural procedures of relocating graves. Client will facilitate the process.</td></tr><tr><td>Residents wanted to know if the contractor will source for workforce within the community where the works will be implemented.</td><td>Residents were informed that both unskilled labour and some skilled will be sourced from the local community. Youths were encouraged to organize themselves into groups and avail themselves for consideration.</td></tr><tr><td>Hadija Omar wanted to be informed if residents will be given sufficient notice before construction commences and also if they will be required to be at their premises throughout during construction.</td><td>Residents were informed that adequate time will be given to land owners before project commences, asset owners will be given sufficient time to salvage whatever they want along the pipeline corridor She was also informed that once owners have agreed and allowed works to proceed, they will not be required to be physically present during implementation.</td></tr></table>	Table 1: Plenary Session		Suggestion / Question	Response	Mr. Kasim Chame wanted to know what will happen to residents who have bought parcels of land but the subdivision process is yet to be completed.	The meeting was informed that the National lands will follow up and authenticate the land documents to ensure compensation is done to the right owner.	Mr. Abdul Kongoniga wanted to know if during compensation there will be any discussion between property owner and the client about the rates.	The meeting was informed that compensation rates will be provided by a registered government value to ensure accuracy. During RAP report disclosure, residents will be given a chance to make adjustments if need be.	Harrison Chiwala wanted to be informed on when the project will commence.	The meeting was informed that funding for the project which include construction of Mwache dam and the transmission line is available. The project will commence immediately after all the pre requisite reports including ESIA report and NEMA licence have been issued and Resettlement Action Plan has been prepared for the affected persons.	Mr. Jiti Abdalla wanted to know what will happen in the event that the pipeline passes were graves are.	Residents were informed that the contractor will try as much as possible to avoid graves, in areas where it is not possible to avoid, the community will be allowed to their cultural procedures of relocating graves. Client will facilitate the process.	Residents wanted to know if the contractor will source for workforce within the community where the works will be implemented.	Residents were informed that both unskilled labour and some skilled will be sourced from the local community. Youths were encouraged to organize themselves into groups and avail themselves for consideration.	Hadija Omar wanted to be informed if residents will be given sufficient notice before construction commences and also if they will be required to be at their premises throughout during construction.	Residents were informed that adequate time will be given to land owners before project commences, asset owners will be given sufficient time to salvage whatever they want along the pipeline corridor She was also informed that once owners have agreed and allowed works to proceed, they will not be required to be physically present during implementation.	MIBP Obra Mmaitsi MIBP Obra Mmaitsi MIBP Obra Mmaitsi MIBP Obra Mmaitsi MIBP Obra Mmaitsi MIBP Obra Mmaitsi
Table 1: Plenary Session																		
Suggestion / Question	Response																	
Mr. Kasim Chame wanted to know what will happen to residents who have bought parcels of land but the subdivision process is yet to be completed.	The meeting was informed that the National lands will follow up and authenticate the land documents to ensure compensation is done to the right owner.																	
Mr. Abdul Kongoniga wanted to know if during compensation there will be any discussion between property owner and the client about the rates.	The meeting was informed that compensation rates will be provided by a registered government value to ensure accuracy. During RAP report disclosure, residents will be given a chance to make adjustments if need be.																	
Harrison Chiwala wanted to be informed on when the project will commence.	The meeting was informed that funding for the project which include construction of Mwache dam and the transmission line is available. The project will commence immediately after all the pre requisite reports including ESIA report and NEMA licence have been issued and Resettlement Action Plan has been prepared for the affected persons.																	
Mr. Jiti Abdalla wanted to know what will happen in the event that the pipeline passes were graves are.	Residents were informed that the contractor will try as much as possible to avoid graves, in areas where it is not possible to avoid, the community will be allowed to their cultural procedures of relocating graves. Client will facilitate the process.																	
Residents wanted to know if the contractor will source for workforce within the community where the works will be implemented.	Residents were informed that both unskilled labour and some skilled will be sourced from the local community. Youths were encouraged to organize themselves into groups and avail themselves for consideration.																	
Hadija Omar wanted to be informed if residents will be given sufficient notice before construction commences and also if they will be required to be at their premises throughout during construction.	Residents were informed that adequate time will be given to land owners before project commences, asset owners will be given sufficient time to salvage whatever they want along the pipeline corridor She was also informed that once owners have agreed and allowed works to proceed, they will not be required to be physically present during implementation.																	
21.	Closing Remarks The area Assistant Chief urged those in attendance to accept the project since it was meant to improve their quality of life, she requested them to be good will ambassadors for the project and spread information to those who could not make it to the meeting. Finally, the chief adjourned the meeting at 11.30 a.m, a closing prayer was conducted by a village elder in attendance.	Assistant Chief Kiteje Sub Location																

MINUTES AUTHENTICATION

Item	Minutes	Action By
7.	Closing Remarks The area Assistant Chief urged those in attendance to accept the project since it was meant to improve their quality of life, she requested them to be good will ambassadors for the project and spread information to those who could not make it to the meeting. Finally, the chief adjourned the meeting at 11.30AM, a closing prayer was conducted by a village elder in attendance.	Assistant Chief Kiteje Sub Location

MINUTES AUTHENTICATION

ASSISTANT CHIEF KITEJE LOCATION

Name..... ALI MOHAMMED SIBABU

Date..... 10-11-2021

Signature..... for [Signature]

ALI M. SIBABU
ASST. CHIEF
PUNGU
 Date: 10-11-2021

Consultant's Representative

Name..... Oba Mmari

Date..... 10-11-2021

Signature..... [Signature]

SAMPLE PHOTOS OF THE MEETING

Consultant representative addressing the meeting



A Resident asking questions



ATTENDANCE LIST – KITEJE SUB LOCATION MEETING

MIBP
CONSULTING ENGINEERS

DETAILED DESIGNS, TENDER DOCUMENTS, SAFEGUARD REPORTS AND CONSTRUCTION SUPERVISION OF
 MWACHE WATER TRANSMISSION PIPELINES AND TERMINAL RESERVOIRS

PUBLIC / INSTITUTIONAL CONSULTATIVE FORUM

ATTENDANCE LIST

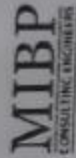
Activity: Public Participation Forum Date: 23/10/2021 Venue: KITEJE ASST CHIEF'S OFFICE

S/No	Name	Institution / Estate / Village	Telephone	Sign
	AULA S. NDAGIRO	GURIRO	072880023	[Signature]
	HAMISH HASSAN MWALIMBA	KITEJE	0701345678	[Signature]
	HAMISH SULEIMANI KADI	INADIBUKANI	0702875193	[Signature]
	IBRAHIM FARA	GURIRO	0743609779	[Signature]
	JUMA MANDO	KITEJE	-	[Signature]
	ALI JABU	ZIBANI	0790387938	[Signature]
	JUMA MWINYI MAREKO	GURIRO	0727984921	[Signature]
	SHEHE JUMA MWAMBAURO	CHAIRMAN BOMBO	0705345805	[Signature]
	ABDULLAH JUMA SAA	MKUMBI	0700600901	[Signature]
	ABDULL MASUD KONGENINGA	BOMBO	0729829554	[Signature]
	SALAMA MUSA SULEIMAN	ASST-CHIEF KITEJE	07165722182	[Signature]
	FARID AHMED	BOMBO	0721601161	[Signature]
	KHALID HADI AHMED	BOMBO	0728144310	[Signature]
	MWINYI HAMADI MWAMENDE	MKUMBI	0722448239	[Signature]

PUBLIC / INSTITUTIONAL CONSULTATIVE FORUM

ATTENDANCE LIST

[illegible]



DETAILED DESIGNS, TENDER DOCUMENTS, SAFEGUARD REPORTS AND CONSTRUCTION SUPERVISION OF
 MWACHE WATER TRANSMISSION PIPELINES AND TERMINAL RESERVOIRS

PUBLIC / INSTITUTIONAL CONSULTATIVE FORUM

ATTENDANCE LIST

S/No	Activity	Name	Institution / Estate / Village	Venue	Telephone	Sign
	Public Participation Forum			21/10/2021		
		ABDALLAH MWAHAKACHI	GURIRO		0715501457	
		MWANYIKOMBO O. MWAENGIZA	MKUMBI		0798342835	
		JUMA A. MWAMTUNZA	GURIRO		—	
		SUMNI JUMA MWAANDAGO	GURIRO		—	
		MWNYIKA MWANDI LEWA	KAYA BOMBO		0701706022	
		SAIDI ABDALLAH MBWANA	GURIRO		0701713901	
		KAMA SAID MWAUKUBO	ZIBANI		0737553835	
		ALFAN RAMA MWAPHUNGO	ZIWANI		0768885728	
		MWNYI HAMISI ABDALLAH M.	KILIMANI		0711904375	
		JUMA MOHAMMED MWIZIWI	BOMBO		0791340035	
		MWNYI ABDURAHMAN	BOMBO		0740245430	
		RASHID SAID MWALESO	NG'OMBENI		0712484090	
		SAIDI SAIDI MWAUKUBO	ZIBANI		—	
		RASHID SAID MWAMREZI	GURIRO		0768678458	

Meeting 4:

NOTES OF MEETING HELD ON 14TH JUNE 2023 BETWEEN TSUNZA AND BONJE
BEACH MANAGEMENT UNITS (BMU) AND COMMUNITY FOREST ASSOCIATION
(CFA) AT ROYAL STAR RESORT MAZERAS AT 10 AM

REPUBLIC OF KENYA



NOTES OF MEETING HELD ON 14TH JUNE 2023 BETWEEN TSUNZA AND BONJE BEACH MANAGEMENT UNITS (BMU) AND COMMUNITY FOREST ASSOCIATION (CFA) AT ROYAL STAR RESORT MAZERAS AT 10 AM

PRESENT:

Kenya Water Security Climate Resilient Project – Client

1. Millicent Dzombo - Project Sociologist
2. Godwin Sakwa - Project Environmentalist

Sweco – Consultant

3. Dr James Kairo Mwakio - Project Ecologist

Bonje and Tsunza BMU

4. See attached attendance List -

AGENDA

1. What are the economic activities in your area
2. What is the value of mangrove (list and rank)
3. What are the threats facing mangroves
4. What Interventions should be adopted to address the threats

Discussions

TSUNZA BMU AND CFA

Importance of Creek / Mangroves

- Provide breeding ground for fish, crabs, prawns, oysters, snails, Mollusca,
- Mangrove provide timber to the local for construction sector (residential structures and boat making)
- Tourist attracting
- Creak help in control of storm and ocean wave surge

Threats to the Creeks / Mangroves

- Over fishing and bait collection
- Oil spills
- Sedimentation / erosion
- Human settlement
- Drought
- Plastic and other solid Wastes

Degradation Hot Spots

- Stoo- affected by Elnino
- Mteza Creek – Over harvesting of Fish and Marine Fauna
- Mkupe Tsunza - Over harvesting of Fish and Marine Fauna
- Gutu Tsunza - Over harvesting of Fish and Marine Fauna and El-nino
- Mwangani Dongo Kundu - Over harvesting of Fish and Marine Fauna
- Kwa Soa - Over harvesting of Fish and Marine Fauna
- Mwijela – Soil Erosion

Activities to be adopted in Specific Area

- Tree planting and re- afforestation Programs
- Stakeholder Sensitisation (Community) programs on conservation
- Stakeholder Sensitisation programs (Kenya Ports Authority KPA) on conservation
- Restoration Programs of Mangroves in Degraded areas
- Beach Clean-up and Waste Management Programs
- Bee Keeping Activities
- Fish Ponds and fishing sites including; Kwasoa, Toneza, Maguzoni, Dongo Kundu, Chuyu, Ngare, Mkupe, Mbagani, Gutu, Mwinjala, Mshame, Mwekerwe Nyanje, Chiweni, Manzazani, Mwangowa, Mwishomo, Fungu ya Kati, Chilomoni, Hodi
- Nursery Establishment within Kaya Chonyi, Kaya Mrera, Kaya Bombo, Kaya Mbuguni and Kaya Teleza

BONJE BMU AND CFA

Importance of Creek / Mangroves

- Mangroves provide traditional ropes used in fishing sector
- Vegetation within mangrove provide medicinal value
- Provide breeding ground for fish, crabs, prawns, oysters, snails, Mollusca,
- Mangrove provide timber to the local for construction sector (residential structures and boat making)
- Tourist attracting
- Creak help in control of storm and ocean wave surge
- Provision of clean air

Threats to the Creeks / Mangroves

- Charcoal burning
- Over collection of firewood
- Clearing for farming
- Over fishing and bait collection
- Oil spills
- Sedimentation / erosion
- Human settlement
- Drought
- Plastic and other solid Wastes

Degradation Hot Spots

- Mbele, Goro, Darajani, Difu, Mwanzenge, Maweni, Ngondi, Nianze, Mbagani, DOE all affected by charcoal burning and deforestation

Activities to be adopted in Specific Area

- Tree planting and re- afforestation Programs
- Stakeholder Sensitisation (Community) programs on conservation
- Stakeholder Sensitisation programs (Kenya Ports Authority KPA) on conservation
- Restoration Programs of Mangroves in Degraded areas
- Beach Clean-up and Waste Management Programs
- Bee Keeping Activities

Appendix 1: Attendance List



KENYA MARINE AND FISHERIES RESEARCH INSTITUTE

P. O. BOX 81651
 MOMBASA

ATTENDANCE REGISTRATION FOR MANGROVE BASELINE SURVEYS IN MWACHE UNDER ECIA PROJECT

ATTENDANCE REGISTER

No.	Name	Sex (M/ F)	Age Tick where applicable		Disability (Y/N)	Institution	Designation	Contact	Signature:
			<35yrs	>35yrs					
1	Milicent Dumbo	F			N	KWRC	Sociologist	073605734	
2	David Kibalo	M			N	KWRC	CRD	072775465	
3	Edwin Mischu	M	✓		N	KFS	Forester	072048414	
4	Frederick Munga	M	✓		N	KWRC	P.S	072802957	
5	Josphud egu	M	✓		N	KWRC	D.S	0711744013	
6	Amey Muma	F	✓		N	KWRC	Intern	0712064572	
7	Godwin Sekine	M	✓		N	KWRC	Community	0721686959	
8									
9									
10									



KENYA MARINE AND FISHERIES RESEARCH INSTITUTE

P. O. BOX 81651
 MOMBASA

ATTENDANCE REGISTRATION FOR MANGROVE BASELINE SURVEYS IN MWACHE UNDER ECIA PROJECT

ATTENDANCE REGISTER

No.	Name	Sex (M/ F)	Age Tick where applicable		Disability (Y/N)	Institution	Designation	Contact	Signature: June 2023 13 th June
			<35yrs	>35yrs					
1	STEPHEN NYAYE	M		✓		ISUNZA		0758443363	
2	JOYCE U. JANGA	F		✓		ISUNZA		0791891579	
3	RUMBA.M. M	M		✓		ISUNZA		07224675972	
4	NGU.S.M. M	M		✓		ISUNZA		0743424873	
5	MURU.M. DU	F		✓		ISUNZA		0721201113	
6	EDWIN MUSAHI	M	✓			KFS	Freelance	0720484114	
7	MURCHISO HIRIAM			✓	H	MURKHE	Vehicle	0706219198	
8	IFRANIR BOAKS M			✓		RONJE	Environment	0700794448	
9	MUAZAME KUTU M			✓		TSUNGA	Fishermen	0742105902	
10									



KENYA MARINE AND FISHERIES RESEARCH INSTITUTE

P. O. BOX 81651
 MOMBASA

ATTENDANCE REGISTRATION FOR MANGROVE BASELINE SURVEYS IN MWACHE UNDER ECIA PROJECT

ATTENDANCE REGISTER

No.	Name	Sex (M/ F)	Age Tick where applicable		Disability (Y/N)	Institution	Designation	Contact	Signature:	
			<35yrs	>35yrs					June 2023	13 th June
1	MARIAM KUNDU	F	✓		N	EMURBUU SENIOR		0705310262	WKS	
2	DENA NIKALA	M		✓	N	BONGE BNU	MEMBER	0728779205		
3	TUNIGUA KATIBEN	N		✓	N	BONGE BNU	MEMBER	0722889255		
4	MASSAM CHAKOYA	N	✓		N	BONGE BNU	MEMBER	0726586954		
5	NISAMUWA MUMBA	M		✓	N	INTERIOR	ASS CHIEF	0717224810		
6	LYRANDE KATIEM	M		✓	N	BONGE	MEMBER	0791557485		
7	MARIAM L. MAYERA	F	✓		N	BONGE	MEMBER	0707547446		
8	TSUMA YARO	M		✓	N	TSUNDA	MEMBER	0702634062		
9	DANIA DZISOA	M		✓	N	TSUNDA	MEMBER	0702634062		
10	GURU MALAI	M		✓	N	BONGE	MEMBER	0714904409		



KENYA MARINE AND FISHERIES RESEARCH INSTITUTE

P. O. BOX 81651
 MOMBASA

ATTENDANCE REGISTRATION FOR MANGROVE BASELINE SURVEYS IN MWACHE UNDER ECIA PROJECT

ATTENDANCE REGISTER

No.	Name	Sex (M/ F)	Age Tick where applicable		Disability (Y/N)	Institution	Designation	Contact	Signature:
			<35yrs	>35yrs					
1	EMMANUEL MUMBA	M	✓		NO	MWACHIE CHANGAMBA		0791771134	
2	JUMBA KALAH	M	✓		N	MWACHIE CH	SECRETARY	0710259275	
3	EDWARD MAMBO	M	✓		N	MWACHIE CH	MEMBER	0704821093	
4	JASIE MAMBO	M	✓		NO	MWACHIE CH	MEMBER	0700058123	
5	TILIANA MIBUYI	F	✓		NO	MWACHIE CH	MEMBER	0723440163	
6	MABEL MIBUYI	F	✓		NO	MWACHIE CH	MEMBER	0740224439	
7	ALI KIGWANA	M	✓		NO	MWACHIE CH	MEMBER	0708443438	
8	BAKARI MUTEKA	M	✓		NO	MWACHIE CH	MEMBER	0713680308	
9	JUMA BAYILI	M	✓		NO	MWACHIE CH	SECRETARY	0702727861	
10	JUMBA M. BAKARI	M	✓		N	MWACHIE CH	MEMBER	0792894709	

Appendix 2: FLIP Charts from Group Discussions- Tsunza

① TSUNZA.C.BMU. QUES

SHUGLI ZA UCHUMI

li - Fish, crabs, prawns, oysters shark
and rays, etc. mkungu tar Sting-
Ray (tar Sardines snails Molluscs

ima - Maize, cereals, Muhogo, Mkiligi
Mikasina, Mbuyu, Mzungi, Mgombo
Miwu.

resting Mangrove - Ujenzi na Kuni

VE STOCK
ING

VALUE

Timber for fire wood on construction

Dawa.

Samaki

Makazi ya Samaki na viumbe hii

Rangi for construction Curioes

Clean air

Rain

Borotshamazingira

Civutio cha utalii

Prevent of storm surge

Save intervention

① TSUNZA.C.BMU.

OTUNZA C. BMU. VALUES

1. CLEAN AIR
2. MAKAZI YA SAMAKI NA YIUI
E HAI.
3. TIMBER FOR FIREWOOD AND
CONSTRUCTION
RAIN.
WAVE INTERVANI
BORESHA MAZINGIRA
KIVUTIO CHA UTALII
SAMAKI
PREVENT OF STORM SURE
DAWA
RANGI FOR CONSTRUCTION
AND CURIOS
BEE KEEPING

④ TSUNZA C. BMU.

HOT SPOTS OF DEGRADATION

At ~~ELNINO~~ / STOO-EL NINO

- .. MIEZA CREEK - HUVESTING
- .. MKUPE - TSUNZA - HUVESTING / DONGA
- .. GUTU [Huvesting Elnino]
- .. MWANGANI [Dongokundu]
- .. KUSASA [Barito Collection]
- .. Mwijala [Soil. erosion]

SOLUTION OF THREATS

- .. UPanzi wa miti
- .. Kutinda misitu yetu.
- .. Kuhifadhi rasumali yetu
- .. Hamasa kwa jamii na wafanyakazi wa K.P.A.
- .. Restoration of Mangrooves after development
- .. Beach clean up and waste management.
- .. Spray of Pesticide.

5

TSUNZA C.F.A.

TSUNZA BANDARINI

1. NURSERY ESTABLISHMENT / MICHENGA
2. FISH POUNDS
3. WASTE MANAGEMENT AND PLASTIC RESIDUAL
4. BEE KEEPING
5. TREE PLANTING. (SHUGHULI)

2. KAYA CHONYI
3. KAYA MRERA
4. KAYA BOMBO
5. KAYA MBUGUNI
6. KAYA TELEZA

NURSERY ESTABLISHMENT/UPA
 KUHIFADHI KASLIMALI

TSUNZA.C. B.M.U.

SEHEMUZA KUVUA

- | | |
|--------------|---------------------|
| 1. KWASDA | 12. MEKWERWE NYANJA |
| 2. TONESA | 13. CHIWENI |
| 3. MAGUZONI | 14. MATSAZANI |
| 4. DONGOKUNA | 15. MWANGOWA |
| 5. CHUYU | 16. MWISHIMO |
| 6. NGARE | 17. FUNGU YA KATI |
| 7. MKUPE | 18. FUNGU YA HAYANI |
| 8. MBAGANI | 19. CHILAMONI |
| 9. MAGOTO | 20. HODI |
| 10. MWIJALA | 21. |
| 11. MSHAME | |

Appendix 3: FLIP Charts from Group Discussions- Bonje

BONJE B.M.U (BOCOFA)

① WHAT ARE THE ECONOMIC ACTIVITIES IN YOUR

- a Uvuvi / Kuuza
- b UKULIMA na UFUGAJI
- c Uzaji wa Mbegu za Kamba
- d Kupanda na Kuweka 'nursery' ya Miche
- e Ufugaji wa Samaki (Kwa Udiimbwi)
- f Ufugaji nyuki

② WHAT IS THE VALUE OF MANGROOVE?

- 1 1 Mazalio ya Samaki
- 5 2 Hewa Safi
- 6 3 Utunzaji wa Mazingira
- 3 4 Kuzuiya Mnamonyoko wa Udongo
- 4 5 Uzaji wa Miche (Mikoko na mistibara)
- 7 6 Kuni/Kujenga na dawa
- 2 7 Chakula cha Samaki

③ WHAT ARE THE THREATS FACING ROOVE IN YOUR AREA?

- 1 1 Uchafuzi kutoka kwa Viwanda
- 3 2 UKataji wa Miti Kiholela
- 2 3 Mafuriko ya Mvua (1997, 2006, 2017, ...)
- 5 4 UKAME / UKosefu wa maji ya mvu
- 4 5 Uchomaji Makaa.
- 6 6 UKulima.

4 WHAT-INTERVAL LIST OF HOTSPOTS OF DAION

- 1 MBELE 2 GORO 3 DARAJANI 4 DIFU
- 5 MWANZENGE 6 MAWENI 7 NGONDI
- 8 NIANZE 9 MBAGANI 10 DOE

4b. LIST OF B.M.U ACTIVITIES.

3b LIST OF HOTSPOTS OF DEGRADATION.

- 1 MBELE
 - 2 GORO
 - 3 DARAJATI
 - 4 DIFU
 - 5 MWANZENGE
 - 6 MAWENTI
 - 7 NGONDE
 - 8 NTANZE
 - 9 MBAGANI
 - 10 DOE
- MAFURIKI
- UKATAJI W
MITI KIHOLEL
NA UCHOMAJ
MAKAA.

A

- WHA!
- 4 INTERUATIONS SHOULD BE ADOPTED?
- 1 Kuhamasisha jamii
 - 2 Tupate askari wa kutasha
 - 3 Kupata njia mibadala za kimapato kwa jamii

4b. LIST OF CFA/BMU ACTIVITIES AND LOCATION OF THE ACTIVITIES

- CFA ACTIVITIES
- 1 Kueka Miche ya ^{Mwanzenge na Maweni} Mikoko na Mitibara ^(Bonje BMU Landing site)
 - 2 Kutunza na kuhifadhi Mikoko
 - 3 Ufugaji wa nyuki ^{(Ndani ya mipaka ya CFA (BOROFU))}
 - 4 Utalii wa ^{Mwanzenge} Kimazingira ^(Goro & Difu) (3)

8 NIANZE 1 MBAKANI 10 DOE

4b. LIST OF BMU ACTIVITIES.

- 1 Uuvi (Mkono wa Mwache na M1)
- 2 Uuzaji wa Samaki (Bandari za BMU)
- 3 Ufugaji / ukulima wa samaki (Difu)

SABABU ZINAZOFANYA KUONGEZLEKA
KWA MIKOKO KISINWAST MWISHIMO?

Mbegu kwachwa kuachwa na maji wakat
maji imejaa (Bamvua)

2. Kuchangiwa na maji kutoka kw
Mito ya maji baridi ifuatayo. Mteza,
Mwache na Maji kutoka (Airport).

3. Hakuna ukataji wa miti *

(5)

Appendix 4: Photographs of Consultative Session





APPENDIX 4

LEAD EXPERT'S YEAR 2025 PRACTICING LICENCE

 FORM 7  EAE 23063249
(r.16(2))

**NATIONAL ENVIRONMENT MANAGEMENT
AUTHORITY(NEMA)**
THE ENVIRONMENTAL MANAGEMENT AND CO-ORDINATION ACT
**ENVIRONMENTAL IMPACT ASSESSMENT/AUDIT (EIA/EA) PRACTICING
LICENSE**

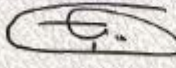
License No : NEMA/EIA/ERPL/22549
Application Reference No: NEMA/EIA/EL/30716

M/S **Godwin Lidahuli Sakwa**
(individual or firm) of address
P.O. Box 18076 - 00500 NAIROBI

is licensed to practice in the
capacity of a (Lead Expert/Associate Expert/Firm of Experts) **Lead Expert**
General
registration number **2492**

in accordance with the provision of the Environmental Management and Coordination
Act Cap 387.

Issued Date: 2/10/2025 Expiry Date: 12/31/2025

Signature.....

(Seal)
Director General
The National Environment Management Authority

f2 P.T.O. 10/02/2025, 14




APPENDIX 5

CRITICAL HABITAT ASSESSMENT (CHA) – PREPARED AS A SEPARATE REPORT

