MOTT MACDONALD

Linden to Mabura Hill Road Upgrade and River Crossing at Kurupukari

Environmental and Social Impact Assessment

2 November 2020

UKaid from the British people

Department for International Development

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List of Abbreviations

ACS	Association of Caribbean States
ACT	Amazon Cooperation Treaty
ACTO	Amazon Cooperation Treaty Organisation
AOI	Area of Influence
APA	Amerindian Peoples Association
AOSIS	Alliance of Small Island States
BHI	Bina Hill Institute
CARICOM	Caribbean Community
CDB	Caribbean Development Bank
CDC	Community Development Council
CESMP	Construction Environmental and Social Management Plan
CHW	Community Health Worker
CIP	Caucus of Indigenous Peoples
CI	Conservation International
CITES	Convention on International Trade in Endangered Species of Wild Flora and Fauna
CMRVS	Community Monitoring, Reporting & Verification System CPA Childcare and Protection Agency
CRC	Convention on the Rights of the Child
CSIS	Centre for Strategic & International Studies
CSME	Caribbean Single Market Economy
CSO	Civil Society Organization
DBST	Double Bituminous Surface Treatment
DFID	Department for International Development
DTL	Demerara Timbers Limited
ECLAC	Economic Commission for Latin America and the Caribbean EU European Union
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
ERM	Environmental Resources Management Inc.
ESIA	Environmental and Social Impact Assessment
FAO	Food and Agriculture Organization
FPIC	Free, Prior and Informed Consent
GAB	Gender Affairs Bureau
GBTI	Guyana Bank of Trade and Industry
GBV	Gender-Based Violence
GDI	Gender Development Index
GESI	Gender Equality and Social Inclusion
GFC	Guyana Forestry Commission
GAB	Gender Affairs Bureau
GBTI	Guyana Bank of Trade and Industry
GBV	Gender-Based Violence
GDI	Gender Development Index
GESI	Gender Equality and Social Inclusion
GGMC	Guyana Geology and Mines Commission
GLSC	Guyana Lands and Surveys Commission
GM	Gender Mainstreaming
GOIP	Guyanese Organisation of Indigenous Peoples
GRA	Guyana Revenue Authority
GSDS	Green State Development Strategy
GSEA	Gender and Social Exclusion Analysis
GSF	Guiana Shield Facility

GNBS	Guyana National Bureau of Standards
GoG	Government of Guyana
GSDS	Green State Development Strategy
GWI	Guyana Water Incorporated
HDPE	High Density Polyethylene
HDI	Human Development Index
HDR	Human Development Report
HFLE	Health and Family Life Education
HIV	Human Immuno-Deficiency Virus
ILO	International Labour Organization
IMC	Inter-Ministerial Committee on Gender
IDB	Inter-American Development Bank
IIC	Iwokrama International Centre for Rain Forest Conservation and Development
ITCZ	Inter-Tropical Convergence Zone
IUCN	International Union for the Conservation of Nature
LCDS	Low Carbon Development Strategy
LMH	Linden to Mabura Hill
LGBTQ	Lesbian, Gay, Bisexual, Transgender, Queer/Questioning
MDGs	Millennium Development Goals
MHLS	Malcolm Hughes Land Surveyors Limited
MICS	Multiple Indicator Cluster Survey (UNICEF)
MOE	Ministry of Education
MOIPA	Ministry of Indigenous Peoples' Affairs
MMC	Mekdeci Mining Company
MOPI	Ministry of Public Infrastructure
MOSP	Ministry of Social Protection
MPI	Multidimensional Poverty Index
MRVS	Monitoring, Reporting & Verification System (for REDD+)
MSMEs	Micro, Small and Medium Enterprises
NCD	National Commission on Disability
NDC	Neighbourhood Democratic Council
NDS	National Development Strategy
NGESIP	National Gender Equality and Social Inclusion Policy
NGO	Non-Governmental Organization
NIS	National Insurance Scheme
NM	Nautical Mile
NRDDB	North Rupununi District Development Board
NRM	Natural Resource Management
NTC	National Toshaos Council
PAHO	Pan American Health Organization
PAP	Public Assistance Program
PLWA	
PPE	Personal Protective Equipment
PWD	Persons with Disabilities
PRSP	Poverty Reduction Strategy Paper
Ramsar	UN Convention on Wetlands Conservation & Management
RCC	Rights of the Child Commission
RDC	Regional Democratic Council
REDD+	Reducing Emissions from Deforestation and forest Degradation plus Conservation, Sustainable Forest Management and Enhancing of Carbon Stocks in Developing Countries
SDG's	Sustainable Development Goals
SIDS	Small Island Developing State
SPAP	Single Parent Assisted Program
SRH	Sexual Reproductive Health
SRHS	Sexual Reproductive Health & Rights
SRKN	SRKN'gineering and Associates Limited

TIP	Trafficking in Persons
TOR	Terms of Reference
TSA	Timber Sales Agreements
UK	United Kingdom
UNASUR	Union of South American Nations
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
VAW	Violence Against Women
VAWG	Violence Against Women and Girls
VC	Village Council
VGM	Village General Meeting
WGEC	Women and Gender Equality Commission
WHO	World Health Organization
WOW	Women of Worth
YLC	Youth Learning Centre (of the Bina Hill Institute & NRDDB in Annai)
ZOI	Zone of Influence

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Executive summary

Introduction

This Environmental Social Impact Assessment (ESIA) report has been prepared by Mott MacDonald Ltd in association with SRKN'gineering and Associates Ltd with input from Environmental Management Consultants (EMC) and V. Radzik as part of an assignment commissioned by the Ministry of Public Infrastructure (MoPI) of the Government of Guyana (GoGY). The Technical Assistance is provided by the United Kingdom (UK) Department for International Development (DFID).

The Environmental and Climate Risk Management and Social and Gender Specialists are required to prepare an Environmental Impact Assessment (ESIA) as a deliverable following guidance included in Annex 1 of the Consultant's Terms of Reference (TOR). The focus of the ESIA is to identify and assess potential physical, ecological and social impacts arising from construction and maintenance activities associated with the upgrade of the LMH road and bridge crossing at Kurupukari, and for those adverse impacts which cannot be avoided, to identify appropriate mitigation actions.

The Project

The Project comprises two distinct site locations. The first site is the 125km road corridor from Linden to Mabura Hill which commences in the town of Linden. The second site is the Essequibo River Crossing at Kurupukari which is located a further 108km south from Mabura Hill. The two sites are critical components of a road network linking coastal regions (including the capital city of Georgetown) with Regions 7, 8, 9 and 10.

The Project intends to focus on:

- The upgrade of the existing Linden to Mabura Hill Road. A 2.5km section at the start of the road has been surfaced with a Double Bituminous Surface Treatment but is showing signs of distress. The remainder of the road corridor is unpaved with a laterite surface. The upgrade will reduce travel time, improve journey time reliability and improve safety particularly during wet seasons.
- Replacement of the existing ferry crossing at the Kurupukari crossing with a fixed bridge link between the eastern and western banks of the Essequibo River on the Linden to Lethem Road. The overall length of the crossing is approximately 700m. The replacement would significantly increase vehicle crossing capacity.

Policy, Legislative and Institutional Framework

The principal policies, legislation and institutions relevant to the project were examined to develop the administrative framework of the project. The policies, legislation and institutions considered are outlined in Table 1.

Table 1: Policies, Legislation and Institutional Framework of the Project

Policies, Strategies, Plans	Green State Development Strategy 2019
	Low Carbon Development Strategy 2013
	National Development Strategy 2001 – 2010
	National Land Use Plan 2013
	Linden-Lethem Road Corridor Land Use Plan 2006
Legislation	Constitution of Guyana 1980
	Environmental Protection Act 1996
	Environment Protection (Water Quality) Regulations 2000
	Environment Protection (Air Quality) Regulations 2000
	Environment Protection (Hazardous Waste) Regulations 2000
	Environment Protection (Noise Management) Regulations 2000
	Environmental Protection (Litter Enforcement) Regulations, 2013
	Labour Act 1942
	Occupational Safety and Health Act 1997
	Roads Act 1909
	Acquisition of Land for Public Purposes Act 2001
	Amerindian Act 2006
	The Iwokrama International Centre for Rain Forest Conservation and Development Act 1996
	Forests Act 2009
	The Mining Act 1989
	Person with Disabilities Act 2010
Institutional Framework	Environmental Protection Agency
	Ministry of Public Infrastructure
	Ministry of Communities (RDCs of Regions 9 and 10, and Linden Town Council)
Convention	International Human Rights Conventions
Constitution	Constitutional Rights and Laws Specific to Indigenous Peoples
	Women's Rights and Gender Equality Provisions within the Laws of Guyana
	Constitutional Human Rights Commissions
	Article 154 A: Protection of Human Rights
	Article 29: The Principle of Equality Between the Sexes
	Article 149G: Indigenous Peoples Rights
	Declaration of Youth in the Constitution
	Article 149 J: The Environment
	Article 154 A: Protection of Human Rights

The Physical Environment

From Linden to Mabura Hill, the existing road mainly traverses white and brown sands underlain by younger granites, metabasic dykes, sills and flows. Faulting is much more prevalent in this section with most faults trending north-west to south-east[1]. Further, the LMH Road traverses one of five recognised physiographic units of Guyana, *the white sand plateau.* The surface is composed of a combination of white quartz sand ('White Sands') which covers much of the area between Linden and Kurupukari[2]. Most of the soils along the LMH road are classified as Category III or IV. The Category III soils are generally poor for agricultural purposes and often require fertilization to cultivate crops.

The existing road between Linden and Mabura Hill is located between the Essequibo and Demerara Rivers. Indeed, the alignment follows the watershed of the two rivers between Linden and Mabura Hill[3] and closely follows the route of the Essequibo River. There is some variation in topography of the route but it is mainly flat to rolling. However, hilly terrain and higher elevations occur between Mile #58 Village and Mabura Hill.

Currently, there are five crossings along the LMH road alignment. These are located at Ch 72+750 (Mile 40), Ch 75+550 (Mile 41), Ch 85+720 (Cassandra Crossing), Ch 87+080 (Mile 47) and Ch 115+240 (a log bridge). There are also four small culverts that provide surface drainage locally to the road e.g. to drain small cuttings. These small culverts are located at chainage 98+900, 99+610, 99+960, and 100+170 respectively.

At the Kurupukari Crossing located 108km south from Mabura Hill there are several rapids which are present upstream of site of the crossing. Downstream there is a mixture of rock bars, islands and channels which may influence water levels at the crossing.

The Biological Environment

Flora

The LMH road falls within the White Sands Plateau which is characterized primarily by white sand/'wallaba' forest with the presence of mixed lowland forest and pockets of swamp/ 'mora' forest[4]. Vegetation occurring within the area of influence of the LMH road may be further classified as Dakama Forest, Wallaba Forest, Mixed Forest and Marsh Forest. In addition, the vegetation types occurring on the eastern and western banks of the Essequibo River at the Kurupukari Crossing are Marsh Forest and Mixed Forest.

Fauna

The area between Linden and Mabura Hill has been subject to anthropogenic activities which include charcoal production, clearance for subsistence agriculture, fuelwood production and logging.

Notwithstanding, this area, similar to Kurupukari in terms of having both forest and riparian vegetation types, offers several habitats which host a diversity of birds, mammals and reptiles. While some species are utilised by indigenous communities for food there is a lucrative wildlife trade and increase in sport hunting and fishing. The most common mammals that are hunted are the labba, peccaries, tapir, deer, agouti, and capybara[5]. The protected area at Iwokrama represents wetlands and river systems of global importance and has been identified by the World Bank as an 'ecological hotspot' and by the International Union for the Conservation of Nature (IUCN) as being a 'major tropical wilderness area' requiring immediate attention. At least 200 mammals, 500 birds, 420 fishes and 150 species of amphibians and reptiles have been documented in this

[1] Ministry of Finance, 2000. Study for the Upgrading and Completion of the Guyana – Brazil Road: Technical Appendices III Description of the Existing Route.

[2] ERM, 1995. Environmental and Social Impact Assessment – Linden – Lethem Road, Guyana. pg Secton 5.2 The Physical Environment

[3] Ministry of Finance, 2000. Study for the Upgrading and Completion of the Guyana – Brazil Road: Technical Appendices III Description of the Existing Route.

[4] Ibid

[5] SCN-Lavalin International Inc, 2011. Environmental and Social Impact Assessment (ESIA) Final Report

protected area. More than 30% of the mammals and many other animals are listed as endangered under the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES). Faunal surveys and studies conducted for the Iwokrama International Centre for Rainforest Conservation and Development (IIC) have produced findings, which are applicable for the project site, specifically: fish surveys in the Essequibo and Siparuni Rivers; reptile and amphibian surveys of the Kurupukari Base Camp and the Three Miles Camp; and survey of birds in the Iwokrama forest.

The Socio-Economic Environment

The land use pattern in the project areas is a function of a number of factors including climate, soil type, topography and culture. The main threats from the various land uses being practiced seem to arise from mining and forestry related activities along the LMH road as small-scale gold mining is practiced along the road.

The town of Linden is the largest settlement which directly interacts with the road at its starting point. Settlements along the alignment are sparse with small communities located at the Mile #47 and Mile #58 Villages. The Mabura Hill community is located at the end of the alignment and was built around the Demerara Timbers Limited (DTL) logging company. On the eastern bank of the Kurupukari Crossing is the base for MMC. MMC operates the toll gate and pontoon crossing. In recent years, several small-scale vending and dry good trading enterprises and bars have developed in the vicinity of the MMC compound. The IIC, a national protected area, is situated on the western bank of the Essequibo River at the Kurupukari Crossing.

Fair View Amerindian Village is also situated on the western bank of the Kurupukari Crossing. It is located adjacent to the Kurupukari to Lethem Road. Fair View obtained title for its Village Lands in 2006 and its titled lands consist of approximately 21,950 hectares (ha). It is the only Amerindian territory located within the Iwokrama Protected Area Site and as such, the Village has special rights-holder relations with the IIC.

The socio economic construct of these villages are considered to be some of the poorest in Guyana. Access to basic services are severely lacking as one moves from the town of Linden to the Fair View Village. Education are limited to primary and nursery schools. There are few persons with tertiary level education. Some of the women are employed as teachers and health care workers but they are generally housewives. Economic activities include logging, mining and community based tourism.

Archaeological Resources

The Kurupukari area is extremely important for the preservation of Guyana's cultural heritage with extensive deposits of *terra preta* (man-altered soils of great archaeological significance) and a concentration of petroglyphs dating back more than 6,000 years.[6]

Impact Assessment

The impact assessment identifies and describes project impacts that typify the construction and operation phases. From the assessment of impacts, it is clear that most impacts can be prevented or minimised if good environmental and social management are employed throughout construction phase of the project. Impacts were assessed based on whether they are localised or extensive, short- or long-term, avoidable or unavoidable, significant or insignificant, and mitigable or unmitigable.

Principal impacts which may arise during the construction and operational phases include:

- Erosion of soils as a result of vegetation clearing for design specifications as per width of the shoulders, carriageways, area required for drainage structures and the width of the utilities' corridors and/or right-of-way for the road upgrade;

[6] ERM, 1995. Environmental and Social Impact Assessment – Linden – Lethem Road, Guyana. pg Secton 5.2 The Physical Environment

- Contamination of soils or surface water from the accidental or intentional release discharge of waste oils, fuels, lubricants, chemical or hazardous wastes into the environment with potential negative impacts on vegetation and terrestrial and aquatic fauna;
- Increased noise and dust levels during construction with potential negative impacts on sensitive receptors such as schools in settlements proximate to the project areas and the protected area at the IIC;
- Loss of habitats and fragmentation leading to species migration and loss from vegetation clearing and construction activities;
- Potential for health and safety incidents during construction as well as increased road accidents as a result of increased traffic when the road is operational.

Table 2 provides a summary of potential environmental impacts and Table 3 provides a summary of potential social impacts.

Table 2: Summary of Potential Impacts on Physical and Biological Resources and Mitigation Measures Proposed

Environmental Component	Impact	Source of Impact	Impact Type	Significance	Likelihood	Project Phase	Mitigation Measures
Physical Resources							
Soils	Erosion	▪ Vegetation clearing to facilitate upgrade of LMH road or construction of bridge at the Kurupukari Crossing	Neg; Dir; Loc; ST;	Moderate	Likely	Construction	• Soil disturbance should be limited to areas only where it is absolutely necessary. • Adequate drainage should be provided at temporary work areas. • Areas of exposed soil should be monitored during periods of heavy rainfall and proper control of stormwater flow over exposed soil surfaces should be practiced. • Weather pattern should be considered before initiating major earthworks. Earthworks should be avoided during periods of heavy rainfall. • Material stockpiles and waste debris should be located at least 10metres away from the drainage system. • Material stockpiles should be kept to a minimum. • Stockpile areas may require berming to collect sediments from runoff during periods of heavy rainfall. Wooden or other material may be used to box off the stockpiled material to prevent erosion. • Excavated materials should be removed from sites as soon as possible and be disposed of at approved sites. Excavated materials should not be onsite for more than two weeks. Where possible excavated materials should be reused. • Side ditches should be installed at road sides and turn-out drains (outlets) should be created at various intervals along the road alignment to help drain water away from the road and into the natural drainage of the area. • After construction, borrow pits should be adequately decommissioned and closed out, including installation of proper drainage. •
	Compaction	▪ Movement of heavy equipment	Neg; Dir; Loc; ST;	Minor	Likely	Construction	• Traffic and movement of heavy-duty equipment including low-bed vehicles and heavy trucks over open areas should be restricted and controlled and damage to these areas should be repaired as soon as possible. • Soils that have been compacted by heavy-duty equipment during transport of materials and also during site works should be scarified. • Appropriate heavy-duty equipment should be utilised for all works. • Designated routes for heavy-duty vehicles should be established and used to prevent soil compaction.
	Soil Contamination	▪ Accidental release of waste oils, fuels, lubricants and hazardous wastes. into soils.	Neg; Dir; Loc; ST;	Minor	Likely	Construction	• No mitigation required.
	Sedimentation	▪ Erosion from improper road drainage and storm water	Neg; Dir; ST; Loc;	Minor	Likely	Construction & Operation	• See previous mitigation measures under Soils addressing erosion during the construction phase. • Weather patterns should be considered during rehabilitation works as heavy rainfall would increase sedimentation rates in bare soil; and • Discharging of storm water runoff directly into nearby water course should be avoided. The location of turnout drains should ensure that storm water is dispersed into the forest and not directly into creeks to prevent sedimentation. The forest acts as a filter, trapping any large solid particles before the water enters the creeks, thus can contribute to reducing the level of sedimentation.

Environmental Component	Impact	Source of Impact	Impact Type	Significance	Likelihood	Project Phase	Mitigation Measures
Water Resources	Contamination	▪ Accidental or intentional discharge of waste oils, fuels, lubricants, or hazardous wastes into water courses and the Essequibo River	Neg; Dir; ST; Loc;	Minor	Likely	Construction	• Waste oil from servicing of machinery and vehicles should be collected and reused/disposed in a safe and acceptable manner in accordance with EPA guidance. • Waste oil drained from vehicles and machinery should be collected by pans and transferred to storage drums located in a designated area. • Used tyres should be stored in a covered area and not be allowed to accumulate water as they can become a breeding ground for mosquitoes. • Used batteries should not be disposed in the environment. These batteries should be collected and returned to the suppliers or provided to approved used batteries dealers. • Fuel storage onsite should be placed at a safe distance from waterways, site offices, accommodation and work areas. Long term storage areas should have secondary containment and impervious base and be covered to keep out rainfall. • Fuel should be transported to the work areas as needed or stored in small quantities. Small quantities of fuel onsite will minimize the possibility of spillages to occur, and also minimize the impacts if spillages do occur. Any fuel storage should be placed higher than ground level to detect any leaks. No fuel should be stored within 100 m of any waterway. • Ensure necessary preventative measures such as adequate signage, fire extinguishers and/or sand buckets are placed in and around the fuel storage areas. The type of fuel stored in tanks should be indicated and the signage should include 'No Smoking' and Highly Flammable'; • Fuel storage containers should be regularly monitored for leaks. • When handling fuel, care should be taken to prevent spillage and leaks, especially during off- loading and refuelling. All nozzles and hoses should be properly secured and stored away to avoid spills and/or accidents; • During the filling/refilling process drip pans should be placed under the equipment/vehicle to prevent any possible contamination and subsequent run off of fuel due to leaks. • Spill kits should be made available in the event of spillages. These kits should be placed in strategic locations that are accessible to key personnel who should be trained in the proper use of these kits through the executions of drills. • Workers, mechanics and other staff should be trained on the proper use of spill kits, as well as in the safe handling of fuel and lubricants.
		▪ Dumping of general solid wastes/ garbage along the road and into water courses and the Essequibo River	Neg; Dir; LT; Ext;	Minor	Almost Certain	Construction & Operation	• Sewage will be generated from work sites associated with the construction phase of the project. Since the road construction activities will result in the shifting of the operation base as the work progresses it is recommended that portable toilets or pit latrines be utilized. If pit latrines are utilized then these should be of the ventilated improved type and be constructed in accordance with the GNBS Guidelines. At the bridge construction site septic tanks should be installed, equipped with filter bed and soak-away. Portable toilets can also be utilized at the construction site. • Waste water from kitchen and bathing areas should be channelled to a soak away. At more permanent sites such as the bridge construction, grease/oil traps should be utilized. • Waste such as paper and cardboard, empty plastic bottles, cans, etc. will be generated by staff working along the construction areas and from the work camps. The waste should be collected via bins placed at strategic points around the construction zones and camps. The bins should be emptied on a regular basis, or once filled. Garbage should not be allowed to accumulate onsite and should be collected and disposed of at an approved area. • All construction waste; such as materials from construction of road, bridges and culverts should be consolidated and reused as much as possible. If it cannot be reused, then it should be properly disposed of. Consideration should be given to making the materials available to nearby communities if requested. Waste should not be left in the open to litter the work camps or the road alignment and the bridge construction zone and should be disposed of within 30 days.

Environmental Component	Impact	Source of Impact	Impact Type	Significance	Likelihood	Project Phase	Mitigation Measures
							• No burning of any type of waste should occur. If burial of waste is to be conducted these pits should be located at least 100 m from waterways and be covered regularly.
	Cross Drainage	▪ Drainage capacity of culverts are not adequate	Neg; Dir; ST; Loc;	Moderate	Rare	Construction & Operation	No mitigation required.
Air Quality	Dust	▪ Light and heavy vehicles traversing the roads	Neg; Dir; ST; Ext;	Minor	Likely	Construction	• Workers should be equipped with the necessary PPE to combat dust nuisance. Personnel working within dusty environments should be required to use dust masks and respirators if needed; • A speed limit should be imposed for vehicles traversing the work sites and construction zone to reduce the generation of airborne particulate matter; • During dry periods to soak the construction zone and routes where vehicles and equipment traverse. As such, a water tanker should be provided onsite; • Dry materials for road construction such as sand and loam should not be stockpiled in close proximity to communities; and • All vehicles transporting loose materials should be covered to minimize dust emissions.
	Emissions	▪ Exhaust emissions from vehicles and machinery	Neg; Indir; ST; Loc; Un;	Negligible	Likely	Construction & Operation	No mitigation required.
Noise	Noise	▪ Activities during the road upgrade and construction of the bridge at Kurupukari	Neg; Dir; ST; Loc;	Minor	Likely	Construction	• Workers should be equipped with the necessary PPE to mitigate noise pollution. Hearing protection for employees exposed to high noise levels: earmuffs and earplugs for employees who operate heavy-duty machines/equipment should be provided; • Noise levels should be controlled at the source through installation of mufflers on exhaust system; • Noisy activities should not occur close to the communities during the night or on Sundays and Holidays. Any work to be conducted after 18:00hrs and prior to 6:00hrs, or on Sundays and holidays, must be approved by the Supervisory Consultants. The request for approval must be made at least three days prior to the works; • Noisy equipment such as generators should be sited away and downwind from workers accommodation and site offices; • In sensitive areas such as school zones and the Iwokrama Field Station more strict measures such as scheduling of noisy activities, etc., should be considered to prevent undesirable noise nuisance. The contractors should liaise with the IIC management to ensure that noisy activities are conducted at appropriate times in order to mitigate impacts of bird and wildlife migration from the construction area. • The contractors should ensure that machinery and equipment are working efficiently; and • Periodic monitoring of noise levels should be conducted during the construction phase. • Iwokrama to ensure that there is no forest clearance or vegetation removal in the forested area between the road corridor and the Iwokrama Field Station; • Signs indicating no stopping and no use of horns on the road corridor between the Kurupukari bridge and Fairview Village; and • Iwokrama rangers to have an enhanced monitoring presence on the road corridor.
		▪ Traffic on the road and bridge during operations	Neg; InDir; LT; Loc;	Negligible	Likely	Operation	• Iwokrama to ensure that there is no forest clearance or vegetation removal in the forested area between the road corridor and the Iwokrama Field Station; • Signs indicating no stopping and no use of horns on the road corridor between the Kurupukari bridge and Fairview Village; and

Environmental Component	Impact	Source of Impact	Impact Type	Significance	Likelihood	Project Phase	Mitigation Measures
							• Iwokrama rangers to have an enhanced monitoring presence on the road corridor.
Archaeological Sites	Vibrations	▪ Activities for pier construction of the bridge at the Kurupukari Crossing	Neg; Dir; ST; Loc;	Negligible	Unlkely	Construction	No mitigation required.
Biological Resources							
Flora	Loss of vegetation	▪ Vegetation clearing for the upgrade of the LMH Road	Neg, Dir; ST; Loc;	Minor	Likely	Construction	• Adequate drainage should be maintained/installed especially crossings to prevent flooding/water accumulation within forested areas; • Any clearing of vegetation should be limited to only areas required and should be conducted in a manner to maintain the aesthetics of the natural landscape; • Harvesting of forest species along the LMH Road for use during the construction should not be allowed. • Natural regeneration along areas previously cleared should not be disturbed, unless required; • Soil erosion control measures should be implemented; and • During the construction period, measures should be implemented to prevent forest fires such as no open or uncontrolled burning of waste and no disposal of lighted cigarettes by workers. • Fire response equipment should be maintained at work areas. • Once the alignment of the 300m road corridor within Iwokrama is identified and demarcated, the IIC should be requested to undertake a flora and fauna survey. IIC should also be requested to undertake the clearance to ensure this is done in accordance with IIC's requirements and also for IIC to maximise the utilization of trees removed. • If it is contemplated that the existing ferry operated by MMC would be decommissioned once the bridge is in place, then the land take from Option 2 could be offset by closing out and re-vegetating, using endemic species, the existing landing area and road. This offers the opportunity of an offset and should be explored with IIC and Fairview village. •
	Loss of vegetation and habitat fragmentation	▪ Vegetation clearing for the bridge at the Kurupukari Crossing	Neg; Dir; ST; Loc;	Moderate	Certain	Construction	
	Loss of vegetation	▪ Fire	Neg, Dir; ST; Loc;	Minor	Likely	Construction	
Terrestrial and aquatic fauna	▪ Habitat loss and fragmentation ▪ Displacement and some mortality of terrestrial vertebrate species	▪ Vegetation clearing ▪ Noise nuisance ▪ Vibrations and dust	Neg, Dir; ST; Loc;	Minor	Likely	Construction & Operation	• Consideration to be given to the establishment of vegetation cover for animal passage, particularly at stream crossings, and wildlife underpass crossings at bridges and culverts and particularly for species with reduced movement capabilities such as herpetofaunal species, and small mammals; • Stream crossings should be constructed to ensure adequate flow of water during storm events. • Water quality of streams within and around the construction zones should not be affected by construction activities. Recommended measures for the management of waste and hazardous materials and the prevention of sedimentation should be implemented. Receiver water quality should be monitored to ensure ecologically acceptable turbidity, nutrient, oil and grease and sediment levels; • No unnecessary clearing of vegetation should be conducted and any clearing should be staggered to allow wildlife to move, especially slow moving species. This is especially the case with the vegetation clearance in the Iwokrama forest to establish the 300m road corridor; • Measures should be implemented to prevent forest fires;

Environmental Component	Impact	Source of Impact	Impact Type	Significance	Likelihood	Project Phase	Mitigation Measures
							• Grubbed up soil and vegetation materials from construction activities should be land spread and placed at the side of the carriageway or within the adjacent forest areas of the roads to prevent the creation of a longitudinal barrier to animal movement; • Animals with reduced movement capabilities should be allowed to escape if encountered by construction workers; • Worker camps and dwellings routinely sanitized and camp food ration and waste storage and disposal done according to best management practices; • • During the operational phase: • • Speed limits should be prescribed and enforced; • Drivers should be educated on avoiding road kills of wildlife; and • Warning signs should be installed at strategic areas indicating hunting/capturing of wildlife is prohibited, especially within the road corridor in the Iwokrama forest; • The IIC should ensure that there is no forest clearance or vegetation removal in the forested area between the road corridor and the Iwokrama Field Station; • Signs indicating no stopping and no use of horns on the 300m road corridor In the Iwokrama forest should be installed; • There should be an enhanced monitoring presence by Iwokrama ranger on the 300m road corridor in the Iwokrama forest.
	▪ Hunting and gathering of wildlife by workers may occur if not strictly managed.	▪ Hunting and gathering of wildlife by workers not strictly managed.	Neg, Dir; ST; Loc;	Minor	Likely	Construction	• All construction workers should be prohibited from hunting, trapping, killing, harming or capturing of any wildlife. Workers should be educated on the importance of wildlife and the impacts they can cause, so as to ensure they are aware of the need to preserve wildlife and to reduce wildlife/roadway conflicts.

Table 3: Summary of Potential Social Impacts and Mitigation Measures Proposed

Social Component	Impact	Source of Impact	Impact Type	Significance	Likelihood	Project Phase	Mitigation and Management Measures
Health	Health Emergencies	• Life threatening emergencies or injuries occurring on worksite with no immediate medical services nearby	Neg; Loc; Dir	Sig.	Mod-L	Con.	• Ensure strict use of Personal Protective Equipment (PPE) for workers. • Ensure the workforce has access to primary healthcare on site, providing prescriptions. • Ensure all workers are suitably trained and qualified for the various roles.

	Communicable and Non-Communicable Diseases	Infection from vector-borne diseases such as dengue and malaria Sexually Transmitted Infections and TB	Neg; Dir; ST/LT	Sig.	Mod-L	Op; Con	• Screen for any occurrence of any communicable diseases amongst the workforce (STD, HIV/AIDS, TB, malaria and Hepatitis B and C) and set up disease prevention programme if needed. • Conduct monthly awareness and education sessions for all staff and workers on sites. • Ensure all staff/workers on construction sites are using appropriate insect repellents and are sleeping under treated bed/hammock nets.
Accidents	Dangerous driving and accidents	Speeding heavy-duty trucks, mini-buses and other vehicles using the roads Presence of parked machinery and equipment on roadways (especially at night) without proper signs or lighting	Neg; In-D; Loc	Sig.	Likely	Con; P-Con	• Ensure safe driving by Project personnel (e.g. through training/induction, monthly awareness sessions and updates). • Prevent storage of construction materials, equipment and machineries on traffic lanes. • Ensure machines and other equipment part on roadway are well illuminated at night and warning signs are placed at safe distances away warning road users to take caution.
	Population safety	Absence of proper warming signs along route, particularly in populated areas and where schools are located	Neg; In-D; Loc	Sig.	Mod-L	Con; P-Con	• Signs promoting behaviour change and outreach activities to improve public awareness of traffic changes and potential hazards for high-risk sections on project route, including near schools. • Early onset behaviour change campaign targeting speeding, adherence to road signs, and temporary control measure to be implemented during construction phase, modelling safety measures to be instituted on the new highway. • Signs warning of upcoming villages, slow-down signs, children crossing areas where schools, animal crossing, etc.
Livelihoods	Vending/Vendors	Potential displacement of vendors who are mostly female, affecting their livelihoods	Neg; Loc; ST	Sig.	Un-L	Con.	• Ensure vendors are enabled to continue earning their income during construction.
	Unemployment	High rates of unemployment in communities along project route	Loc, In-D, LT	Sig.	Likely	Op; Con; P-Con	• Ensure local communities are preferred for the supply of goods and services (such as cooks, marshals, janitors, etc.) to the Project, where appropriate. • Ensure minimum legal Labour standards as per ILO regulations and the national labour laws of Guyana (child/forced labour, no discrimination, working hours, minimum wages) are met • Prioritize and recruit both skilled and unskilled labour from adjacent communities. Fosters ownership and buy-in of communities, and potential safety and protection for project resources • Provide on a first preference basis, where suitable candidates can be identified, jobs to unemployed youth from communities along project route •
Culture and Heritage	Preservation of Indigenous Culture	Potential violations against the rights, cultural heritage including sacred sites, and titled lands of Indigenous Peoples	Loc; In-D; LT	Mod.	Un-L	Con.	• Ensure all discoveries of cultural heritage (e.g. graves, old ceramic, old building fragments) are reported immediately to the relevant authority. • Conduct sensitization session for all staff/workers on the importance and significance of Indigenous and local cultures and heritage and respect for diversity. •

	Conservation of endangered species (wildlife)	Hunting or purchasing endangered species of wildlife	Loc; In-D; LT	Mod.	Mod-L	Op; Con.	• Conduct sensitization sessions on Guyana's endangered species for all staff/workers • Immediately report any incidents of hunting, trapping or otherwise capturing of wildlife by anyone in the employ of the project.
Utility and Habitation	Disruption of water supply	Damage to GWI main during constructions works at Village #58	Neg; Ex; ST	Sig.	Mod-L	Con.	• Work with management of GWI to map pipeline infrastructure and develop plan for conducting construction works without adversely affecting water supply to properties.
	Contamination of water sources	Potential contamination of water sources (creeks and rivers) during construction	Neg; Ex; ST	Sig.	Mod-L	Con.	• Restrict excavation activities during periods of intense rainfall. Use temporary bunding to reduce the risk of sediment, oil or chemical spills to the receiving waters.
	Displacement	Displacement of homes and buildings along project route	Neg; Ex; ST	Sig.	Mod-L	Con.	• Engage with local communities and potential affected properties to plan for relocation where necessary.
Social Awareness and Engagement	Trafficking in Persons (TIP)	Complicity towards activities of trafficking in persons	Neg; Ex; LT	Sig.	Un-L	Op; Con	• Ensure adequate security personnel at the site. Ensure proper training in engagement with and appropriate conduct toward workers and communities along project route. • In cases where TIP is suspected, ensure referral guidelines and reporting mechanisms are in place to be followed by staff/workers on project sites.
	Engagement with local communities	Construction camps interacting with local communities	Pos; Loc; ST	Min.	Likely	Op; Con.	• Ensure all contractors implement codes of conduct concerning employment and workforce behaviour, including but not limited to: – safety rules and regulations – substance abuse – social awareness of the area – gender equality and sexual harassment – respect for cultural beliefs and customs – community interactions in general
	Protests		Neg; Loc; ST	Min.	Mod-L	Op; Con.	• Engage/communicate with communities and plan sufficient time for their voices to be heard as it relates to the project and how it may impact them. Ensure regular consultations with the local authorities and communities regarding the management of construction.

KEY – IMPACT RATING PARAMETERS

Pos – Positive	**Loc – Localised**	**Dir – Direct**	**ST – Short Term**
Neg – Negative	**Ex – Extensive**	**Indirect – Indirect**	**LT – Long Term**

It is likely that increasing access by upgrading the LMH road and constructing the Kurupukari bridge may encourage greater economic activities in the extractives sector and other development areas e.g. increasing artisanal gold mining and small-scale logging in the forested areas adjacent to the LMH road, resuscitating large-scale gold mining and logging operations; and increasing demand for ecotourism activities particularly in the IIC.

Environmental and Social Management Plan

The Environmental Social Management Plan (ESMP) recommends activities to be undertaken in an effort to mitigate the principal adverse effects of the project and describes the way in which the main potential environmental and safety impacts of the project can be managed, and recommends appropriate mitigation measures that should be adopted by the contractors during the construction phase of the project, as well as measures to be applied during the operation phase. The activities to be conducted for the implementation of this project, especially during the construction phase, should be carried out in a manner which is in compliance with the legislation and guidelines, and in particular, with the conditions of the Environmental Authorisation to be granted by the Environmental Protection Agency (EPA), and the requirements of the Ministry of Public Infrastructure (MOPI).

The ESMP outlines:

- Measures to mitigate impacts to the soil resulting from erosion, compaction and sedimentation;
- Measures to mitigate impacts from dust emissions and noise nuisance;
- Measures for proper management of wastes including liquid wastes, solid wastes and hazardous wastes;
- Measures for management of fuel, lubricants and hazardous wastes;
- Procedures for documenting archaeological finds in the project areas;
- Measures for mitigating impacts to flora and fauna in the project areas;
- Measures to ensure workers' health and safety;
- Recommendations to be incorporated into the Traffic Management, Public and Road Safety Plans; and
- Recommendations to be incorporated into the contractor's Emergency Response Plan (ERP).

Implementation Framework for the ESMP

A framework for the implementation of the ESMP is outlined. The activities to be conducted for the implementation of the project, especially during the construction phase, should be carried out in a manner which is in compliance with the legislation and guidelines outlined in chapter 3, and in particular, with the requirements of the EPA as set out in the Environmental Permit.

The Implementation Framework outlines roles and responsibilities of the key agencies, which will be involved in the execution of the project namely: the MOPI, the Supervisory Consultants and the Contractors. Guidance is also provided on the key elements of the Construction Environmental and Social Management Plan (CESMP), which should be prepared by the Contractor to guide their operations and ensure that all activities are conducted in an environmentally friendly manner. The Framework also outlines an Environmental Monitoring Plan for the implementation of the project, in particular for the construction period. The Plan identifies parameters to be monitored, frequency and location. An indicative budget is presented including estimated costs for mitigation and monitoring activities during the construction phase of the project.

Conclusion

This ESIA has been prepared at a time when there is no Government decision regarding upgrade of other sections of the Linden to Lethem Road Corridor and while final designs for the LMH road and bridge across the Essequibo River at Kurupukari is still to be completed.

Based on the information provided, and the indication that the existing alignment will be largely retained, the proposed upgrade of the LMH road and construction of a bridge across the Essequibo River at Kurupukari is envisaged to have relatively few potential significant adverse impacts on the physical and ecological environment. These could be addressed by putting in place the necessary management measures during the construction and operation phases of the project.

1 Introduction

1.1 Background[7]

The Georgetown to Lethem road is the critical north-south link between the hinterland and the coastal belt, enhancing access to the seaport at Georgetown and the town of Lethem by the border with Brazil.

Upgrading the Linden to Mabura Hill (LMH) road is the first phase of an overall high priority development project of GoG to upgrade the rest of the road to Lethem. A 2.5km section at the start of the LMH road has previously been surfaced with a Double Bituminous Surface Treatment (DBST), which is now showing signs of distress. The remainder of the section is unpaved and constructed with a laterite surface. On a regular basis, conditions of the road surface deteriorate, especially during the rainy season and this has led to difficulties for road users.

In 2019, with Technical Assistance provided by UK DFID through CDB, the GoG proceeded to undertake a Feasibility Study & Designs of the LMH Road Upgrade and Kurupukari River Crossing Project. The Project is being executed by Mott MacDonald Limited with support from a local sub-consultant, SRKN..

The key objective of the Project is to provide technical support to the MoPI and GoG, to:

- Update the existing Feasibility Study
- Prepare detailed designs to upgrade the LMH road
- Provide bidding documents for the LMH Road; and
- Prepare bidding documents for design-build works for the new river crossing at Kurupukari.

As part of updating the existing Feasibility Study, an Environmental and Social Impact Assessment (ESIA) Report is being prepared to examine the physical and ecological issues and potential impacts from the LMH Road Upgrade and Kurupukari River Crossing. In addition, a Social Impact Assessment and Gender Analysis is also being conducted.

1.2 Previous Studies Done for the Linden to Lethem Road

Over the last three decades, several studies have been commissioned by the GoG. These include:

Year	Studies
2014	*Biodiversity and Ecosystem Services Assessment* completed in 2014 by Conservation International (CI) with support from the Inter-American Development Bank (IDB).
2012	*Feasibility Study, Preliminary Designs and Environmental and Social Impact Assessment (ESIA)* completed in 2012 by SNC Lavalin International in association with VIKAB with support from the IDB.
2008	*Pre-Feasibility Study of the Georgetown to Lethem Road* completed in 2008 by Mott MacDonald with support from the IDB.
2000	*A Study for the Upgrading and Completion of the Guyana to Brazil Road* in 2000 by ADK Consulting Engineers Ltd in association with Gibb Ltd with support from the European Union.

[7] Adapted from Mott MacDonald, May 2019, Inception Report, Linden to Mabura Hill Road Upgrade and River Crossing at Kurupukari, pg 9 – Section 1 Introduction

1995 *ESIA of the Linden to Lethem Road* completed in 1995 by Environmental Resources Management Inc. (ERM) with support from the World Bank.

1990 *A Study of the Feasibility of the completion and upgrade of the Road Link between Guyana and Brazil* conducted in 1990 by Technecon and supported by the Secretariat of the Caribbean Community (CARICOM) and the Commission of the European Communities.

1984 In 1984, a feasibility study of the Mabura Hill to Lethem Road was prepared.

1981 A Feasibility study of the Georgetown to Lethem Road was first conducted in 1981.

1.3 Objective of the ESIA

The Environmental and Climate Risk Management and Social and Gender Specialists are required to prepare an ESIA as a deliverable and for this guidance is included in Annex 1 of the Consultant's TOR. Further the Social and Gender Specialist are to investigate socio-economic developmental opportunities and risks related to the execution of the project.

The focus of the ESIA is to identify and assess potential impacts arising from construction and maintenance activities of the upgrade of the LMH road and river crossing at Kurupukari and to identify appropriate mitigation actions for those adverse impacts which cannot be avoided.

Additionally, the objective of this technical assistance (TA) is to:

1. Update the existing feasibility study
2. Prepare detailed designs to upgrade the Linden to Mabura Hill road
3. Provide bidding documents for the Linden to Mabura Hill Road
4. Prepare bidding documents for design build works for the new river crossing at Kurupukari.

1.4 Approach to the ESIA[8]

The preparation of the ESIA was done in three broad phases:

Phase 1. Baseline Information and Stakeholders Engagements

Phase 2. Review of Data and Impact Analysis

Phase 3. Mitigation and Management Planning

The key tasks undertaken include:

- Assembling relevant baseline information on the project area including its geology, soils, hydrology, climate, natural hazards and terrestrial and aquatic flora and fauna (including endangered, rare or threatened species and species of commercial importance). Given the timeline and resource availability, most of this information was derived from secondary sources. Of specific interest was the ESIA conducted by SNC-Lavalin in 2012 and the ESIA conducted by ERM in 1995. In addition, existing data was also utilized from other sources.
- Consulting with key stakeholders, including agencies and institutions, as well as, relevant communities. This was done jointly with the Social and Gender Specialist and project team to ensure stakeholders' engagements for the project were efficiently executed and to avoid stakeholders' fatigue due to multiple engagements.

[8] Adapted from Mott MacDonald, May 2019, Inception Report, Linden to Mabura Hill Road Upgrade and River Crossing at Kurupukari, pg 37 – Section 2.5 Task 5 - Environmental and Social Impact Assessment (ESIA)

- Assessing the regulatory and institutional framework for the project. This included identifying the relevant national policies, legislation, standards and guidelines that define the implementation framework of the project, as well as the responsible institutions.
- Reviewing project information and other relevant documentation to compile a project description, including any alternatives being considered.
- Identifying, as far as is possible, and assessing the environmental impacts of the road upgrade and river crossing. The approach was to distinguish construction and post construction phase impacts, as well as cumulative impacts. An Impacts Prediction Matrix is utilized to identify short-term and long-term impacts, positive and negative impacts, unavoidable, or irreversible; and direct and indirect impacts. The main potential environmental impacts examined relate but are not be limited to: geology and soils; hydrology, land use and land tenure, topography and landscape; land contamination; transport; air quality, water resources (quality and quantity); noise and dust nuisance, biological resources, public health and worker safety; and waste.
- Identifying and assessing, for impacts which cannot be avoided, practical and cost-effective mitigation measures to minimise or prevent these impacts.
- Preparing an EMP that recommends measures to prevent or reduce adverse impacts to acceptable levels, including plans for monitoring and contingency and emergency response. This covers both the construction and operation phases for the road corridor and the bridge.
- Preparing an implementation framework for the EMP, including outlining roles and responsibilities, schedule, contractor plans, monitoring and reporting requirements, grievances mechanism, training, etc.

The preparation of the SIA was done according to specific TOR for the Social and Gender Analysis and is as follows:

1.4.1 Stakeholder Consultations

1. Conduct consultative and participatory stakeholder meetings periodically at appropriate stages of the project with community leaders, community groups, residents, ministerial departments and agencies and all other relevant parties
2. Conduct separate meetings for women and men in the affected communities, as necessary, and their representatives at the community and national level
3. Undertake consultations with these entities regarding their perspectives, concerns, perceived current needs and priorities, as well as their input and feedback on proposed designs and implementation. The consultations should ensure conducive meeting times and facilitate participation through the provision of transportation, child care, and other supportive measures.

1.4.2 Social Impact Assessment priorities

1. **Sex-disaggregated demographic profile of communities**: Producing a sex-disaggregated demographic profile of communities in the project areas including socio-economic conditions, poverty status, individual and community characteristics including disability status, crime, gender-based violence, and health issues
2. **Identification of key employers and livelihood activities**: Identification of key employers and livelihood activities in the communities with clear identification of opportunities to reduce poverty and promote equitable, inclusive employment through the implementation and operational phases of the project. Due attention is to be given to identifying safety risks to road/river-side vending, with recommendations to maximise benefits derived from livelihood activities; an analysis of the potential opportunities and benefits for men, women and youth, and the measures needed to support these must also be included
3. **Potential Adverse impacts of the project**: Clear identification of any potential adverse social impacts of the project

4. **Identification of risks and vulnerabilities during implementation and operation**: Identification of risks and vulnerabilities during implementation and operation, including those linked to projected climate change, in the following areas including, inter alia: housing; economic activities; employment opportunities; livelihoods; labour force participation; shelter management; natural hazards; security and violence (including gender based); education; health; transportation; cultural and archaeological heritage; wildlife habitat; and water, sanitation, and drainage;
5. **Investigating gender-specific risks and vulnerabilities and coping mechanisms**: Investigating gender-specific risks and vulnerabilities and gender-specific coping mechanisms, including those linked to projected climate change
6. **Conducting robust social impact assessment and gender analysis**: Conducting robust social impact assessment (SIA) and gender analysis, including analysis of both qualitative and quantitative socio-economic benefits; (see Annex 1 of the Terms of Reference (TOR) detailed content for SIA)
7. **Community risks, vulnerabilities and priorities for potential investments**: Prioritisation of community risks and vulnerabilities and community priorities for potential investments. Include women and men equally in public consultations as well as stakeholders representing the various groups including youth, indigenous people and persons with disabilities (PWDs).

1.5 Challenges

The following were the key challenges which were experienced in the preparation of this ESIA:

- **Limited Resources** – Considering that the consultancy was expected to be an update of the 2012 ESIA, no resources were provided to the Environmental and Climate Risk Management Specialist for the collection of primary baseline information. This restricted the methodology used in gathering data particularly baseline data of the project areas. However, stakeholder consultations and data from secondary sources were used to inform the ESIA.
- **Meeting Fatigue Syndrome**: A consideration in terms of separate meetings being held for men and women is that there is the "consultation / meeting fatigue" syndrome to contend with. So many different types of projects and government sessions are on-going at the same time and people feeling fed-up and fatigued by it - since, they say, so little results are manifested out of these various consultations. The long gap between 2012 Feasibility and promises made for this long-awaited road link to be paved also contributes to scepticism and the "meeting fatigue syndrome".
- **Measures put in place to ensure women's participation** in Phase One round of consultations:
  - During mobilisation for the community consultations - special emphasis was placed on inviting women and youth. There was a positive response to this and all the meetings had a fair level of gender parity in terms of participation of women and of youth of both sexes
  - Key women leaders were involved in mobilisation of the stakeholder meetings and contributions to the consultations held. A number of women are leaders in the AOI communities. The elected Toshao of Great Falls/#58 Village is a woman; The Deputy / Secretary of the #47 village is a woman; the Deputy Toshao of Fair View Village is a woman and so are several Councillors, including the MRU representative. The community health worker (CHW) in Mabura Hill community is a woman and one of the prominent community leaders there. She is also a pastor for the community, and the consultant's key contact for Mabura Hill. The Iwokrama Tourism Manager is a woman and there are woman tour guides at Iwokrama as well as prominent business women on the river islands near to Kurupukari and at the back of the MCC compound - all of whom were well represented at the community-based consultations held
- **Persons living with disabilities**

Similarly, for PWD - there is very little information available from the CHW's in the communities on PWD.

- **Site visit exercises**

Execution of site visit exercises to verify, update and fill gaps using community maps, transect walks, snowballing, as well as photographic documentation, and other appropriate participatory approaches:

This component will not be undertaken. There is no scope for it in the contractual agreement with the consultant in terms of time. The type of activity is more conducive to a sub-project or project in its own right. The consultant produced the original Fair View Resource Management Plan[9] and participated in reviews of the Fauna Project in Fair View which produced community atlases for Fair View and other communities in Region 9, and in the CMRV Social & Wellbeing Monitoring. All of these activities were full year-long or multi-year projects. There have been no other comparable research projects conducted for any of the other stakeholder communities.

Measures undertaken: What will be included in this ESIA report is a sampler of this type of detailed information for Fair View that was collected through other projects over the past decade or two.

- **Investigate governance and structure in the construction management sector etc.**

Section 3(b) of the Scope of Work in the Detailed TOR states:

"Investigate the governance and management structure in the construction management sector, including staff ratios by occupation and sex in Work Services Group (WSG), equality in recruitment, workplace policies conducive for women, and occupational health and safety."

This group of research activities is unlikely to be fully undertaken in this consultancy. It is more conducive to a sub-project or whole project in its own right. An investigation, for instance, into the "construction management sector" falls outside the scope of this consultancy.

What can be undertaken, however, with the permission, advice and guidance of the WSG/MOPI is a gender analysis of occupation and staff ratios etc. within the WSG, since this section of the MOPI is directly engaged in the project.

- **Matrix of Stakeholders' Comments**
  - A Checklist / Matrix of Stakeholders' Inputs/Recommendations has been compiled by the Social consultant to compile the key stakeholder inputs and provide summarised guidance for the design consultants and specialists.

1.6 Organisation of the ESIA

The ESIA Report is organized in eleven (11) main sections as outlined below**:**

- **Executive Summary** – The Executive Summary provides a brief synopsis of the ESIA, including key potential impacts and mitigation measures.
- **Chapter One** – This Chapter provides an introduction to the ESIA, including its scope and methodology employed.
- **Chapter Two** – This Chapter provides a brief description of the project.
- **Chapter Three** – This Chapter provides a description of the national policies relevant to the project, the various legislation the project will have to comply with, and the regulatory bodies which will have oversight of the activities.

[9] The Fair View Community Resource Management Plan (2009) was compiled by consultant, V. Radzik

- **Chapter Four** – This chapter presents the stakeholder consultations done in preparation for this ESIA. This includes documents the stakeholder engagement exercises conducted along with engagements with communities, relevant Government agencies and other institutions.
- **Chapter Five –** This chapter provides a description of the socio-economic environment of the project environment.
- **Chapter Six – T**his Chapter provides a description of the project environment, including the physical, biological and socio-economic environment.
- **Chapter Seven** – This Chapter assess the potential impacts on the socio-economic environment in detail.
- **Chapter Eight** – This Chapter assesses the potential impacts of the project on the physical, biological and socio-economic environments. In addition, this section also outlines health and safety and cumulative impacts of the project.
- **Chapter Nine** – This Chapter outlines recommendations for the management of potential environmental and social issues relating to the project. Recommendations for emergency response and demobilising are also included.
- **Chapter Ten** – This Chapter presents an implementation framework for the ESMP.
- **Chapter Eleven** – Conclusion.
- **References**

2 Project Description

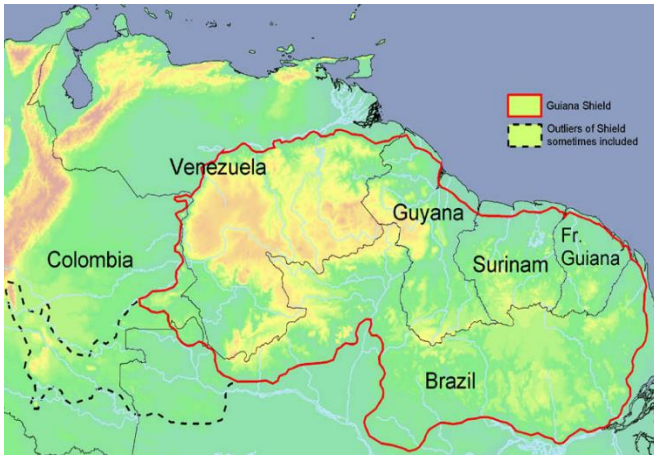
2.1 Snapshot: Guyana's Geographical Location, Regional and International Affinities

2.1.1 Geographical Location

Guyana is situated on the northern coast of South America, bordered by the Atlantic Ocean to the north, Brazil to the south and southwest, Suriname to the east and Venezuela to the west, and comprises 83,000 square miles or 215,000 square kilometres. It is approximately the same size as Great Britain and the largest CARICOM country yet it is the third-smallest country on mainland South America after Uruguay and Suriname.

***Total Area**: 214,969 sq. km; (**land**: 196,849 sq km; **water**: 18,120 sq km; **coastline**: 459 km; **territorial sea**: 12 nautical miles).*

2.1.2 Amazonia and the Guiana Shield



Guyana is a part of Amazonia with its associated eco-systems, rain forests and river tributaries. Guyana is also part of the Guiana Shield, a 1.7 billion-year-old Precambrian geological formation in northeast South America and part of its northern coast. The Guiana Shield Highlands are where the table-like mountains (tepuis) are found such as Mount Roraima. The Guiana Highlands are also the source of some of the world's most spectacular waterfalls such as Kaieteur Falls, Angel Falls and Kuquenan Falls. The Guiana Shield underlies Venezuela, Guyana, Suriname, French Guyana (Guyane), and parts of Brazil and Colombia. Guyana is a signatory to the Amazon Cooperation Treaty (ACT) and its organisational arm ACTO.

The Guiana Shield: A Zone of Southern Caribbean Integration and Sustainable Development

With a rising focus globally on regionalism and the benefits of integration, there is a growing recognition that the three Guianas can strengthen their economic and social development by exploring greater regional and functional cooperation. This is critical in the work of intergovernmental regional organizations like the Caribbean Community (CARICOM), the Association of Caribbean States (ACS), or the Union of South American Nations (UNASUR). The full Guiana Shield region includes one of the world's last remaining blocks of pristine rain forest, which boasts a rich biodiversity and contributes significantly to climate change mitigation. Beyond the new promising focus on oil and gas exploration, this future zone of cooperation has also been recognized for its potential for expanded hydro-energy production, agricultural development, mainly in the coastal area near the Atlantic Ocean, and the promotion of sustainable ecotourism. *Sustainable tourism is currently one of the leading income earners in the global tourism sector, which alone is the world's number one employer, accounting for 10 percent of jobs globally. This subregion is among the greenest and most unspoiled spots on the globe. With "green travel" presently the latest trend in the travel and tourism industry, this sector offers significant potential for development.* (*Excerpt adapted from the Centre for Strategic & International Studies (CSIS) November 28, 2017)*

The Guiana Shield Facility

The Guiana Shield Facility (GSF) is a multi-donor funding facility established/launched in February 2012. The Guiana Shield eco-region contains 18% of the world's tropical forest carbon with stores of carbon-sequestering ~ 500 million tonnes per year. And 20% of the world's freshwater. The volume of water carried by the present Amazon riverbed, passing between the Guyana and Brazil Highlands, comprises a fifth of all the flowing water of the world.

(*GSF website and guianashield.blogspot.com)*

Guyana and the Caribbean Community:

CARICOM serves as the regional, representative, inter-governmental organisation of the Caribbean. Guyana is linked to the Caribbean historically, culturally and geographically.

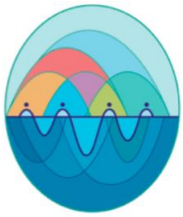
Guyana gained her Independence in 1966 and CARICOM was established in 1973.

The CSME - Caribbean Single Market Economy came into being through a CARICOM Agreement in July 1990. CSME allows for free movement and employment of CARICOM nationals/citizens throughout the Region.

The CARICOM Secretariat is located in Guyana. Guyana is one of the larger CARICOM States which includes Suriname and Belize, Antigua & Barbuda, Bahamas, Barbados, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, St Kitts & Nevis, St Lucia, St Vincent & the Grenadines.

In 2017 the CARICOM-Cuba Trade & Economic Cooperation Agreement was signed to facilitate closer ties. CARICOM is Guyana's main political and economic platform and it relates to the United Nations forum through the UN designated Latin America & Caribbean Region.

Small Island Developing States (SIDS) and Low Lying Developing Coastal Countries



Local Voices
Global Choices

Guyana and SIDS: Due to its vulnerability as a low-lying coastal state within the Caribbean basin, Guyana is considered a Small Island Developing State (SIDS), and it is a member of the Alliance of Small Island States (AOSIS). *In common with other SIDS, Guyana also faces special disadvantages associated with small size, insularity, remoteness and susceptibility to natural disasters. These factors render the economies of these states very vulnerable to forces outside their control – a condition that sometimes threatens their economic viability*.

(Smirnov, N. (April 2014). Problems and Challenges of SIDS: Analysing Current issues in the Changing Hemispheric Environment.)

2.2 Background and Current Status

The project has two main locations:

1. The LMH Road
2. The Essequibo River Crossing at Kurupukari

These locations can be observed in Figure 1.

The LMH Road – This road, approximately 121 km in length, commences in the town of Linden and ends at Mabura Hill. This road is part of a critical road network linking coastal regions (including the capital city of Georgetown) with Regions 7, 8, 9 and 10. The LMH Road is the sole means of directly accessing the Mile #47 and Mile # 58 villages which are located along the road corridor. The roadway and Kurupukari crossing provide a cost-effective means of travel to Mahdia (Region 8), the Fairview Village, IIC and the Rupununi regions and northern Brazil as compared with air travel. As a consequence, significant quantities of freight are transported using the project sites with food and fuel being transported inland and forest produce such as logs and lumber being transported out. Finally, the Rockstone Junction, located along the LMH road connects to one of the main road networks leading to Region 7.

A 2.5 km section at the start of the LMH road has been surfaced with a DBST but is showing signs of distress. The remainder of the road corridor is unpaved with a laterite surface. In addition, in some sections, the road is constructed on white sand which is highly susceptible to erosion. The existing road has limited drainage system and rainwater runs off the surface of the road. At some sections of the road, makeshift turnout drains have been created and some of these drains are significantly eroded. At other sections of the road, pits have been dug on the land at either side into which water drains. At several locations, runoff has led to the formation of gullies which erode the road edge and increase the risk of washouts if not repaired and maintained. Currently, there are five crossings along the alignment at Ch 72+750 (Mile 40), Ch 75+550 (Mile 41), Ch 85+720 (Cassandra Crossing), Ch 87+080 (Mile 47) and Ch 115+240 (a log bridge). There are also four small culverts that provide surface drainage locally to the road e.g. to drain small cuttings. These small culverts are located at chainage 98+900, 99+610, 99+960, and 100+170 respectively. During the dry seasons, there are significant emissions of dust when vehicles traverse the road. Sections of the road occasionally become impassable during the rainy season due to inadequate roadside drainage and limited maintenance.

Essequibo River Crossing at Kurupukari - Kurupukari is located approximately 108 km south from Mabura Hill. The Kurupukari crossing is the link between the eastern and western banks of the Essequibo River on the Linden to Lethem Road. The overall length of the crossing is approximately 700m. Currently, the Mekdeci Mining Company (MMC) operates a ferry service which runs on an hourly basis between 06:00 hrs to 18:00 hrs daily. Several rapids are present upstream of site of the crossing. Downstream there is a mixture of rock bars, islands and channels which may influence water levels at the crossing.

Figure 1: Project location map in relation to the wider Linden to Lethem Road

2.3 Proposed Project

The Feasibility Study indicated that the LMH Road and River Crossing at Kurupukari provides good economic viability assuming the realisation of diverted cargo traffic from the port of Manaus in Brazil to a proposed deep-water port in Georgetown, Guyana and improvement of the whole route between Linden and the Brazilian border at Lethem.[10]

The Preliminary Design Report presented the preliminary designs, cost and quantity estimates and updated economic analysis for the preferred option for the Linden to Mabura Hill Road Upgrade and River Crossing at Kurupukari identified at the feasibility stage.

For the purposes of the EIA, a summary of the preferred option is presented below.

2.3.1 LMH Road Upgrade

2.3.1.1 Design

This project consists of upgrading 121.2km of existing road between Linden and Mabura Hill. The proposed road has been designed to a design speed of 80kph with a posted speed of 70kph. It will have a minimum width of 13.2m, consisting of a 7.2m carriageway (two 3.6m lanes) plus a 2.4m hard shoulder and a 0.6m verge either side of the carriageway. At village locations the road will be slightly wider with a 0.4m hardstrip, a 1.0m raised separation island, and a 2.0m footway and 0.6m verge either side of the 7.2m carriageway. Carriageway widening will be required on tight bends to allow vehicles to safely negotiate the turn and verge widening will be required in places to achieve visibility or accommodate a safety barrier, meaning that there are many locations where the proposed road is wider than 13.2m.[11]

The existing LMH Road is generally wide, mostly measuring between 13m and 15m and extending up to 20m in places. This is expected to allow space for much of the road upgrade to be constructed within the existing road footprint, however vegetation clearance will be required in places to allow for construction of the drainage ditches and the provision of a 2.5m wide utility corridor on the right hand side of the road. Please see Figure 2 and Figure 3 for the design.

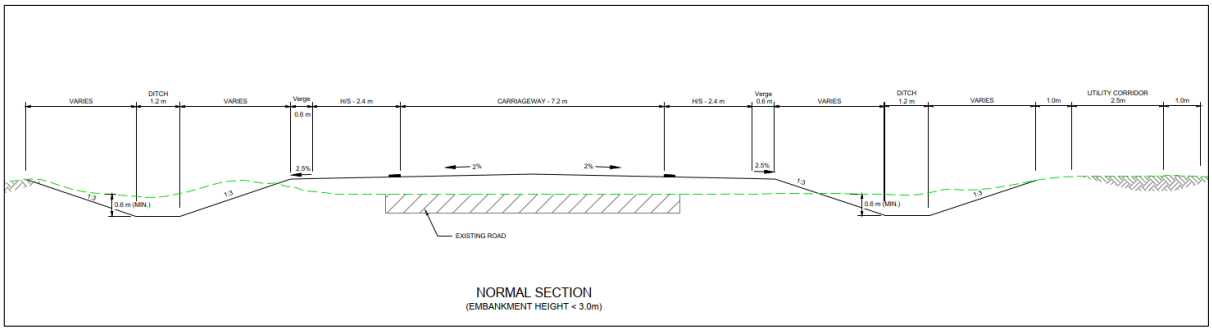


Figure 2: Normal Section of Road Design

[10] Extracted from Mott MacDonald May 2019, Preliminary Design Report, Linden to Mabura Hill Road Upgrade and River Crossing at Kurupukari, pg 11 – Section 1.5 Findings of the Feasibility Study

[11] Extracted from Mott MacDonald May 2019, Preliminary Design Report, Linden to Mabura Hill Road Upgrade and River Crossing at Kurupukari, pg 15 – Section 3.1 Geometric Design Criteria

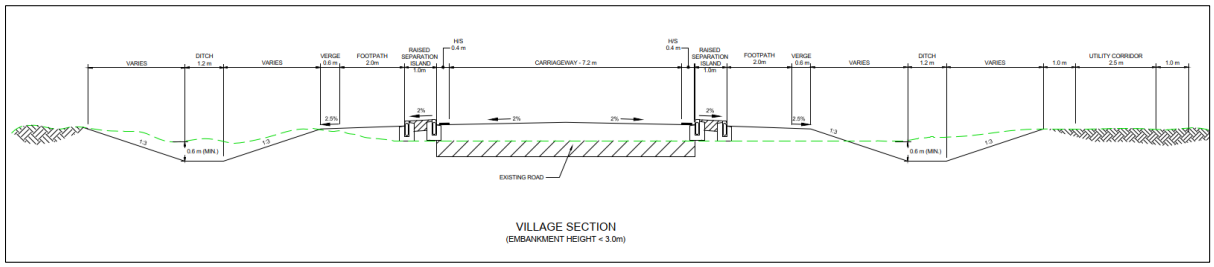


Figure 3: Village Section of the Road Design

2.3.1.2 Drainage[12]

The poor condition of the existing road can largely be attributed to poor drainage leading to water pooling on the road and the road surface deteriorating. The proposed design includes the following measures to address this:

- The new road will be built up so that it is higher than the surrounding ground;
- A 2% cross-fall and minimum longitudinal gradient of 0.3% will be provided to allow water to drain from the road surface;
- Trapezoidal drainage ditches with a base width of 1.2m will be provided with an effective depth of 0.6m (including freeboard allowance). These have been sized to collect runoff generated over the driving lane (i.e. 3.6m width), hard shoulder, drain footprint, and the adjacent utility corridor and are based on 1 in 5 year design flow + mid-century climate change allowance; and
- Each road drain will be provided with a channel outlet or “turnout” at regular intervals, including its downstream extremity, to discharge runoff back to the environment in a controlled way.
- Drainage Ditch Lining – Lining protection is to be provided along the full length of the drainage ditches to prevent erosion/scour. The majority of the drainage ditches will be lined with a 3D cellular confinement system (also known as geocell) comprising a permeable geotextile fabric formed in a honeycomb-like structure, which has already been used in Guyana, that can be infilled with readily available white sand before the system is overlaid with 50mm of black sand which then vegetates naturally.
- In locations where the longitudinal gradient of the drainage ditch exceeds 5%, a geosynthetic cementitious composite mat (GCCM) will be provided to prevent erosion. This is a flexible, concrete filled geosynthetic, which hardens on hydration to form a thin, durable concrete lining. At embankment locations where there is high erosion risk, concrete kerbs and drainage chutes will be provided to channel water from the road. These embankments will be protected at the base to prevent erosion.

2.3.1.3 Pavement

The project aims to improve the alignment and upgrade the pavement to an all-weather surface using asphalt concrete (AC). This scenario is based on the port and remainder of the highway to Lethem being completed – i.e. construction of a pavement based on a 20-year design life from the outset. Please refer to Figure 4 for the design.

[12] Extracted from Mott MacDonald May 2019, Preliminary Design Report, Linden to Mabura Hill Road Upgrade and River Crossing at Kurupukari, pg 59 – Section 4.3 Road Drainage

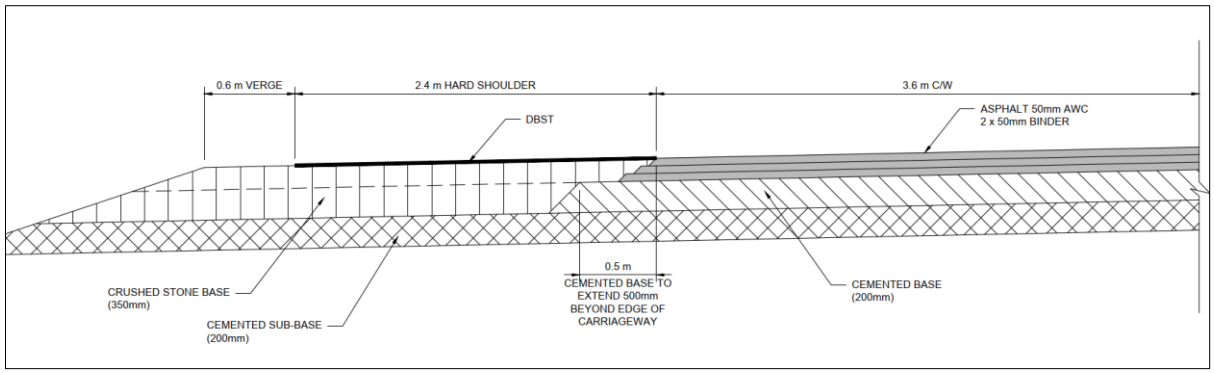


Figure 4: Cross Section Design

The below design principles have been applied to produce this design:

- Retention of the existing structure. The existing pavement structure comprises lateritic gravel, loam and sand which are to be retained or recycled, as far as is practicable.
- Maximising the use of locally sourced materials to limit import requirements. Borrow pits have been identified along the route containing laterite, loam and white sand. Additionally, igneous rock sources have been identified within proximity of the route. Laboratory tests commissioned during the feasibility stage have allowed the suitability of these materials for use within the pavement to be assessed.

2.3.1.4 Borrow Pits[13]

The following table shows the borrow pits identified.

Table 4: Borrow Pits identified

No.	Chainage (KM)	Location	Surface	Remarks
13	70+070	R/CL	Gravel	320m before 4Km MP
14	500m from east bank	L/CL	Gravel	Kurupukari (Linden side)
15	500m from west bank	R/CL	Gravel	Kurupukari (Lethem side)
	Borrow Pits			
16	1+000	Borrow Pit	White Sand	2 samples taken
17	12+720	Borrow Pit	Gravel	4 samples taken
18	47+240	Borrow Pit	Loom	2 samples taken
19	59+880	Borrow Pit	Laterite & Loam	8 samples taken
20	67+760	Borrow Pit	Loam	2
21	77+040	Borrow Pit	Laterite & Loam	4
22	98+400	Borrow Pit	Laterite	4
23	119+880	Borrow Pit	White Sand	2
24	123+300	Borrow Pit	Laterite	4

[13] Extracted from Mott MacDonald November 2019, Feasibility Study Report, Linden to Mabura Hill Road Upgrade and River Crossing at Kurupukari, pg 26 – Section 2.8.3 Pavement Composition, Table 1

2.3.1.5 Structures [14]

Four new structures are proposed along the route as follows:

- Chainage 72+750 - Reinforced concrete twin box culvert
- Chainage 75+550 - Integral prestressed concrete bridge
- Chainage 87+000 - Reinforced concrete twin box culvert
- Chainage 115+020 - Integral prestressed concrete bridge

Fifteen (15) smaller pipe culverts are also proposed as follows:

Section	Chainage	Type	Size	Flow
4	66205	Pipe	2No x 0.6m dia.	L-R
4	72132	Pipe	3No x 0.6m dia.	R-L
4	72750	Box	2No 2.4m x 1.2m	
4	72950	Pipe	1No x 1.5m dia	L-R
4	73428	Pipe	1No x 1.5m dia	L-R
4	75550	Bridge		
4	76484	Pipe	1No x 1.5m dia	L-R
4	76974	Pipe	1No x 1.5m dia	L-R
5	82080	Box	2No 2.4m x 1.2m	
5	88720	Pipe	2N0 x 0.6m dia.	R-L
5	98920	Pipe	1No x 1.5m dia	??
5	99630	Pipe	1No x 1.5m dia	R-L
5	99977	Pipe	1No x 1.5m dia	R-L
5	100190	Pipe	1No x 1.5m dia	R-L
6	114057	Pipe	1No x 1.5m dia	R-L
6	114395	Pipe	3No x 0.9m dia.	R-L
6	115240	Bridge		
6	115655	Pipe	1No x 1.5m dia	L-R
6	116055	Pipe	1No x 1.5m dia	L-R

[14] Adapted from Mott MacDonald November 2019, Feasibility Study Report, Linden to Mabura Hill Road Upgrade and River Crossing at Kurupukari, Section 4.4.2 Linden to Mabura Hill

2.3.1.6 Other Features

Other salient features of the LMH Road upgrade as outlined in the Preliminary Design Report include:

- One climbing lane is to be provided as a trial at a location of steep gradient *(see Preliminary Design Report Section 3.2 for details);*
- Raised pedestrian crossings are to be provided in villages *(see Preliminary Design Report Section 3.3 for details);*
- Bus stops and shelters are to be provided in villages *(see Preliminary Design Report Section 3.4 for details);*
- Rest areas are to be provided at 10km intervals along the route *(see Preliminary Design Report Section 3.5 for details);*
- Solar powered LED lighting is to be provided at village *locations (see Preliminary Design Report Section 3.7 for details);* and
- Thermoplastic road markings will be provided – these should last longer than traditional road markings.

2.3.2 Kurupukari River Crossing[15]

Three bridge alignments were identified as suitable crossings of the Essequibo River, namely:

- Option 1 – Between Existing Ferry Landings
- Option 2 – 75m Downstream of Ferry Landing
- Option 3 – Downstream Linden Bank to Lethem Ferry Landing

Option 1 – Between Existing Ferry Landings

The bridge crossing extends between the two ferry landings and using the appropriate road curves to bring alignment onto the existing Linden - Lethem road. The proposed length of the bridge for this alignment option is 740m. This length comprises eleven spans of 60m and two side spans of 40m each.

Option 1 does not encroach into the nature reserve on the western bank, however there could be issues associated with the holes caused by dredging noted in the bathymetric survey which need to be assessed for the foundation design and construction.

Option 2 – 75m Downstream of Ferry landing

The bridge crossing is approximately 75m downstream of the Option 1 alignment, primarily to reduce the impact of the holes caused by dredging on the foundations, as shown in Figure 36 of the Feasibility Study Report. The proposed length of the bridge for this alignment is 700m. This length comprises eleven spans of 55.6m and two side spans of 44.2m each.

Option 2 exhibits limited impact from the holes caused by dredging but does cross into the nature reserve.

Option 3 – Downstream Linden Bank to Lethem Ferry Landing

The bridge crossing follows the alignment of Option 2 on the Linden approach to the bridge and then extends towards the ferry landing on the Lethem side. The proposed length of the bridge for this alignment is 820m. This length comprises thirteen spans of 57m and two side spans of 39.5m each.

[15] Extracted from Mott MacDonald Novemner 2019, Feasibility Study Report, Linden to Mabura Hill Road Upgrade and River Crossing at Kurupukari, pg 70 – Section 4.4.1.4 Bridge Alignment Options

Option 3 partly avoids the holes caused by dredging seen in the river bed beneath the Option 1 alignment. There is encroachment into the Iwokrama forest reserve but this is less extensive than for Option 2.

Each of the three options have their advantages and disadvantages which have been summarised in Table 5.

Table 5: Advantages and Disadvantages of the Options

Option	Advantages	Disadvantages
Option 1	- This alignment follows the existing road alignment and avoids impacting the Iwokrama Nature Reserve	- This alignment has an overall bridge length of 740m. - The bridge passes over deep scour holes in the river bed which will make construction of the foundations more challenging and likely lead to an increase in cost. - As this alignment extends between the existing ferry landings there may be some disruption/ displacement to the ferry service.
Option 2	- This alignment has an overall bridge length of 700m. - The bridge avoids the scour holes in the river bed and will therefore be easier to construct. - Based on the above, it is anticipated that this will be the lowest cost option. - This alignment will have no impact on the existing ferry crossing.	- This option has the greatest impact on the Iwokrama Nature Reserve. This may however be mitigated by replanting at the site of the existing ferry landing to offset the land take from the proposed road alignment.
Option 3	- This alignment more closely follows the existing road alignment and partially avoids the scour holes in the river bed. - This alignment will have no impact on the existing ferry crossing.	- This alignment has an overall bridge length of 820m and therefore likely to have the highest cost of construction. - This alignment will have a minor impact on the Iwokrama Nature Reserve.

Source: Mott MacDonald

Option 2 has been identified as the preferred option. This option will have an overall bridge length of 700m which is the shortest of the options, is considered the lowest cost option and will avoid the scour holes in the river bed which are closer to the Kurupukari Falls. A Plan View of Option 2 can be observed in Figure 5.

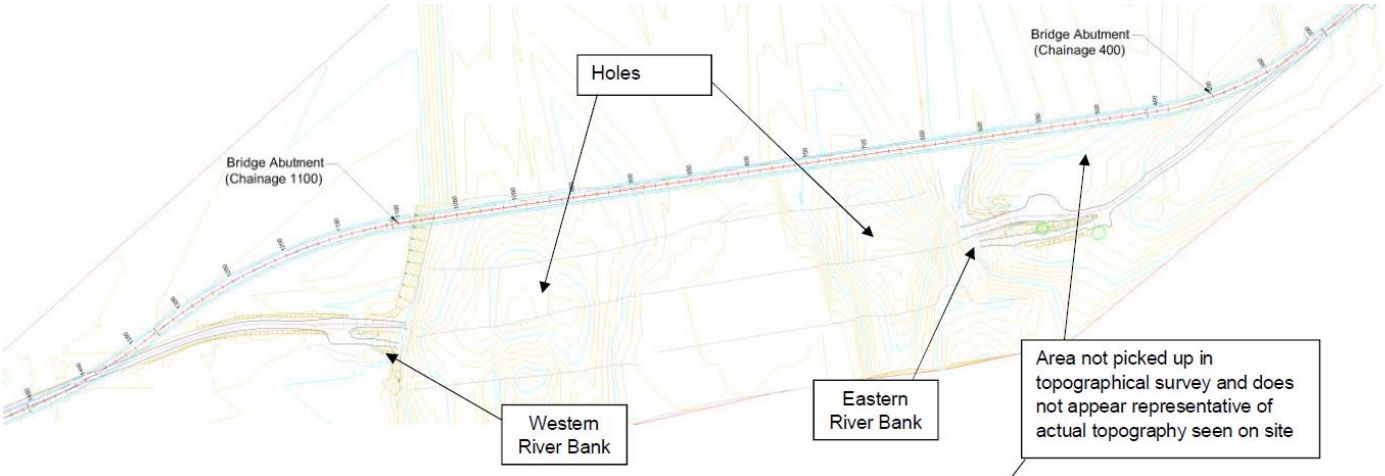


Figure 37: Bridge Alignment Option 2 – Longitudinal Section

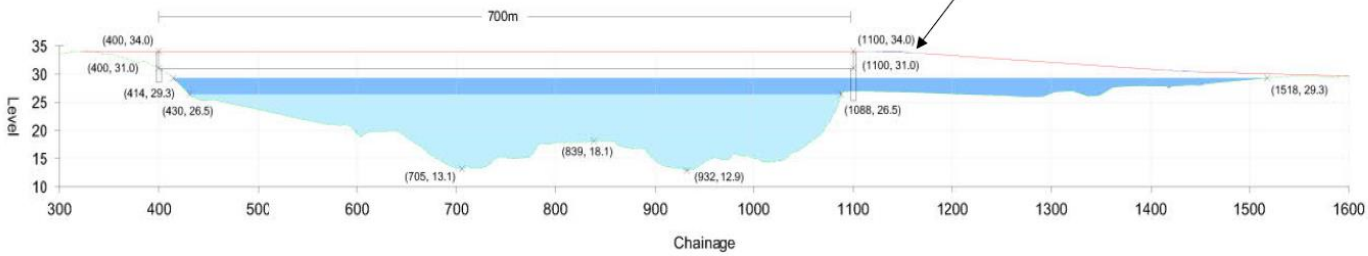


Figure 5: Bridge Alignment Option 2 Plan View

2.3.3 Green Opportunities

Several features of the project have been designed to promote safety, security and efficiencies especially in terms of energy. These include the following:

- Use of local materials for pavement and in the concrete (laterite stabilised with cement for road base and subbase in the pavement and crushed stone from local quarries).
- Solar powered LED lighting.
- Using geocell material for erosion protection rather than concrete throughout.
- Box culverts are larger than existing culvert provision that will facilitate wildlife crossing.
- Process of selecting the bridge at Kurupukari – went for the shortest option and one which uses local materials. Both of which will reduce carbon emissions when compared with the other options.
- Introducing one climbing lane as a trial should help reduce congestion. Constructing one first as a trial, rather than all 7 identified and them potentially not working, reduces unnecessary construction.

2.4 Description of Alternatives

The alternatives considered for the LMH Road upgrade and River Crossing at Kurupukari are described as follows.

2.4.1 LMH Road Upgrade

Four alternatives were assessed as part of the feasibility study for the LMH Road upgrade. These are:

- **Alternative 1 - Do Nothing**: there will be no improvement to the alignment or pavement. Status quo remains.
- **Alternative 2 - Do Minimum**: retain the existing alignment and improve the pavement using either a new gravel surface. or a double bituminous surface treatment (DBST). The scenario is based on neither the new port or remainder of the highway to Lethem being completed, thereby limiting traffic growth.
- **Alternative 3 - Do Maximum 1:** improve the alignment and upgrade the pavement to an all-weather surface using asphalt concrete (AC). This scenario is based on the port and remainder of the highway to Lethem being completed – i.e. construction of a pavement based on a 20-year design life from the outset.
- **Alternative 4 - Do Maximum 2:** improve the alignment and upgrade the pavement using DBST for the first 8-10 years. The scenario is based on the port and remainder of the alignment to Lethem being upgraded. If the anticipated resultant traffic growth materialises, the route could then be overlaid with asphalt at the 8 to 10-year period, when the DBST is coming towards the end of its serviceable life.

The design which is being progressed is Alternative 3.

2.4.2 Kurupukari River Crossing[16]

Three bridge alignments for the Kurupukari River Crossing were identified as suitable crossings of the Essequibo River, namely:

- Option 1 – Between Existing Ferry Landings
- Option 2 – 75m Downstream of Ferry Landing
- Option 3 – Downstream Linden Bank to Lethem Ferry Landing

Option 2 has been identified as the preferred option. This option will have an overall bridge length of 700m which is the shortest of the options, is considered the lowest cost option and will avoid the scour holes in the river bed which are closer to the Kurupukari Falls. Option 2 will have minimal impact during construction, on the existing ferry crossing. However, it will encroach into the Iwokrama forest and require a 300m long, 30m wide road corridor.

[16] Extracted from Mott MacDonald Novemner 2019, Feasibility Study Report, Linden to Mabura Hill Road Upgrade and River Crossing at Kurupukari, pg 70 – Section 4.4.1.4 Bridge Alignment Options

3 The Institutional, Constitutional, Legal and Policy Framework

This section provides an overview of relevant national policy, legal, and institutional framework for the project. The principal policies, legislation and institutions are listed in Table 6.

Table 6 Policies, Legislation and Institutional Framework of the Project

Policies, Strategies, Plans	Green State Development Strategy 2019
	Low Carbon Development Strategy 2013
	National Development Strategy 2001 – 2010
	National Land Use Plan 2013
	Linden-Lethem Road Corridor Land Use Plan 2006
Legislation	Constitution of Guyana 1980
	Environmental Protection Act 1996
	Environment Protection (Water Quality) Regulations 2000
	Environment Protection (Air Quality) Regulations 2000
	Environment Protection (Hazardous Waste) Regulations 2000
	Environment Protection (Noise Management) Regulations 2000
	Environmental Protection (Litter Enforcement) Regulations, 2013
	Labour Act 1942
	Occupational Safety and Health Act 1997
	Roads Act 1909
	Acquisition of Land for Public Purposes Act 2001
	Amerindian Act 2006
	The Iwokrama International Centre for Rain Forest Conservation and Development Act 1996
	Forests Act 2009
	The Mining Act 1989
	Person with Disabilities Act 2010
	Constitutional Rights and Laws Specific to Indigenous Peoples
	Women's Rights and Gender Equality Provisions within the Laws of Guyana
	Constitutional Human Rights Commissions
	Article 154 A: Protection of Human Rights
	Article 29: The Principle of Equality Between the Sexes
	Article 149G: Indigenous Peoples Rights
	Declaration of Youth in the Constitution
	Article 149 J: The Environment
	Article 154 A: Protection of Human Rights
Institutional Framework	Environmental Protection Agency
	Ministry of Public Infrastructure

	Ministry of Communities (RDCs of Regions 9 and 10, and Linden Town Council)
Convention	International Human Rights Conventions

3.1 Policies, Strategies and Plans

3.1.1 Green State Development Strategy (2019)[17]

The Green State Development Strategy: Vision 2040 (GSDS) was approved in 2019 by the GoG and is Guyana's national development plan that outlines the investment priorities for economic and social development over the next 20 years. The goal of the GSDS is to improve standards of living, ensure social equity and reduce environmental risks and it is also the roadmap for Guyana to achieve the Sustainable Development Goals by the 2030s. The Strategy outlines the principles of the green agenda for 2040 as "*an inclusive and prosperous Guyana that provides a good quality of life for all its citizens based on sound education and social protection, low-carbon and resilient development, providing new economic opportunities, justice and political empowerment*."

The GSDS identifies three focus areas which are to (1) Manage Natural Resource Wealth; (2) Support Economic Resilience; and (3) Build Human Capital and Institutional Capacity. Under the focus area (2) Support Economic Resilience, a key objective is *Building Resilient Infrastructure, Green Towns and Urban Public Spaces* and where there is specific mention that *Investments are needed to improve the road network in the coastal region, and south to the Brazilian border, with links to Bartica and Linden.*

In addition, the GSDS, under focus area (1) Manage Natural Resource Wealth, identifies as a key objective that *Natural resources define the country's natural wealth and require careful management, based on scientific research and a decision-making culture that is uncompromisingly evidence-based* and under this objective it is stated that *The country's natural wealth must not be lost to economic growth but managed with a long term perspective that embraces the principles of sustainable development.*

The GSDS has made direct reference to the Linden to Lethem Road corridor, which, no doubt will include the LMH Road and the Essequibo River Crossing at Kurupukari. In addition, the Strategy makes mention of critical issues such as natural resources management (mining, forestry, etc), biodiversity conservation and management and supporting traditional livelihoods and indigenous communities, issues which have relevance to the upgrade and operation of the LMH Road and the Essequibo River Crossing at Kurupukari.

3.1.2 Low Carbon Development Strategy (2013)

The Low Carbon Development Strategy (LCDS) is a long-term development strategy which was prepared in 2009 and updated in 2013. The LCDS provides an overarching framework for transforming Guyana's economy along a low carbon, climate resilient development path. A Reducing Emissions from Deforestation and Forest Degradation (REDD+) mechanism was prominently featured in the LCDS as a means through which Guyana could earn results-based payments for sustainable forest management and forest conservation. The LCDS outlined several priority development projects into which monies earned from REDD+ should be invested and which included supporting Amerindian people's development, advancing efforts at conservation of biodiversity and sustainable forest management, renewable energy, and supporting climate resilience. The LCDS served as the basis for the Guyana-Norway Partnership on REDD+ and through which Guyana earned over 200 Million USD as performance-based payments for maintaining its deforestation rate below an agreed threshold and improving forest governance. These funds earned supported projects identified in the LCDS.

[17] Ministry of the Presidency, 2019. Green State Development Strategy, Vision 2040 Volume 1 – Policy Recommendations, Financial Mechanism & Implementation. Pg 3-6.

While the LCDS does not make specific reference to the LMH Road and the Essequibo River Crossing at Kurupukari, the fundamental thrust of the strategy places important focus on issues such as sustainable forest management, protection of biodiversity, and Amerindian peoples' development which have relevance to the upgrade and operation of the LMH Road and the Essequibo River Crossing at Kurupukari.

3.1.3 National Development Strategy (2001 – 2010)

The National Development Strategy (NDS) set out the primary development policy framework for Guyana. It provides a framework for national planning and captures several cross-sectoral issues such as the environment, forestry, agriculture, mining, tourism and fisheries, among others. The NDS identified six major constraints that are faced by Guyana as a result of poor infrastructure (mainly, Guyana's road network) and outlined measures aimed at improving the road network system.

According to the NDS, *the highest importance is attached to the third element of the Strategy, which is the establishment of a road network throughout the length and breadth of Guyana over the next ten years. This transport infrastructural strategy which, if followed, will result (i) in the rehabilitation and modernisation of the coastal roads, and the placement of bridges across the Supenaam, the Essequibo, the Demerara and the Berbice rivers; (ii) in the construction of an up-to-date north-south road from Georgetown to the Takutu; etc*. According to the NDS, *Although this road network will contribute to the attainment of all of the NDS's objectives, it will particularly assist in the penetration of our interior, in the opening up of new lands for a wide variety of economic activities, and in the facilitation of ecotourism. Above all, it will contribute immensely to the social and physical unification of Guyana.*[18]

This is further elaborated in Chapter 8 of the NDS which focuses directly on transportation and the road networks with the overall objective of constructing a national road transport network which would provide the basis for the economic development of the entire country and assist in the attainment of its social integration.

In identifying the construction of an up-to-date north-south road from Georgetown to the Takutu, a clear reference is made to the LMH Road and the Essequibo River Crossing at Kurupukari. While the NDS has been succeeded by more recent national strategy documents, its elaboration on issues such as mining, biodiversity, wildlife, environmental management etc. under Chapter 5 – The Environment, still holds relevance.

3.1.4 National Land Use Plan (2013)

A National Land Use Plan was prepared by the Guyana Lands and Surveys Commission (GLSC) in 2013 with the primary objective to provide a strategic framework to guide land development in Guyana and is built upon a number of national policies and strategies that have a direct relevance for land use and land management. A main objective of the Plan is to enable financial resources to be targeted at optimal land uses at the regional level through the promotion of multiple land use.[19]

This Plan is still being reviewed by GoG.

3.1.5 Linden-Lethem Road Corridor Land Use Plan (2006)

A Linden-Lethem Road Corridor Land Use Plan was prepared by the GLSC in 2006. The Plan focused on the road corridor between the Takutu River Bridge at Lethem and Linden, a distance of 432km and took into consideration a width of 8km on either side of the road.

Notwithstanding its focus on the road corridor, the Plan recognized that the development scenario for the road corridor was continuously evolving even as developments beyond the corridor were moving apace in terms of

[18] Government of Guyana, 2000. National Development Strategy 2001-2010 – Eradicating Poverty and Unifying Guyana, Section IV – The Strategy, pg 7 para 1.

[19] Government of Guyana, 2013. Guyana National Land Use Plan. Section 1.1 Objectives, pg 10 para 2.

infrastructure, agriculture and extractive industry. In this regard, the Plan, while not being prescriptive, recognized that land capability should be a principal criteria to determine use and that there is the need to have in place a national land use policy and national land use plan to guide sectoral and regional plans and to also place emphasis on establishing land use priorities.

In relation to the upgrade and operation of the LMH Road and the Essequibo River Crossing at Kurupukari, the Plan recognized Linden, Mabura Hill and Kurupukari as growth nodes along the road corridor.

This Plan is still to be approved by GoG.

3.2 Legislative Framework

The legislation relevant to the project is discussed below.

3.2.1 Constitution on Guyana

The Constitution is the supreme law of Guyana and outlines, inter alia, the branches and powers of Government, the rights of Guyanese, and the principles for the political, economic and social systems. Specifically, Articles 2:25 and 2:36 of the Constitution provides the basis for a national environmental policy and emphasizes these as key elements of Guyana's social and economic systems. Article 2:25 of the Constitution states that "every citizen has a duty to participate in activities to improve the environment and protect the health of the nation". And Article 2:36 states that "in the interest of the present and future generations the state will protect rational use of its flora and fauna and will take all appropriate measures to conserve and improve the environment".

The provisions of the Constitution are expected to serve as a guide for national strategies and plans as well as projects. Considering the upgrade of the LMH Road and the Essequibo River Crossing at Kurupukari, Articles 2:25 and 2:36 therefore have direct relevance in the planning, implementation and management of this project.

3.2.2 Environmental Protection Act (1996)

The Environmental Protection Act, 1996, and the Environmental Protection Amendment Act 2005, establishes the basic institutional and regulatory framework within which all activities that may significantly impact on the natural, social, and cultural environments are assessed. The Act also provides that EPA will be the central coordinating agency for environmental management in the relevant sectors in Guyana. The Act outlines the environmental authorisation process for new or existing projects being modified. Part IV of the Act addresses EIAs and outlines the steps in seeking environmental authorization, the determination of whether a project will require an EIA, and the steps to be followed and scope of the EIA.

The MOPI has initiated the process for securing environmental authorization from the EPA for the LMH Road Upgrade and Kurupukari River Crossing project.

3.2.2.1 Environmental Protection Regulations (2000)

Section 68 of the Act provides for the elaboration of regulations to articulate specific areas of environmental management, and of relevance are the Regulations on hazardous waste management, water quality, air quality, noise management and environmental authorization. These pollution management regulations were developed to regulate and control the activities of developmental projects during construction and operation and will apply during the construction and operation phase of the upgrade of the LMH Road and the Essequibo River Crossing at Kurupukari.

3.2.2.2 Environmental Protection (Water Quality) Regulations (2000)

These regulations require registration and environmental authorization by any person whose construction, installation, operation, modification or extension of any facility cause the discharge of effluents. They cover parameter limits of effluent discharges, new sources of effluent discharges, fees for registration and environmental authorization, sampling points, records and reports and general provisions for the registration of water effluent, biological integrity, spills or accidental discharges and standard methods of analysis. The Guyana National Bureau of Standards (GNBS), has developed Interim Guidelines for Industrial Effluent Discharge into the Environment, which specifies the discharge limits for various parameters and different types of operations. The discharge limits are outlined in Table 7.

Table 7 GNBS Industrial Effluent Discharge Limits

Parameter	Acceptable Standard
pH	5.0 – 9.0
Conductivity	53 (ms/cm)
Total Suspended Solids	10 mg/l
Dissolved Oxygen	>50 mg/l
Turbidity	<25 NTU
Temperature	<40
Oil and Grease	25 mg/l
Aluminum	0.03 mg/l
Sulphate	400 mg/l
Copper	0.05 mg/l
Iron	0.3 mg/l
Zinc	5 mg/l

These Water Quality Regulations will apply during the construction and operation phase of the upgrade of the LMH Road and the Essequibo River Crossing at Kurupukari.

3.2.2.3 Environmental Protection (Air Quality) Regulations (2000)

These regulations require the registration and environmental authorization by persons with facilities that emit air pollution from any process into the atmosphere. Elements related to parameter limits on air contaminants and emission samplings are also stated in the regulations. The list of air contaminants for which parameter limits are to be set by the Agency are also detailed in the regulations. The EPA has the responsibility to develop standards to regulate emissions; however, this is not completed. In the absence of national standards on air quality, international standards are consulted. Table 8 highlights the World Bank Air Quality Standards on a 24-hour average.

Table 8 World Bank Air Quality Standards on a 24-Hour Average

Element	Acceptable Limit (24-hour Average)
Nitrogen Dioxide	200 g/m^3
Particulate Matter (PM 10)	50 g/m^3
Particulate Matter (PM 2.5)	25 g/m^3
Sulphur Dioxide	20 g/m^3

These Air Quality Regulations will apply during the construction and operation phase of the upgrade of the LMH Road and the Essequibo River Crossing at Kurupukari.

3.2.2.4 Environmental Protection (Hazardous Waste Management) Regulations (2000)

The Environmental Protection (Hazardous Wastes Management) Regulations require that any person operating a facility that generates, treats, stores, disposes or transports hazardous waste must notify the EPA

and apply for an authorisation. The Regulation also outlines the provision for reporting, emergency preparedness plan, list of hazardous characteristics and hazardous waste to be controlled.

These Hazardous Waste Regulations will apply during the construction and operation phase of the upgrade of the LMH Road and the Essequibo River Crossing at Kurupukari.

3.2.2.5 Environmental Protection (Noise Management) Regulations (2000)

Operators executing various activities that cause or emit noise above a required threshold are required to apply to the Agency for an environmental authorization. The GNBS is responsible for the establishment of standards for permissible noise levels in industry, construction and other areas. The EPA has in collaboration with the GNBS developed noise standards which stipulate level of noise for construction activities, which are 90dB (daytime) and 75dB (night time).

These Noise Management Regulations will apply during the construction and operation phase of the upgrade of the LMH Road and the Essequibo River Crossing at Kurupukari.

3.2.2.6 Environmental Protection (Litter Enforcement) Regulations (2013)

These Regulations provide for the enforcement against litter offences. It is an offence under these regulations to (a) place litter in a public place; (b) permit or cause another person to litter a public place or; (c) have litter on private premises that pose a health risk. Under the Litter Prevention Regulations, the contractor will have to ensure that solid waste generated is managed and disposed of in an acceptable manner.

These Litter Enforcement Regulations will apply during the construction and operation phase of the upgrade of the LMH Road and the Essequibo River Crossing at Kurupukari.

3.2.3 Labour Act (1942)

The Labour Act of 1942 specifies the conditions that an employer must observe in the contracting employees. Part V specifies that the entire wages of the employee must be paid as money and not otherwise. However, in occupations where it is customary to make partial payment of allowances in the form of food, toiletries, housing etc. these are acceptable and not considered illegal, if both the employer and employee are agreed on such terms.

This Act will come into force in particular during the construction phase of the upgrade of the LMH Road and the Essequibo River Crossing at Kurupukari so as to ensure that workers under the project are not mistreated, paid adequately in accordance with the Laws of Guyana and have proper representation.

3.2.4 Occupational Health and Safety Act (1997)

The Occupational Safety and Health Act 1997 defines the responsibilities of management and workers with respect to safety and health and applies to every workplace in Guyana. The Act makes provisions for the registration of industrial establishments, the establishment of an Occupational Safety and Health Authority, the establishment of a National Advisory Council on Occupational Safety and Health, the duties of employers, workers and other persons, treatments of accidents and occupational diseases, and occupational safety and health regulations. The Act authorises OH&S inspectors to enter and inspect workplaces.

Under this Act the employer has a responsibility to establish a joint workplace safety committee consisting of four (4) persons. When the workplace has more than fifty (50) persons, the committee should consist of six (6) persons of which at least half the numbers should be workers who do not exercise managerial functions and should be selected by the workers themselves. Employers also have duties of providing protective devices for workers, providing instructions and supervision to ensure the safety of workers, maintaining a medicine chest and establishing an occupational health service for workers. At a construction site, employers must

ensure that the requirements of the Act are implemented and that the safety and health of workers are protected onsite.

This Act will apply especially during the construction phase of the upgrade of the LMH Road and the Essequibo River Crossing at Kurupukari.

3.2.5 Roads Act (1909)

Under the Roads Act, the Minister has the authority to constitute a Road District in any part of Guyana. Before making any alteration or changes to roads, the plan showing the proposed works must be submitted to the Official Gazette for three (3) weeks and any persons with objections will have an opportunity to object to the plan. This Act also gives road officers the power to enter upon any roadway and alter, clean, clear, dig or conduct general maintenance once authorized by the Minister. This Act also gives the Minister the right to control the type of vehicles that uses the roadways and allows for penalties to persons found guilty of defacing or damaging existing roads.

This Act will come into force in particular during the operational phase of the LMH Road and the Essequibo River Crossing at Kurupukari.

3.2.6 Acquisition of Lands for Public Purposes Act (2001)

The Land Acquisition for Public Purposes Act covers expropriation of land required for public works including roads. This Act gives the Minister the power to enter upon any piece of land (with the consent of the occupier) and acquire said land for road work, etc. The Act states that in determining claims for compensation, the Government may consider: the market value of the land; losses to earnings; losses due to severance and relocation expenses.

As it regards the upgrade of the LMH Road and the Essequibo River Crossing at Kurupukari, if any land is needed for the project, it can be acquired under this Act, even if it is occupied by a private person, and that person will be compensated by the Government for the value of their land and any structure.

3.2.7 Amerindian Act (2006)

The Amerindian Act provides for the recognition and protection of the collective rights, the granting of land and the governance of Amerindian Villages and Communities. The Act gives Amerindian villages legal rights to manage and conserve their lands. A village can prohibit or control entry and access to its territory and traditional knowledge, prohibit or control mining, zone its lands, protect sacred sites, regulate hunting, fishing, tourism, research etc. All Amerindian lands are owned collectively by the whole community (technically called a “Village”) and administered through a Village Council. The Village Council is elected by the community and is a recognised legal entity.

While this Act is relevant to the wider Linden to Lethem Road Corridor, the upgrade of the LMH Road and the Essequibo River Crossing at Kurupukari does not fall within or close to Amerindian Lands. Nonetheless, other provisions of the Act, as it relates to Amerindians still needs to be upheld by the project during both the construction and operational phase.

3.2.8 The Iwokrama Act for Rainforest Conservation and Development (1996)

The Act provides for the sustainable management and utilisation of approximately 360,000 hectares of Guyana's Tropical Rain Forest dedicated by the GoG as the Programme Site for the purposes of research by the Iwokrama International Centre to develop, demonstrate and make available to Guyana and the international community systems, methods and techniques for the sustainable management and utilisation of the multiple resources of the Tropical Forest and the conservation of biological diversity. The Act prohibits mining, logging and land leasing without the approval of the Centre. However, the exception to stipulation is

Guyana's indigenous peoples who, whether through legal or traditional means, have a connection with any area of land within or neighbouring.

The Iwokrama Nature Reserve is upstream and downstream of the area on the western bank (Left Bank) of the Essequibo River where the Kurupukari Bridge will connect. As such, the provisions of Act need to be taken into consideration during the construction and operational phase of the project and in particular the Bridge Crossing at Kurupukari.

3.2.9 Forests Act (2009)

The Forest Act authorizes the Guyana Forestry Commission (GFC) to address issues within Guyana's State Forest. Under the Act the GFC is allowed, among other things, to grant leases, Timber Sales Agreements (TSAs), and to permit individuals and companies to harvest/extract timber from defined tracts of State Forest, as well as, to regulate harvesting, transport and marketing and exports of timber. The Act also outlines the ownership of forest produce, offences and legal proceeding under the Act, and penalties that may arise as a result.

This Act is relevant to the upgrade of the LMH Road and the Essequibo River Crossing at Kurupukari since there are several logging concessions in vicinity of the road corridor and these operations, along with others outside of the road corridor, utilize the LMH Road and Kurupukari Crossing for transport.

3.2.10 Mining Act (1989)

The Mining Act makes provisions for the prospecting and mining of metals, minerals and precious stones. Under the Act, all mineral resources in Guyana are vested in the State. Read in conjunction with the Guyana Geology and Mines Commission (GGMC) Act (1979), the Act empowers the GGMC to take charge of and have guardianship over all minerals in the lands of Guyana and the Minister has the authority to establish mining districts. Accordingly, the GGMC may, with approval of the Minister, grant permits or licences for mining of Government lands, State lands and private lands including Amerindian villages. The Act also makes provisions for prospecting on a large, medium and small-scale basis, steps in discovery of a mineral, the grant and enlargement of a mining area, issues licenses and permits for prospecting and mining, and the paying royalties to the GGMC.

The Act is relevant to the upgrade of the LMH Road and the Essequibo River Crossing at Kurupukari as there are several small-scale mining operations which may be accessed directly from the road corridor. In addition, the road connects to several mining districts in Guyana including the Potaro and Rupununi districts and is frequently used by mining operations in these districts for transport.

3.2.11 Additional Legislation

Other pieces of legislation which may be applicable include:

- Wildlife Conservation and Management Act 2016,
- Wild Birds Protection Act 1973,
- Prevention of Discrimination Act 1997,
- Employment of Young Persons and Children Act 1983,
- National Insurance and Social Security Act 1969.

3.2.12 The Persons with Disabilities Act (2010)

The TOR for the project makes substantial reference to PWD and their inclusion. This is a welcome emphasis on PWD as key stakeholders in the project. Hence the special emphasis on the legal and organisational framework for this vulnerable and important group.

Guyana signed the United Nations Convention on the Rights of Persons with Disabilities in 2007 and ratified the Convention in 2013. In 2008, the Guyana Council of Organisations for Persons with Disabilities was established. In 2010, the Persons with Disabilities Act was passed by the National Assembly. The Act makes decent provisions for Health, Education, Employment and Accessibility rights in terms of housing, access to public buildings and utilities; and also makes provision in Section 30 for inclusion of policies in the Motor Vehicle and Road Traffic Act to facilitate appropriate adaptations / modifications to motor vehicles driven by PWD.

Section 31 of the Person with Disabilities Act states:

The Commission shall collaborate with the Minister responsible for Transport to formulate a public transportation policy which shall provide for persons with disabilities and which policy shall be implemented on order of the Minister.

It is not clear if any such policy has been formulated or implemented by the relevant Minister, but there seems to be no such indication.

Lack of Policy for Road Design and Use by Person with Disabilities

The PWD Act falls short of establishing obligations or policies that mandate road designs to ensure appropriate features to enable/enhance safe, secure and accessible use of roads by PWD.

The emphasis in this CDB contract on the participation and contribution of PWD to the designs is therefore commendable and provides an opportunity for both the National Commission on Disability and the Ministry of Public Transportation to follow through on the Act with policy development.

National Commission on Disability

The National Commission on Disability (NCD) plays a coordinating role in a multi-sectoral approach to helping persons with disabilities to live full and productive lives. The NCD was officially launched on December 10, 1997. The NCD is now governed by an Act of Parliament: The Persons with Disability Act No. 11 of 2010 which was assented to by the President on 2nd November 2010. It comprises 12 members appointed by Cabinet and selected by agencies and organizations.

NCD Vision: A society where persons with disabilities enjoy their rights and are able to lead full and productive lives.

NCD Mission:

- To Protect and Promote the Rights of Persons Living with Disabilities
- To influence policy changes and enforcement of laws that protects the rights of persons with disabilities.
- To be a major source of information on disability issues in Guyana.

PWD inclusion in Stakeholder Consultations:

Contact has been with the NCD and interviews held with key personnel there. A stakeholder consultation session is being organised by the NCD in Georgetown. The NCD will advise on PWD in the AOI and facilitate contact to ensure, as far as possible, their inclusion in the stakeholder consultation process.

NCD Surveys on PWD: A Press Release from the NCD reported in national newspapers in June 2019 provided the following information:

11,713 persons are living with a disability in Guyana: A survey conducted by the National Commission on Disability has revealed that 11,713 persons are living with a disability in Guyana based on a household survey carried out in four of Guyana's ten regions. The survey was conducted in Regions Two, Three, Five, and Ten,

while a pilot was done in Region Six in 2016. Disabilities were categorised as: physical/mobility disability, visual/seeing disability, hearing/speech disability, learning/cognitive disability, mental health and medical/other disability.

In Region Ten (Upper Demerara-Berbice), there were 1,718 cases of persons living with a disability, of which:

- 31.5% were physical
- 16.4% were hearing
- 14.3% were learning
- 28.5% were visual
- 6.9% were mental
- 2.4% were other.

PWD living in stakeholder communities alongside the Linden-Mabura Road:

- **Specific to the Stakeholder communities alongside the Linden-Mabura roadway:** Recorded by the NDC were a total of 21 PWD - 8 Males and 13 females - in the three communities of Great Falls / #58, #47 and Mabura Hill.
- **Breakdown by community and sex:**
  - Great Falls / #58 Village: Total of 13 PWD recorded - 5 Males and 8 Females
  - # 47 community: Total of 3 PWD recorded: 1 Male and 2 Females
- Mabura Hill community: Total of 5 PWD recorded: 2 Males and 3 Females
- **Types of Disabilities:** Types of disabilities recorded for all three communities include: Visually impaired, orthopaedic, cerebral palsy/learning disability, hearing impaired/deaf, Down's Syndrome and Autism.

PWD Survey Data as a Policy Tool: Avonel Corrica, a PWD advocate and Communications Officer attached to the National Commission on Disability, explained that the survey data becomes useful for policy makers. She stated it can be used when Government prepares a budget or plans the construction of new facilities and other infrastructure. Also, to cater for the hearing and speech impaired, public institutions and buildings will be expected to have persons specialising in sign language in place to help with communication.

Road Design Measures and Policies to Include PWD as Road Users

There is a deficiency in terms of policies and rights-based advocacy for PWD generally and, in particular for communities in rural and interior communities. The NCD surveys have been important in making a start. The Linden to Mabura Hill road is a particularly unsafe one for PWD, with its heavy-duty logging trucks overloaded with massive logs as well as the heavily laden fuel and goods trucks that ply the road day and night. Most PWD in these remote communities are basically house-bound and/or with limited mobility, even within the community. Crossing the road would, currently, certainly constitute a major hazard for them. In terms of schooling for PWD, it is not clear if any are being integrated into schools, but if they have to cross the road to attend school, this would be very difficult and dangerous. Therefore, for the road design and road safety policies, it would be prudent to incorporate measures for PWD, so that there is greater opportunity for PWD to become better integrated and to enjoy the right, as Guyanese citizens, to use and cross the road safely.

Defenders of PWD Rights in Guyana

The NCD and other PWD Advocacy NGOS such as the Society for the Blind and the Deaf Association of Guyana as well as the Ptolemy Reid Rehabilitation Centre in Guyana are all pro-active in lobbying for and defending the rights of PWD in Guyana. An example of this from the Deaf Association of Guyana (DAG) is given below which is specific to their rights concerning road transportation.

Deaf citizens demand the right to drive (February 18, 2019) www.report.gy

The Deaf Association of Guyana (DAG) staged a picketing exercise in front of the Ministry of Public Security on Brickdam in Georgetown on February 18, 2019 - demanding that the Government repeal the law which prevents deaf persons from driving in Guyana. The Traffic Department of the Guyana Police Force does not permit deaf persons to take the driver's license test. Deaf citizens believe it is a violation of their human rights.

'Deaf people can drive' and 'Equal Rights Now,' were some of the protestors' slogans.

The Deaf Association of Guyana is asking for an intervention that would allow them to enjoy the social and financial benefits of driving. Deaf citizens have been relying on their sight all their life and according to research, they may be better drivers because of their visual acuity. They are also outfitted with hearing aids. The DAG protestors made reference to other countries adapting to deaf persons driving, such as neighbouring Suriname. *"In Suriname, they don't have such requirements. They have a little sign like an ear with an X indicating that it is a deaf person driving that car so maybe that would work here in Guyana, or some other thing".* DAG met with the Ministry of Public Security in 2015 on this matter, but nothing has materialised thus far.

3.2.13 Women's Rights and Gender Equality Provisions within the Laws of Guyana

While the national constitution stands out as the supreme legal framework that ensures equality for all persons the legislations outlined in Table 9 were enacted to specifically protect the rights of persons, inclusive of children, women, indigenous peoples, workers, and persons with disabilities.

Table 9: Name and date of the law or policy and summary of key rights

Name of the law	Date	Summary of key rights
Racial Hostility Act	1964	An Act to make provision for preventing conduct tending to excite hostility or ill-will against any and all persons by reason of their race.
The Labour Law	1883	As a result of this law, women are to be compensated for overtime work in factories and night work of women is regulated.
Fiscal Amendment Act	1987	Married women can now file separate income tax returns.
Domicile Reform Act	1988	Both men and women can transmit their citizenship to their spouses.
Equal Rights Act	1990	This Act makes it illegal to discriminate against anyone on the ground of her/his sex or marital status. The Act states that women and men doing the same or similar work must receive equal pay.
Family & Dependents Act	1990	This Act prevents family members and dependents from being left without proper means of support when the person upon whom they are dependent dies. Persons who can make claims under this act are legally wed spouses, common-law spouses (of more than 7 years), children, people treated as children, and lovers.
Married Persons Property Act	1995 (amended 2014)	The High Court can make an order regarding any property in dispute between a husband and wife. If a couple is not legally married, they must have been living together and both be single. If they have lived together for less than 5 years, the court must take into account both partners' contributions to the relationship, home, and welfare of the family. If they have lived together for more than 5 years and one person did not work outside the home, the court must award one third of the property in dispute to him/her. If they lived together for more than 5 years and one person worked outside the home, the court must award one half of the property in dispute to him/her.
Medical Termination of Pregnancy Act	1995	Abortion is legalised in Guyana. A woman has the right to choose what to do with her own body and to choose to terminate an unwanted pregnancy.
The National Policy on Women	1995	Emphasizes: equitable gender mainstreaming ensuring women's conditions and positions are fully taken into account in social, economic, political and cultural development; need for quantifying women's unwaged labour and reproductive roles; attitudinal change in men re sharing family responsibilities; elimination of poverty; inclusion of gender equity on the national agenda, educating and informing the public of the importance of addressing gender in all areas of national life.

Name of the law	Date	Summary of key rights
Domestic Violence Act	1996	The Act provides protection to victims and survivors of domestic violence in cases involving all forms of domestic/family violence, regardless of whether the perpetrator is a man or a woman, or the victim is a man or woman, girl or boy or elder. It allows for prosecution of perpetrators, protection orders for victims/survivors. It also covers counselling for victims and perpetrators and shelters for victims/survivors.
Prevention of Discrimination Act	1997	This Act prevents discrimination with regard to employment, professional partnerships, membership of trade organizations and unions, training programs, and access to goods, services, and facilities. The Act also protects an expectant mother from being dismissed due to pregnancy or of denial of maternity leave by her employer.
Matrimonial Causes Act	1998	If a couple divorces this act permits the wife to submit an application to the court for alimony and/or permanent maintenance.
Guyana Elections Law Amendment Act	2000	The Act makes it mandatory for 33% of women to be represented on the lists of all political parties contesting general and regional elections.
Combating of Trafficking in Persons Act	2005	This Act outlaws Trafficking in Persons (TIP) of any sex, race, class or age. Guyana has now complied with its provisions and is currently classified as a Tier One country. Annual Reports are submitted and published globally by the US State Department. Provisions for support of TIP victims is mandated and a specialised TIP Unit within the Ministry of Social Protection has been established. TIP traffickers are increasingly charged and jailed for violations of the TIP law. Training and sensitisation sessions are conducted.
Amerindian Act	Amended 2006[20]	An Act to provide for the recognition and protection of the collective rights, lands and resources of Indigenous/Amerindian Villages and Communities, the granting of land to Amerindian Villages and Communities and the promotion of good governance within Amerindian Villages and Communities. Collective decision-making is enshrined through the mechanism of the Village General Meeting (VGM). Gaps and short-comings in the Act have been identified by Indigenous leaders and peoples through a highly participatory process and recommendations for a Revision of the Amerindian Act has been submitted to the Ministry of Indigenous Peoples Affairs.
Revised National Policy on HIV/AIDS in Guyana	2006	The protection of human rights is essential to safeguard human dignity in the context of HIV/AIDS. All HIV positive individuals, regardless of nationality, race, age, religion, disabilities, gender, sexual orientation and socio-economic status, have the right to the best quality of health care available without being subjected to any form of discrimination. Because HIV/AIDS is now a developmental issue, especially in the context of Guyana, the response needs to be a multi-sectoral one involving the private sector, governmental, non-governmental agencies and community-based organizations including persons living with HIV/AIDS and/or their advocates. Women are more vulnerable to HIV infection due to biological factors as well as societal factors such as discriminatory attitudes, gender stereotypes and the prevalence of violence against women, which increase women's likelihood of contracting HIV. This is reflected in the increased rate of infection amongst women in Guyana, and subordination and abuse of women and girls is seen as driving the HIV/AIDS epidemic worldwide.
Protection of Children Act	2009	Both girl and boy children have the equal right to lead a happy and productive life, free from physical, sexual, emotional and mental harm or abuse. The Act also protects children from neglect and abandonment, drugs and alcohol, obscenity ad pornography and trafficking and gives children the right to speak out against any and all abuses and harm done to them, and to help parents and guardians and the courts in making the best decisions for their safety, protection and wellbeing.
The Persons with Disabilities Act	2010	An Act to provide certain rights to persons with disabilities; to provide for the promotion and protection and full and equal enjoyment of the rights; to facilitate the enforcement of the rights; to eliminate discrimination on the basis of disability; to provide for the welfare and rehabilitation of persons with disabilities; to provide for the registration of persons with disabilities; to establish the National Commission on Disabilities; and for connected purposes.
Custody, Contact, Guardianship and Maintenance Act	2011	Originally, fathers were considered to be guardians of their children, but this act stipulates that both parents are guardians, whether the couple is married or not. If a couple splits up, in the absence of a court order, the two parents are deemed joint guardians.

[20] Currently under revision through a participatory process.

Name of the law	Date	Summary of key rights
Right of Persons in Common Law Union (Amendment) Act	2012	With the enactment of the new law, persons in common-law unions for five years will receive the same privileges as a widow or widower, where their partner has died without making a will. The explanatory memorandum states: The bill seeks to provide for the rights of persons in a common law union "in intestate succession." Clause 2 of the Bill provides that a single woman living with a single man in a common law union for not less than five years or vice versa to "have the same power and rights regarding intestate succession under the law as a widow or widower or a surviving spouse. However, only one such union shall be considered for any benefit."
Sexual Offences Act (SOA)	2010 (amended 2013)	This Act covers all forms of sexual offences, regardless of whether the perpetrator is a man or a woman or the victim is a woman or a man. There are particular clauses pertaining to offences against children under the age of 16. The Act also allows for Paper Committals which protects victims of rape and related sexual offences from having to verbalise and re-live their experience of being raped in open court with their rapist in proximity. Since the SOA, there has been an increase in convictions of rapists.
National Insurance Social Security Act, Subsidiary Legislation	2014	Of the many benefits covered in this regulation, maternity leave is offered to expectant mothers for a minimum of 13 weeks and a maximum of 26 weeks at 70% salary (based on her average earnings during the previous 26 weeks). An expectant mother is also entitled to a maternity grant if she or her husband has paid enough contributions. There is (as yet) no national legislation pertaining to paternity leave.
National Gender Equality and Social Inclusion Policy	2019	This brand-new gender-mainstreamed policy lays out the strategic and inclusive framework for advancing gender equality nationally. Its inclusiveness entails PWD, the Lesbian, Gay, Bisexual and Transgender (LBGT) community and Persons living with HIV or Aids (PLWHA). It is a well-thought policy, and if implemented in a robust manner, will serve to considerably advance equitable human development in Guyana.

3.2.14 Constitutional Rights and Laws Specific to Indigenous Peoples

The rights of the Indigenous peoples of Guyana are protected by international and domestic law. Guyana has acceded to a number of international human rights instruments that provide for the protection of indigenous peoples' rights and some of these instruments have been incorporated into domestic law.

3.2.14.1 Recognition of Indigenous Peoples Rights to Land, Security and Community Policies

The preamble to the Guyana Constitution specifically states that Guyana values *"the special place in our nation of the Indigenous Peoples and recognizes their right as citizens to land and security and to their promulgation of policies for their communities."*

3.2.14.2 Overarching Principle of Free, Prior and Informed Consent (FPIC)

The Guyana Constitution provides appreciable Indigenous rights protection and sets the foundation for the exercise of Free, Prior, Informed Consent.

Contemporary International law protects the right of Indigenous peoples to their free, prior and informed consent (FPIC). By virtue of this protection Indigenous peoples have the right to participate in decision making and to give or withhold their consent to activities that affect or are likely to affect their rights to lands, territories and resources in general. The right of FPIC flows from the collective right of Indigenous peoples to property and from their collective right to self-determination.[21]

3.2.14.3 Definition of Free, Prior and Informed Consent (FPIC)

FREE: this means that communities give their opinions and decisions freely and have not been pressured, deceived or forced to decide or agree to plans or proposals made by external agencies and others.

[21] UN Declaration on the Rights of Indigenous Peoples, Articles 3 & 4.

PRIOR: this means that external agencies must provide communities with all necessary prior information in adequate time, including notice of when they will consult with the community. The external agencies must carry out this consultation before any decisions are taken and not afterwards.

INFORMED: this means that external agencies have an obligation to tell the community the truth about their plans, including all positive/negative things that could possibly result from the programme or project.

- Communities must be provided with all the information they need in the appropriate languages, and in a clear format that they are able to understand
- Communities must be given adequate time to allow for proper internal discussion and evaluation of all the information and proposals being made by the external agencies.

CONSENT: this means the right of communities to say either "yes" or "no" to a proposal.

- External agencies must respect the communities' customary processes for decision-making (including allowing for adequate time needed to reach collective decisions)
- External agencies must accept from the very outset that a legitimate and just outcome of the consultation process may include a community's rejection of their proposal.

3.2.14.4 Right to FPIC in Jurisprudence of UN and International Human Rights Bodies

Examples of the elucidation of the right to FPIC are found in the jurisprudence of United Nations

Expert Committees and other international human rights bodies which monitor the implementation of relevant international instruments. For instance, the UN Committee on the Elimination of Racial Discrimination (CERD) which monitors the compliance of States' parties to the UN Convention on the Elimination of All Forms of Racial Discrimination made the following recommendation in 1997 calling on State parties to:

- Ensure that members of indigenous peoples have equal rights in respect of effective participation in public life, and that no decisions directly relating to their rights and interests are taken without their informed consent." [General Recommendation XXIII (51) concerning Indigenous Peoples.][22]

3.2.14.5 Declaration by Inter-American Commission on Human Rights (2006)

In 2006, the Inter-American Commission on Human Rights stated:

> *"The Commission notes, in light of the way international human rights legislation has evolved with respect to the rights of Indigenous peoples that the indigenous peoples' consent to natural resource exploitation activities on their traditional territories is always required by Law"*[23]

3.2.14.6 The United Nations Declaration on the Rights of Indigenous Peoples UNDRIP (2007)

The United Declaration on the Rights of Indigenous Peoples (UNDRIP) which was approved by the UN General Assembly in September 2007 also speaks to the right of Indigenous peoples to FPIC. Articles 19 and 32 (2) of the Declaration read as follows:

- *"States shall consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free, prior and informed consent before adopting and implementing legislative or administrative measures that may affect them" (Article 19); and*
- *"States shall consult and cooperate in good faith with the indigenous peoples concerned through their own representative institutions in order to obtain their free and informed consent prior to the approval of any project affecting their lands or territories and other resources, particularly in connection with the development, utilization or exploitation of mineral, water or other resources" Article 32 (2).*

[22] Adopted at the Committee's 1235th meeting, 18 August 1997. UN Doc. CERD/C/51/Misc.13/Rev.4, at para. 3.

[23] (Case #12.338 (Surinam) Twelve Saramaka Clans, at paragraph 214).

3.2.14.7 The Amerindian Act of Guyana (2006) – General Provisions

The Amerindian Act, assented to by the President of Guyana on 14 March 2006, provides for the recognition and protection of the collective rights of Amerindian Villages and Communities, mechanisms for good governance within Amerindian Villages and Communities and the granting of land to these Villages and Communities. The Amerindian Act 2006 gives Amerindian communities legal powers to manage and conserve their lands. Communities can use the powers in the Amerindian Act 2006 to create and enforce protected areas over their lands. A community can *inter alia* prohibit or control entry and access to its territory and traditional knowledge, prohibit or control small and medium scale mining, zone its lands, protect sacred sites, regulate hunting, fishing, tourism, research etc.

3.2.14.8 Amerindian Act: Part III Governance

- **Section 10**
  - A Village Council is established to administer a Village.
  - A Village Council is a body corporate.
  - In discharging its functions, the Village Council shall act collectively.
- **Section 13 (1) - *The functions of a Village Council:***
  - Hold for the benefit and use of the Village all rights, titles and interests in or over Village lands;
  - Manage and regulate the use and occupation of Village lands;
  - Promote the sustainable use, protection and conservation of Village lands and the resources on those lands;
  - Encourage the preservation and growth of Amerindian culture;
  - Ensure that places and artefacts located within Village lands and which hold sacred or cultural values to the Village are protected and cared for;
  - Protect and preserve the Village's intellectual property and traditional knowledge.

VILLAGE GENERAL MEETING: The main decision-making forum is the Village General Meeting (VGM).

3.2.14.9 Ownership of Amerindian Lands and Powers of Toshaos and Village Councils

All Amerindian lands are owned collectively by the whole community (technically called a "Village") and administered through a Village Council. The Village Council is elected by the community and is a recognised legal entity. This Village Council also has the power to make law i.e. rules which are legally binding on everyone within the Village lands whether or not they are members of the Amerindian community. Some communities have informal or traditional arrangements by which they regulate or restrict hunting, fishing, burning, poisoning etc. The Act further assigns to every Toshao the status of *ex officio* Justice of Peace for the district, area and/or village. This also allows the Toshao to serve as a rural constable. However, the enforcement of the provisions within this Act remains weak and the projected increase in human and vehicular traffic in close proximity to Amerindian areas will test its provisions. [24]

3.2.14.10 Revision of the Amerindian Act of 2006

The Amerindian Act is under Revision led by the APA in partnership with the MOIPA. A 15-page summary of Recommendations emerging from this highly participatory process has been handed over to the Minister in June 2019.

[24] Referenced by DPMC (2012) for the LL Feasibility Study.

3.2.15 Article 13: Participation of Citizens in All Sectors of Decision-Making

Article 13 of Chapter II the Guyana Constitution entitled Principles and Bases of the Political, Economic and Social System propounds an inclusive platform for the participation of citizens in all sectors of decision-making and supports the call for an ongoing indigenous peoples' stakeholder process to accompany all further/future stages of the Linden-Lethem Road project.

Article 13 States: *"The principal objective of the political system of the State is to establish an inclusionary democracy by providing increasing opportunities for the participation of citizens and their organisations, in the management and decision-making processes of the State, with particular emphasis on those areas of decision-making that directly affect their well-being."*

3.2.16 Article 29: The principle of Equality between the Sexes

(1) Women and men have equal rights and the same legal status in all spheres of political, economic and social life. All forms of discrimination against women on the basis of their sex is illegal. (2) The exercise of women's rights is ensured by according women equal access with men to academic, vocational, and professional training; equal opportunities in employment, remuneration, and promotion; and in social, political, and cultural activity, by special labour and health protection measures for women, by providing conditions enabling mothers to work, and by legal protection and material and moral support for mothers and children, including paid leave and other benefits for mothers and expectant mothers.

3.2.17 Article 149 G: Indigenous Peoples Rights

"Indigenous Peoples shall have the right to the protection, preservation and promulgation of their languages, cultural heritage and way of life".

Value the special place in our nation of the Indigenous Peoples and recognise their right, as citizens, to land and security and to the promulgation of policies for their communities. *(Preamble)*

3.2.18 Declaration of Youth in the Constitution

Acknowledge the aspirations of our young people who, in their own words, have declared that the future of Guyana belongs to its young people, who aspire to live in a safe society which respects their dignity, protects their rights, recognises their potential, listens to their voices, provides opportunities, ensures a healthy environment and encourages people of all races to live in harmony and peace and affirm that their declaration will be binding on our institutions and be a part of the context of our basic law.

3.2.19 Article 149 J: The Environment

1. Everyone has the right to an Environment that is not harmful to his or her health or wellbeing.
2. The State shall protect the Environment, for the benefit of present and future generations through reasonable legislative and other measures designed to:

a. Prevent pollution and ecological degradation
b. Promote conservation
c. Secure sustainable development and use of natural resources while promoting justifiable economic and social development.

3.2.20 Article 154 A: Protection of Human Rights

Subject to paragraphs 3 & 6, every person as contemplated by the respective International Treaties set out in the Fourth Schedule to which Guyana has acceded is entitled to the human rights enshrined in the said international treaties and such rights shall be respected and upheld by the executive, legislature, judiciary and all organs and agencies of Government and where applicable to them by all natural and legal persons and

shall be enforceable. Key International Human Rights Treaties and Conventions to which Guyana has acceded are listed in Section 3.4.

3.3 Institutional Framework

The main Government agencies that have regulatory oversight for the project are highlighted below.

3.3.1 Environmental Protection Agency

The EPA is governed by a Board of Directors but falls under the direct supervision of the Department of Environment, Ministry of the Presidency. The Agency was established in 1996 by the Environmental Protection Act and is responsible for the development and enforcement of national environmental legislations and advises the GoG on the development and implementation of environmental policies and standards. It also undertakes the inspection and enforcement of matters dealing with the environment, conservation and natural resources and administers the environmental permitting process in Guyana.

In Sec. 4 (1) (a), of the Act, the EPA is given the mandate to *"take such steps as are necessary for the effective management of the natural environment so as to ensure conservation, protection and sustainable use of its natural resources"*. In addition the Agency is given the overall responsibility to ensure management of the natural environment to ensure conservation, protection and sustainable use of its natural resources; assess any developmental activity, which may cause an adverse effect on the natural environment before such activity commences; and coordinate and maintain a programme for the conservation of biological diversity and its sustainable use. The EPA is mandated to ensure that any project that may have a significant impact on the environment must acquire an Environmental Authorisation from the EPA. Projects are considered to have an environmental impact when they threaten the health, safety and natural life supporting systems of humans and other living things.

The EPA will be responsible for the issuance of environmental authorisation for the project through an Environmental Permit and to monitor compliance in accordance with the provisions of the Environmental Permit.

3.3.2 Ministry of Public Infrastructure

This MOPI is responsible for the establishment and maintenance of primary infrastructure throughout Guyana. This includes the development and maintenance of roads, bridges, kokers, sea defence and other public structures. The Ministry would usually issue the contracts for major infrastructural works to independent contractors. Once this is done the Ministry's role would be to provide oversight and monitor these works to ensure that they are of high standards (including social and environmental standards).

As the primary Government institutions responsible for the upgrade of the LMH Road and the Essequibo River Crossing at Kurupukari Project, the Ministry is responsible for finalizing the details of the projects through various studies and assessments, engaging key stakeholders and Agencies and securing planning and development permission, and overseeing the construction and operation of the project.

3.3.3 Ministry of Communities (RDCs of Regions 9 and 10 and Town Council of Linden)

The Local Government System is enshrined in the Constitution of Guyana. Chapter VII, Section 71(1) states that Local Government is a vital aspect of democracy and shall be organised so as to involve as many people as possible in the task of managing and developing the communities in which they live.

The Ministry of Communities has responsibility for overseeing Local Government, which comprises the Regional Democratic Councils (RDCs), the municipalities and the neighbourhood democratic councils (NDCs). The project locations will fall within three Local Government areas: the RDCs of Regions 9 and 10, and the Linden Town Council. These entities have an important role to play as stakeholders to be engaged in the

planning and implementation of the upgrade of the LMH Road and the Essequibo River Crossing at Kurupukari.

3.3.4 Other Government and Non-Governmental Entities

There are several other Governmental and Non-Governmental entities that would have an interest in the project site which include:

- The Guyana Lands & Surveys Commission
- The Guyana Geology and Mines Commission
- The Guyana Forestry Commission
- The Ministry of Indigenous Peoples Affairs
- The North Rupununi District Development Board
- The Iwokrama International Centre for Rain Forest Conservation and Development
- The Guyana Police Force

3.4 International Human Rights Conventions:

Guyana has signed and ratified eleven International Human Rights Conventions. These are listed in Table 10, along with the Optional Protocols.

Table 10: International human rights conventions signed by Guyana

International Conventions	Guyana Signature	Ratification / Accession
International Convention on the Elimination of All Forms of Racial Discrimination (CERD): 1965 (1969)	1968	1977
International Covenant on Civil and Political Rights: 1966 (1976)	1968	1977
Optional Protocol to the International Covenant on Civil and Political Rights 1966 (1976)	N/A	1999
Second Optional Protocol to the International Covenant on Civil and Political Rights, aiming at the Abolition of the Death Penalty: 1989	N/A	N/A
International Covenant on Economic, Social and Cultural Rights: 1966 (1976)	1968	1977
Optional Protocol to the International Covenant on Economic, Social and Cultural Rights: 2008	N/A	N/A
Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW): 1979	1980	1980
Optional Protocol to the Convention on the Elimination of All Forms of Discrimination against Women: 1999	N/A	N/A
Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment: 1984 (1987)	1988	1988
Optional Protocol to the Convention against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment: 2002 (2006)	N/A	N/A
Convention on the Rights of the Child (CRC): 1990	1990	1991
Optional Protocol to the Convention on the Rights of the Child on the involvement of children in armed conflict: 2000 (2002)	N/A	2010
Optional Protocol to the Convention on the Rights of the Child on the sale of children, child prostitution and child pornography: 2000 (2002)	N/A	2010
Optional Protocol to the Convention on the Rights of the Child on a communications procedure: 2011 (2014)	N/A	N/A
International Convention on the Protection of the Rights of All Migrant Workers and Members of their Families: 1990	2005	2010

International Conventions	Guyana Signature	Ratification / Accession
International Convention for the Protection of all Persons from Enforced Disappearance: 2006	N/A	N/A
Convention on the Rights of Persons with Disabilities: 2006	2007	2014
Optional Protocol to the Convention on the Rights of Persons with Disabilities: 2006	N/A	N/A

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4 Stakeholder Consultations

4.1 Environmental Impact Assessment

Institutions and agencies related to or involved with the project and those which have regulatory and administrative oversight are important stakeholders and were consulted during the preparation of the EIA. In addition, landowners, small businesses and land users in close proximity to the project locations were considered stakeholders of the project and were also engaged along with communities located in close proximity to the project sites, including Indigenous communities.

Consultations were conducted in collaboration with the Social and Gender Specialist as outlined in Section 4.2.1. The following stakeholder groups were identified as key stakeholders for consultation with respect to the Environmental Impact Assessment:

- Regional Democratic Council (RDC) - Region 10
- Mayor and Town Council of Linden
- Community Development Council (CDC) and residents of the Mile #47 Village
- Village Council of Great Falls and Residents of the Mile #58 Village
- Representatives of the Iwokrama International Centre
- Mekdeci Group of Companies and proximate businesses/residents at Kurupukari
- Village Council and residents of Fair View Village
- Residents of Linden
- Residents of the Mabura Hill Community

During the consultations feedback was invited on the following questions related to the environmental impacts of the project:

- What can be foreseen as some of the main environmental and social considerations relating to the road and/or bridge crossing construction?
- What are potentially the main environmental impacts along the road alignment (Linden to Mabura) and at the bridge site (Kurupukari) during construction and operation?
- What can be considered the main impacts of the project on the socioeconomic environment during the construction and operational phases?
- What measures should be implemented to avoid or mitigate these impacts, during the construction and operational phases?

For the purpose of the EIA, the environmental related issues were extracted from the other issues raised so that these can be adequately addressed in the EIA. Table 11 shows the key environmental issues raised by stakeholders in relation to the upgrade of the LMH road and the construction of a bridge at the Kurupukari Crossing.

Table 11: Key Environmental Issues Raised by Stakeholders

Thematic Area	Description
LMH Road Construction and Operation	▪ Increased noise during the construction phase of the road is an issue especially from increased traffic. Potential noise impacts of heavy ‘container’ trucks traversing the road

Thematic Area	Description
	(including trucks from Brazil) when the entire Linden to Lethem road is completed is also an issue. ▪ Dust during the construction phase of the road is an issue. However, the current situation of the road allows for significant dust generation during the dry periods and which will be mitigated when the new road is in place. ▪ Speeding is currently a concern along the existing roadway and would increase with the new road in place. This needs to be addressed. Recommendations were made for the installation of speed bumps within communities where the road is passing through, as well as establishing and enforcing speed limits. Road safety sessions in the schools targeting the students was also recommended. ▪ To improve road safety lighting should be installed where the road passes through communities. Solar lighting was recommended. Installation of pedestrian crossings or foot bridges, sidewalks and roadside parking were also recommended for communities. ▪ During the construction period the flow of traffic along the roadway has to be maintained. ▪ Trucks currently using the roadway are overloaded, damaging the roads and bridges. Weight restrictions should be considered for the new road. ▪ Some of the materials required for construction of the road may be sourced close to the construction areas and no stockpiling of materials will be required. There is a geology belt moving out of Linden where there is an abundance of material. There should be a reclamation plan for any areas where sand or other construction materials are extracted, especially areas proximate to the road. ▪ Consideration should be given to reducing the gradient of the road.
Bridge Construction and Operation	▪ The placement, height and design of the bridge has to ensure that it takes into account heavy flooding and also the Kurupukari Rapids and Petroglyphs. It must not be located anywhere too close by to this historic and touristic location. ▪ Bridge design should be touristic and include a pedestrian walkway and lookout. ▪ Existing alignment should be utilized since this will reduce impacts on the environment and be beneficial to the community. ▪ River surveys should be done in both rainy and dry seasons. This section of the Essequibo River is not tidal but during the wet seasons water levels change significantly. ▪ There are potential impacts of the establishment of a construction camp/ area for stockpiling materials close to Iwokrama, Fair View village and Michelle's Island. Noise and other impacts from construction may adversely affect tourism at these locations. ▪ The Iwokrama road corridor and pontoon at the Kurupukari crossing are closed at night and this is a control measure within the protected area. Night-time traffic puts wildlife at greater risk of illegal hunting, trapping and deaths from road

Thematic Area	Description
	kill. It was queried whether the current restriction of traffic through the forest at nights will be maintained. ▪ Weight restriction was recommended for the traffic to traverse the bridge. ▪ During the bridge construction phase the activities should not hinder the current pontoon crossing. ▪ Small boats traverse the area proposed for the bridge, including Iwokrama and Fair View Village boats. The bridge design should allow for the unhindered movements of these boats during the wet season. There are also plans to have bigger boats going upriver for tourism/fishing purposes in the near future and this should be considered.
Impacts of Heavy Rainfall	▪ Culverts at Ch 87+080 (within the Mile #47 village) washed away in 2004 and in 2010 during periods of heavy rainfall. ▪ Culvert at Ch 72+750 (Mile 40) washed away in 2010 during periods of heavy rainfall. ▪ Other small bridges/culverts washed away at different times. Adequate flow of streams during storm event should be maintained and it might be better to have bridges in place rather than culverts. ▪ Consideration should be given to controlled drainage of rainwater runoff in areas where people live.
Water Quality	▪ Storm runoff increases the turbidity of the crossings along the LMH. This may negatively impact people who depend on these crossings for freshwater. ▪ Significant dust levels generated from vehicles traversing the LMH during dry seasons also have adverse impacts on the quality of water in the crossings. ▪ Freshwater wells should be established in the Mile #47 Village.
Garbage Collection	▪ There will be increased garbage associated with increased road use when the road and bridge are operational. A waste management plan should be developed. ▪ A waste management plan should also be developed specifically for the bridge at the Kurupukari Crossing so as to prevent dumping of garbage into the Essequibo River. Currently, the pontoon has a garbage bag affixed to side of the ferry.
Road Dimensions/Corridor	▪ Enquiry was made as to whether there was a road corridor plan and how implementation of the project will occur in terms of installation of infrastructure and utilities. ▪ It was suggested that community development plans should be harmonized with the road plan. ▪ Through the road project, it is expected that the issue of the road reserve will be resolved since this is currently unclear.
Biological Resources/ Fauna	▪ Increased traffic on the LMH road will lead to more illegal hunting, poaching and trapping. This may adversely impact development of ecotourism ventures at the Mile #58 Village

Thematic Area	Description
	which is proposed as part of the Community Development Plan for the Great Falls Village. ▪ Noise from construction and then from heavy vehicles traversing the road and bridge may cause animals to migrate inward. This will affect ecotourism as many international bird watchers visit Iwokrama. Some species may have already been affected by the existing road. ▪ It was recommended that wildlife crossings such as underpasses should be installed along sections of the road to allow wildlife to cross. Culverts can be designed as underpass. The construction of crossings along the LMH should facilitate passage of aquatic fauna (fishes) and slow animals like turtles and tortoises. ▪ The Essequibo River is a main traverse to the Rupununi River, especially in spawning season. Need to be careful not to negatively impact this important resource. ▪ Fish movements at different times of the year should be studied. Only the Arapaima has been tracked. ▪ There are potential impacts on fauna of proximate swamp areas.

4.2 Social Impact Assessment

4.2.1 Stakeholder Participation

4.2.1.1 Categories of Stakeholders

The stakeholders that participated in phase one of the consultations can be broadly grouped into five categories as follows:

1. National Government Ministries & Agencies;
2. Regional & Local Government Councils, Town Councils and Authorities
3. Village Councils and Community Development Councils
4. Villagers & Community Residents
5. Private Sector entities involved in enterprises along the AOI

4.2.1.2 Stakeholder Engagements - Phase 1

Table 12 provides a list and dates of the stakeholder engagement meetings undertaken during Phase 1.

Table 12: List of stakeholder engagements – Phase 1

Meeting type and location		Date
1. Inception Meeting with MOPI / WSG	MOPI Offices, Georgetown	20 February 2019
2. Multi-Stakeholder / Inter-Agency Session	GFC Multiplex, Kingston, GT, Region 4	11 April 2019
3. #47 Community Stakeholder Engagement	#47 School, #47 Village, Region 10	25 April 2019
4. #58 / Great Falls Community Stakeholder Engagement	#58 Benab / Great Falls Village, Region 10	25 April 2019
5. Iwokrama / MMC / FV Council / Business Cluster Session	Iwokrama River Lodge, Kurupukari, Region 8	27 April 2019
6. Fair View Village Stakeholder Engagement	Fair View Primary School, Fair View, Region 8 / Region 9	27 April 2019

Meeting type and location		Date
7. Regional Democratic Council (R10) Full Council Consultation	RDC Office, Linden Region 10	2 May 2019
8. Linden Mayor & Town Council (R10)	Linden Town Hall, Linden Region 10	16 July 2019
9. Mabura Hill Community Stakeholder Engagement	M&D Guest House Verandah, Mabura Hill, Region 10	17 August 2019

4.2.1.3 Other Preliminary Meetings held

Scoping Sessions held in SRKN Office

1. Region 4 & Region 10 RDC & NDC
2. National Road Safety Council
3. President of Mini-Bus Owners & Operators Association

Key Informant Conversations

4. Mr. Renis Morian, Chairman, RDC, Region 10
5. Mr Dwayne Bowen, #47 Chair, Community Development Council (CDC)
6. Ms. Maylene Couchman - #47 Secretary, Community Development Council (CDC)
7. Ms. Nicole Daniel - Toshao of Great Falls Village/#58
8. Ms. Juanita Garcia - Community Health Worker, Great Falls Village
9. Mr. Martin Carter, Toshao of Fair View Village
10. Ms Leonie Ewell, Makushi Research Unit, FV Representative
11. Ms Myrna Bollers, Community Health Worker, Mabura Hill
12. Ms. Simone Benn, GFC Community Forestry Coordinator
13. Mr Anil Roberts, Principal Regional Development Officer, MOIP
14. Dr. Raquel Thomas, Director, Iwokrama

4.2.1.4 Roll-up Analysis of Stakeholder Participation - Phase 1

Number of Stakeholder Consultations

- A total of eight face to face Stakeholder Engagements were held over the phase 1 period.
  - Seven of these meetings were held in Region 10 and one was held in Region 4.

Overall Number of Participants

- A total of two hundred and twenty-nine (229) stakeholders participated directly and interactively in these sessions.

Disaggregated participation by sex

- One hundred and twelve (112) women (49%) and one hundred and seventeen (117) men (51%) participated with a high level of active women leaders and community advocates. This shows good gender balance in terms of stakeholder participation.
  - The communities themselves have small populations, so in relative quantitative terms, the participation level was reasonable.

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5 Socio-economic Baseline

5.1 Population and Demographics

5.1.1 Country Population Size in 2012

The most recent Population and Housing Census was conducted in 2012 and is carried out on a 10-year basis with the next census due in 2022. Accordingly, the total population of Guyana in 2012 was 747,884, marginally decreased by 3,339 persons from 2002 with an annual negative growth rate of 0.04%. In 2012, the sex ratio population was 49.8% males and 50.2% females.

5.1.2 Country Population Estimates for 2018

For more up to date estimates, reference is made to UN estimates for 2018 which are reported as of January 1st, 2019 with an estimated population of 776,601 people. This is an increase of 0.36 % (2,793 people) compared to the population estimates of 773,808 the year before.

In 2018 the natural increase was positive, as the number of births exceeded the number of deaths by 8,349. Due to external migration, however, the population declined by 5,556.

5.1.3 Country Population Disaggregated by Sex (2018)

As of 31 December 2018, the number of males was 390,232 or 50.2% and the number of females 386,369 or 49.8% of the total population. This shows a slight reverse of the male to female ratio in 2012. Overall, the sex ratio stood at 1.010 males to 1.000 females, which is more equitable than the global sex ratio which stood at 1.016 males to 1.000 females in 2018

5.1.4 Guyana population figures

Below are the key figures estimated for Guyana population in 2018[25]:

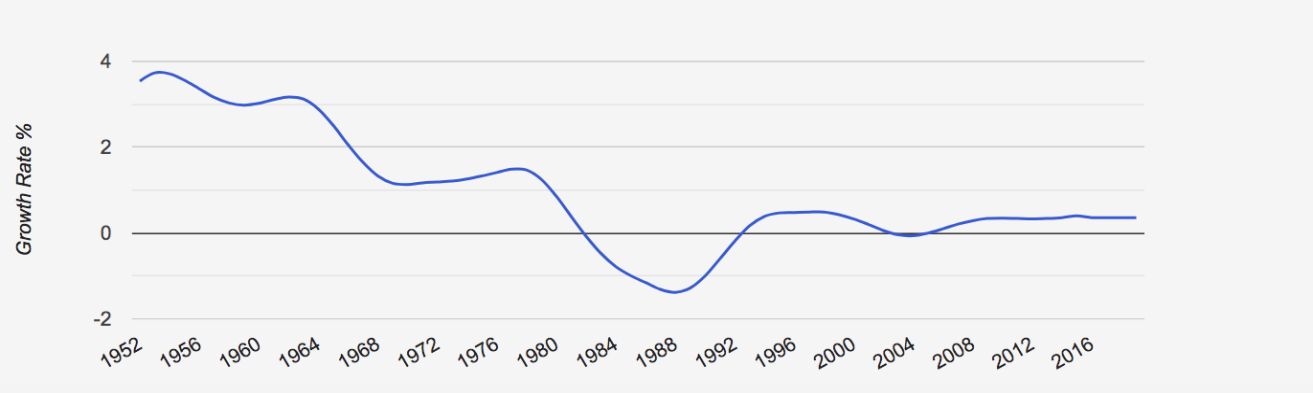
- 14,540 live births
- 6,190 deaths
- Natural increase: 8,349 people
- Net migration: -5,556 people
- 390,232 males as of 31 December 2018
- 386,369 females as of 31 December 2018.
- Guyana ranks number #165 in the list of countries (and dependencies) by population
- The population density in Guyana is 4 per km^2 (10 people per square mile)
- The total land area is 196,850km^2 (76,004 square miles)
- 30.4% of the population is urban (238,995 people in 2019)
- The median age in Guyana is 24.9 years

5.1.5 Guyana Population Growth

Figure 6 and Table 13 show the population growth rate of Guyana in graphical form between 1952 and 2016 and in tabular form between 2012 and 2016 respectively.

[25] Bureau of Statistics

Figure 6: Guyana population growth rate – 1952 to 2016



Source: Bureau of Statistics

Table 13: Guyana population – 2012 to 2016

Year	Population
2012 Mid-Year	748,917
2013 Mid-Year	746,880
2014 Mid-Year	744,558
2015 Mid-Year	741,962
2016 Mid-Year	743,458

Source: Bureau of Statistics – De-facto population includes all persons found in the territory at a given point in time

5.1.6 Comparative Population Pyramids

The population of Guyana increased by 6.5% between 1990 and 2015. In 1990, the population had an expansive structure. By 2015, the structure became irregular, with an expansive shape in the groups older than 45 years of age and in those 15 and 30 years of age; a regressive shape manifested itself in the remaining groups, as a result of changes driven by migration, birth rate, and mortality at different periods[26].

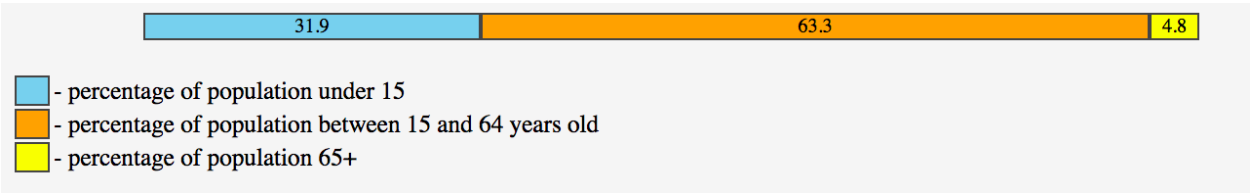
[26] Pan-American Health Organization (PAHO), based on the United Nations Department of Economic and Social Affairs, Population Division. Revision 2015, New York, 2015

Figure 7: Guyana comparative population pyramids 1990 - 2015

5.1.7 Population by age

Figure 8 shows a comparison of the Guyana population split by three age categories.

Figure 8: Guyana population by age

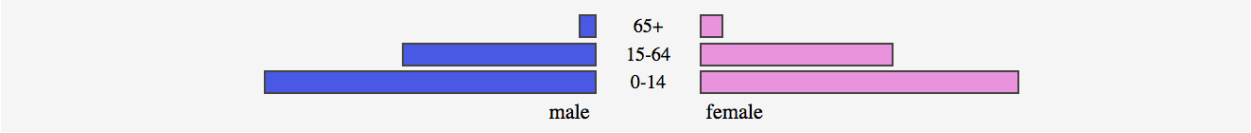


Source: PAHO

5.1.8 Population by sex

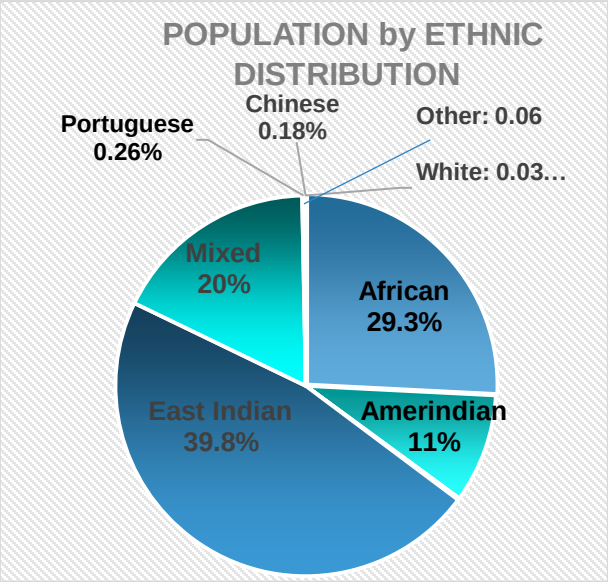
Figure 9 shows a comparison of the Guyana population split by age and sex.

Figure 9: Guyana population by sex



Source: PAHO

5.1.9 Population by Ethnicity



Of the six races / ethnicities in Guyana, the Indigenous Peoples/Amerindians are the fastest growing population, followed by Guyanese describing themselves as "Mixed" in terms of more than one ethnicity, ancestry/heritage. The largest population bloc comprising East Indians recorded the greatest decline in population followed by African-Guyanese. The minorities recorded comprising Portuguese, Chinese, Whites and Other are very small, registering zero in percentage terms. Guyana's multi-ethnic population includes Indo-Guyanese (39.8%) African-Guyanese (29.3%), Amerindians/Indigenous (11%), and persons of Mixed ethnicity (20%). The Portuguese, Chinese, and White population together account for less than 1% of the total.

Although the official language is English, the majority of people speak creole and there are at least nine different Indigenous languages. There are also speakers of Hindi, Urdu and Arabic in the country and several Guyanese persons living in proximity to the borders with Brazil and Venezuela converse in Portuguese and Spanish. There is also an increasing migration of Venezuelans and Brazilians into Guyana. Spanish is also being taught in schools.

5.1.10 Indigenous Peoples / Amerindians

Indigenous Peoples are the original inhabitants of Guyana and have survived the brutalities of enslavement and land grabs by the imperialists and colonisers of Europe and Britain and retreated further and further inland to the interior and hinterland. They are still making representation for their land rights and ownership of traditional territories. Indigenous Peoples and their villages and communities are located in every region of Guyana. The Amerindian Act (2006) governs the Indigenous Peoples of Guyana. There are 76 titled Amerindian Village Councils though there are actually 215 Amerindian communities listed and recognised by the Ministry of Indigenous Peoples Affairs. There are nine distinct Indigenous nations with their histories, rich traditional and ecological knowledge, and their own languages: Arawak-Lokono, Akawaio, Arecuna, Carib-Kaliyna, Makushi, Patamona, Wapichan and Wai-Wai.

5.1.11 Distribution of Population by Coastal and Hinterland Regions

The majority of the population (89%) lives on the Coastland which represents 7.5% of the country's landmass. The remaining 11% of the population lives in the Hinterland region, which encompasses 92.5% of the country's landmass. This distribution can be seen in Figure 10.

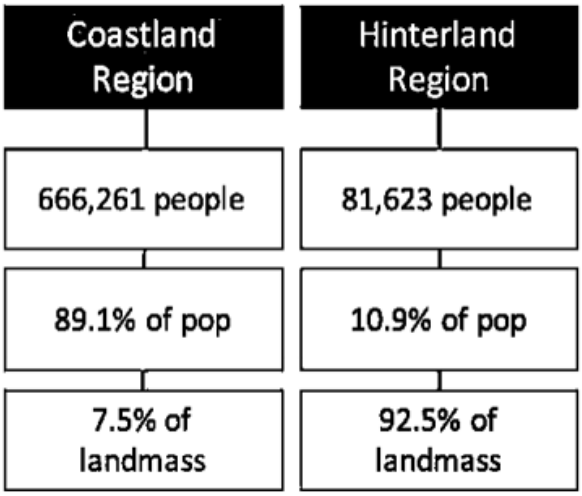


Figure 10: Distribution of population by coastal and hinterland regions
Source: Bureau of Statistics Guyana, June 2014

5.1.12 Population by Administrative Region

There are ten administrative regions is Guyana derived from river boundaries. The populations and location of these regions can be seen in the bullet points below and in Figure 11 and Figure 12.

- Region 1: Barima-Waini with a population of 26,941.
- Region 2: Pomeroon-Supenaam with a population of 46,810
- Region 3: Essequibo Islands - West Demerara with a population of 107,416
- Region 4: Demerara-Mahaica with a population of 313,429
- Region 5: Mahaica-Berbice with a population of 49,723
- Region 6: East Berbice - Corentyne with a population of 109,431
- Region 7: Cuyuni-Mazaruni with a population of 20,280
- Region 8: Potaro-Siparuni with a population of 10,190
- Region 9: Upper Takatu-Upper Essequibo with a population of 24,212
- Region 10: Upper Demerara-Berbice with a population of 39,452

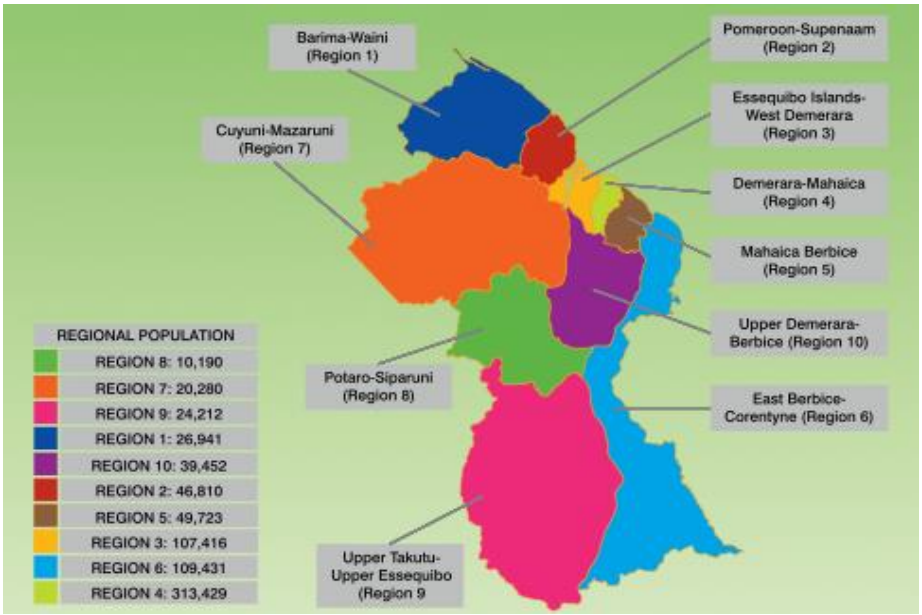


Figure 11: Population by administrative region

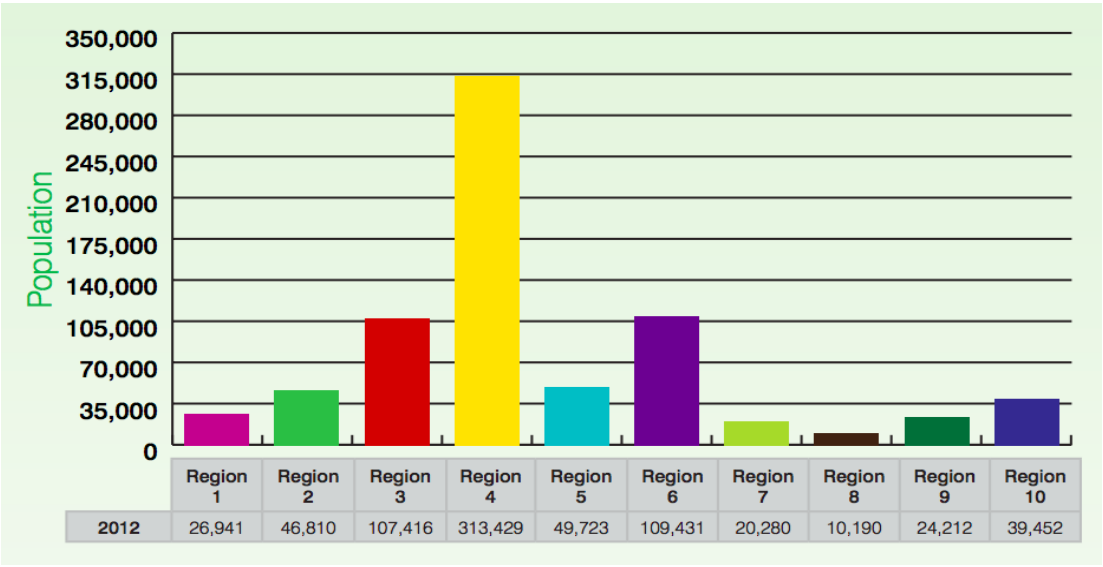


Figure 12: Chart showing population figures for administrative regions

5.1.13 Population of Communities within Area of Influence

The project will be carried out in a highly forested part of the interior. Seven population clusters are identified: four communities and two other groups of people that live in the Area of Influence. The villages/communities are: #47 community; Great Falls / #58 Village; Mabura Hill community; and Fair View Village. The two community groups identified are: the Iwokrama River Lodge and Training and Research Centre of the Iwokrama International Centre for Rain Forest Conservation and Development, a Protected Area, and the other is the Mekdeci MIning Company (MMC) compound that houses the staff operating the pontoon and toll gate related to the Kurupukari crossing. There is also the ad hoc small-business community that has grown up a short distance away from the MMC compound that comprises a mix of entrepreneurial settlers and local persons from Fair View, and its environs.

The population of the seven communities within the AOI spanning Regions 10, 9 & 8 are in Table 14:

Table 14: Population of Communities within Area of Influence

Community	Population
#47 community (Region 10)	210 persons; *Verified July 2019
Great Falls/#58 Village (Region 10)	267 persons; *Verified July 2019
Mabura Hill Community (Region 10)	200 persons; *Estimated Aug 2019
N Kurupukari businesses (Region 8) + MMC Ferry / Toll Staff	20 persons; *Estimated July 2019
Iwokrama River Lodge, Training/Research Centre (Region 8)	60 +persons; *Estimated July 2019
Fair View Village (Region 8 - administered by Region 9)	348 persons; *Verified July 2019

TOTAL estimated combined population of communities within AOI = 1,105 persons

All seven of the identified stakeholder locations and communities along the Linden to Mabura Hill road are very sparsely populated and situated within some of the most sparsely populated Administrative Regions of Guyana. The population range is between an estimated 20 persons (smallest) (MMC and Microenterprise entrepreneurs) on the right bank of the Essequibo with 348 persons being the largest in Fair View Village on the left bank of the river.

5.2 Migration

5.2.1 Guyanese Outward Migration

Guyana's emigration rate is among the highest in the world - more than 55% of its citizens reside abroad - and it is one of the largest recipients of remittances relative to GDP among Latin American and Caribbean counties. A significant number of Guyanese professionals and skilled personnel migrate to Europe, North America, and other Caribbean countries (PAHO, 2012). Data from the United Nations DESA-Population Division and UNICEF shows that in 2013 more than four hundred and twenty-two thousand (422,000) Guyanese lived abroad, most of them in the United States and Canada. Table 15 shows the top five destination countries for Guyanese migrants. The high levels of emigration in Guyana are related to difficulties in finding employment, and the inability of local economies to absorb young graduates. UNICEF reports that, currently, those who are qualified by the educational system in Guyana do not see immediate opportunities in the country and move abroad to continue their education, and/or to use their skills. This "brain-drain" produces gaps in knowledge and skill not easily replaced. Table 15 shows total outward migration from Guyana for the year 2013.

Table 15: Outward Migration from Guyana for the year 2013

Country of destination	Total
United States of America	281,371
Canada	101,004
United Kingdom of Great Britain and Northern Ireland	21,073
Suriname	11,530
Venezuela (Bolivarian Republic of)	7,401
Total	**422,379**

Source: UN DESA – Population Division & UNICEF (2013)

From an economic perspective: The Caribbean Development Bank (CDB) reports that Guyana's emigration has resulted in a loss of 7.8% of the country's GDP (Caribbean Development Bank, 2015). Estimates from the World Bank in 2008 show that around 80% of those who were born in Guyana and had graduated at university level live abroad, mostly in the United States.

5.2.2 Inward Migration to Guyana

In 2013, Guyana recorded just over eleven thousand, three hundred and ninety-nine (11,399) legal immigrants, mainly from Suriname, Brazil and Venezuela. This is split by top five countries in Table 16.

Table 16: Stock of legal migrants by top five countries, Guyana

Country of origin	Total
Suriname	4,662
Brazil	2,166
Venezuela (Bolivarian Republic of)	2,132
United States of America	1,273
China	1,166
Total	**11,399**

Source: UN DESA, 2013

These figures for 2013, however, might not accurately reflect a significant number of persons moving across borders and to and from within the country attracted by the mainly gold mining operations, especially near the borders of Venezuela and Brazil (and a few logging operations). There is also a growing number of Cubans who come to Guyana to shop and trade in the city of Georgetown, but also in Lethem.

5.2.3 Changing Face of Migration into Guyana – 2019

Information provided by the Minister of Citizenship takes into account a number of countries in addition to the original "Top Five" shown in Table 16.

These figures are tabulated in Table 17 and span the period from January 2015 to July 2019.

Table 17: Stock of legal migrants by country, Guyana

Country of origin	Total
Suriname	2,900
Brazil	5,948
Venezuela (Bolivarian Republic of)[27]	5,123
Cuba	272
United States of America	45,944
China	1,995
India	679
Haiti	8,476
Trinidad & Tobago	11,119
Barbados	2,980

[27] documented up to February 2019

Country of origin	Total
UK	2,548
Canada	1,995
Total	**89,979**

Source: Minister of Citizenship, Ministry of the Presidency (6 August 2019)

Notes on new trends of Inward Migration

Venezuelans: Most critically, there is the influx of Venezuelans from certain border points in Regions 1 and 7. The UN International Organisation for Migration (IOM) is working in partnership with Guyana since December 2011. The IOM and other organisations, including UNICEF, are providing emergency relief measures for these very vulnerable Venezuelans who are refugees, fleeing the hardships in their country. Many are Guyanese, mainly Indigenous, who fled Guyana in the 1980s when the country was in a similar situation. They are now returning as Venezuelan citizens, but with Guyana birth certificates. They are a rapidly increasing group. In 2017, there were 948 Venezuelans recorded and in 2019 this number increased to 5,123. The Venezuelans are here to stay, according to the Ministry of the Presidency, and agricultural and other livelihood incentives and locations for settlement are being developed for them. Most of the Venezuelan refugees enter Guyana in the Barima-Waini (Region 1) area that borders Venezuela to the North-West of Guyana, and in the Region 7 Bartica area. There is some speculation that as the Linden-Lethem / Guyana-Brazil road opens up, opportunities may be provided for Venezuelans to settle and work.

Haitians: There are also a number of Haitians that migrate legally to Guyana under the CARICOM Single Market Economy (CSME) Agreement, usually on route to their own diaspora countries which includes Cayenne, Brazil and Colombia. There are reports that the Haitians regularly use the Georgetown-Lethem bus route as a transit route out of Guyana to their diaspora countries, which includes Brazil. They also do this legally. Information on August 6 provided by the Minister of Citizenship indicates the following migration in and out of Guyana by Haitians. Between 2013 and 2018, a total of 6,660 Haitians legally entered Guyana and a total of 1,175 legally left Guyana. Haitians are also free to seek work in Guyana as CARICOM citizens under the CSME agreement.

Returning Guyanese: Additionally, there is a growing number of Guyanese re-migrants encouraged by the off-shore oil-wealth find. A substantial influx of US and others related to the oil and gas industry come and go, some staying on a temporary basis as managers and employees in the industry.

5.3 Socio-Economic Situation in Guyana

5.3.1 Economic Overview

5.3.1.1 Natural resources

Natural resources include off-shore oil, timber, bauxite, gold, diamonds, other minerals including semi-precious stones and rare-earth metals timber, shrimp and fish.

5.3.1.2 Gross Domestic Product

Steady Gross Domestic Product (GDP) growth has been recorded in the past few years as shown below in GDP per capita:

- 2015 = $7,500
- 2014 = $7,300
- 2013 = $7,100

5.3.1.3 Economic growth

The Guyanese economy exhibited moderate economic growth in recent years and is based largely on agriculture and extractive industries. The economy is heavily dependent upon the export of six commodities - sugar, gold, bauxite, shrimp, timber, and rice - which represent nearly 60% of the country's GDP and are highly susceptible to adverse weather conditions and fluctuations in commodity prices. Much of Guyana's growth in recent years has come from a surge in gold production in response to global prices, although downward trends in gold prices may threaten future growth. In 2014, production of sugar dropped to a 24-year low. Guyana's entrance into the CARICOM Single Market and Economy in January 2006 has broadened the country's export market, primarily in the raw materials sector. Guyana experienced positive growth annually over the past decade with inflation under control.

5.3.1.4 External Debt and Debt Cancellation

External debt has been reduced to less than half of what it was in the early 1990s. Despite this, the government is still juggling a sizable external debt against the urgent need for expanded public investment. In March 2007, the Inter-American Development Bank, Guyana's principal donor, cancelled Guyana's approximately $470 million debt, equivalent to 21% of GDP, which combined with debt cancellation relief by Britain and others awarded to Guyana as one of the Highly Indebted Poor Countries brought the debt-to-GDP ratio down from 183% in 2006 to 67% in 2015.

Accelerated Economic Growth is predicted in Guyana over the next 5 years

A recent Nasdaq report predicts that Guyana will be the #1 fastest growing economy of the world from its abundant off-shore oil wealth.

Guyana's off-shore oil fields are described as being of the greatest quantity and quality in the world since the 1950s and an article on Nasdaq's website (June 2019) has predicted Guyana to be the #1 country of the five fastest growing economies in the world.

Guyana, with a projected growth rate of 16.3% during the four-year period 2018 - 2021, Guyana is the fastest growing economy in the world. With a GDP size of $3.63 billion (2018 Rank: 160), a growth rate of 4.6% in 2019, Guyana's economy is expected to grow by 33.5% and 22.9% in 2020 and 2021 respectively. With a per-capita income of $5,194, Guyana is a middle-income country and is covered by dense forest. It is home to fertile agricultural lands and abundant natural resources. Gold, bauxite, sugar, rice, timber and shrimp are among its leading exports. Back in 2000, the US Geological Survey identified the Guyana-Suriname Basin as the second highest resource potential among unexplored oil basins in the world. Exxon Mobil, Esso, Hess, Repsol (Spain), Anadarko, Total (France) Tullow Oil (UK) and CGX Energy (Canada) have all been part of drilling activities. ExxonMobil Guyana has made 13 discoveries since 2015 and plans to begin producing up to 120,000 barrels of oil per day from the Liza Phase 1 development in early 2020. Guyana is projected to be among the world's largest per capita oil producers by 2025.

(Source: Prableen Bajpai Nasdaq, June 27, 2019).

It is anticipated that with the upgrading of the Linden to Mabura Hill Road and construction of the bridge over the Essequibo at Kurupukari as part of the wider Linden-Lethem/Guyana-Brazil Road Link that economic opportunities will also open up for those communities directly aligned to the roadway. It is equally important that safeguards be put in place to ensure human development that will contribute to the enhanced wellbeing of the communities and negate negative effects. The IPP for the 2012 Feasibility Study takes into account a number of these issues. An updated excerpt of the IPP is also produced as part of the consultant's TOR.

Current Economic Status - Poverty and Unemployment

Guyana is considered an upper middle-income country. Despite its good GDP performance, and taking into consideration the GDP per capita, Guyana is the third poorest country in the Western Hemisphere, after Haiti

and Nicaragua. Unemployment is high, and particularly concerning for the young population, which represents more than 60% of Guyana's people. Since 2002, youth unemployment has been consistently higher than 30% and is currently estimated at 40%.

5.4 Poverty in Guyana

5.4.1 Percentages of Guyanese living in Poverty

Guyana's latest official poverty measurement was done in 2006, prior to the economic crisis that hit the world in 2008. According to that measure, 36.1% of the population in the country was living in poverty, including 18.6% that were living in extreme poverty. 19 percent of Guyanese or almost 2 in 10 people are living in extreme poverty i.e. surviving on an income of U$1.25 per day or G$7,550 per month. More than 36 percent of Guyanese or almost 4 in 10 people are living in poverty i.e. surviving on an income of U$1.75 per day or G$10,494 per month. (Poverty Survey 2006). According to the Guyana Poverty Reduction Strategy (PRSP) 2011-2015 - people living in poverty simply do not have sufficient income to pay for enough food to meet daily caloric and nutrition intake required for proper nourishment and healthy and productive lives. The PRSP states that the level of poverty and associated levels of malnourishment will have dire consequences on the future health of the population and the potential for future economic growth unless these issues are addressed.

A quarter of adults (41 years and older) lives in poverty.

Poverty among adults of age 41 and above is also severe, although, less than for children and young adults. In this age group, more than 2 in 10 people or 24 percent live in poverty. A high level of poverty among working age adults represents a significant economic loss to the economy and limits economic growth. Often adults in poverty have more than one job yet make insufficient income to pay for necessities. The main driver of adult poverty is low paying jobs or occupations. Other factors contributing to adult poverty include unemployment, low-levels of education, poor quality and inadequate public services, and little household wealth[28].

5.4.2 Child poverty

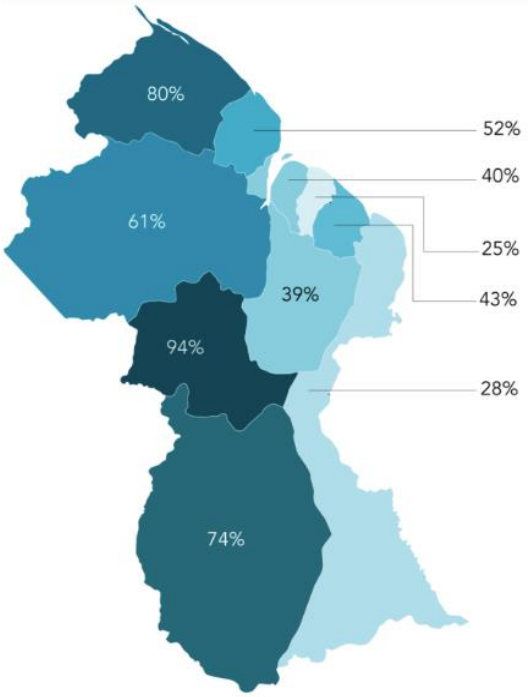
"Poverty in Guyana has a child's face." (UNICEF 2017) "Worldwide, the youngest children living in multidimensional poverty, bear the greatest burden". *(Multi-dimensional Poverty 2019))*

Almost half of all children in Guyana aged 16 and below were poor: Similar to previous measurements, the poverty number from 2006 - the last poverty survey done shows that younger age cohorts have a significantly higher poverty headcount than older ones. 33.7% of young people aged 16-25 lived in poverty. Almost half of all children in Guyana aged 16 and below were poor (47.5%). (*Bureau of Statistics).*

Worldwide 1 in 3 children are poor and suffer poverty more intensely than adults: The recent Multidimensional Poverty Index (MPI) report released in July 2019 show results that children suffer poverty more intensely than adults and are more likely to be deprived in all 10 of the MPI indicators, lacking essentials such as clean water, sanitation, adequate nutrition or primary education. Even more staggering, worldwide, one in three children is multi-dimensionally poor, compared to one in six adults. That means that nearly half of the people living in multidimensional poverty—663 million—are children, with the youngest children bearing the greatest burden.

[28] Guyana Budget & Policy Institute and Centre for New Economic Studies: Work, Income & Poverty Fact Sheet (August 2017)

5.4.3 Poverty Levels per Area



Poverty levels in Guyana are higher in the interior & rural areas.

Poverty is higher in the interior of the country, and for those families living in the rural areas (including rural communities on the coast). The populations of communities living along the Linden to Mabura Hill roadside are within these statistical brackets. **The level of poverty and extreme poverty in rural interior communities are disproportionately higher than the rest of the country – more than 200 percent and 300 percent, respectively.** Compared to the national average, the level of poverty and extreme poverty in rural interior communities are at alarming levels and the highest in the country. Almost three-quarters (73.5 percent) of people in these communities live in poverty i.e. more than 200 percent of the national average of 36.1 percent. Even worse, the level of extreme poverty of these communities is 54 percent i.e. almost 300 percent of the national average of 18.6 percent. The map in Figure 13 the poverty figures by region. These are also listed below by area categories.[29]

Figure 13: Poverty figures per region
Source: GOGY, Poverty Reduction Strategy Paper: 2011-2015

The stakeholder populations of the Linden to Mabura Hill roadside communities fall into the category of "rural interior areas" where poverty levels are the highest: Regions 8, 9 &10.

Rural Interior Areas

- 12 percent of the country's population lives in communities in the rural interior areas.
- 73.5 percent of the population or, more than 7 in 10 people, live in poverty.
- 54 percent of the population or, more than 5 in 10 people, live in extreme poverty.

Rural Coastal Areas

- 60 percent of the country's population lives in communities in the rural coastal areas.
- 37 percent of the population or, almost 4 in 10 people, live in poverty.
- 17.1 percent of the population or, almost 2 in 10 people, live in extreme poverty.

Urban Coastal Areas

- 28 percent of the country population lives in communities in the urban coastal areas.
- 18.7 percent of the population or, almost 2 in 10 people, live in poverty.
- 7.3 percent of the population or, roughly 1 in 10 people, live in extreme poverty.

Assessing Poverty in the Indigenous/Amerindian context

One challenge in calculating poverty in Guyana is to find a measurement that can encompass different cultures and lifestyles that are present in the country. As emphasized in the 2011-2015 Poverty Reduction Strategy Paper (PRSP) (Government of Guyana, July 2011), due to the Amerindians' lifestyle characteristics, this group

[29] Poverty Reduction Strategy 2011-2015

is particularly prone to measurement error when using the same consumption basket to calculate poverty lines, and that expenditure patterns for this group may be quite different from those of other ethnicities.

Hinterland Employment Youth Services

This is one of the successful and innovative small business boosting initiatives currently being implemented. One hundred and sixty-one youth from Region Ten have benefitted from a stimulus package facilitated under the Ministry of Indigenous Peoples' Affairs Flagship Youth initiative – the Hinterland Employment Youth Service (HEYS) Programme. The Region 10 HEYS programme was launched on April 7th, 2019. The 161 participants to receive the grant currently have businesses operating and will each receive $50,000. That totals just over $8 million to further boost their respective business ventures. Region 10 testimonies from beneficiaries of HEYS indicate its value in transforming lives of young Indigenous women in particular.

- Kelly Blunt, a participant from Siberia/Old England stated, *"Life before HEYS was very hard. I would depend on my mother who is a single parent to take care of me. I was very frustrated many days. Then HEYS came to my community and I was very lucky to be a part of the programme. I am now my own boss with my ice-cream shop and my own freezer. Kelly who has a disability says, affirmatively: "I still suffer from seizures but my life is easy now."*
- Twin sisters Arrieana and Annina Hosea of Kairuni operate a grocery and provision shop stated: "*Before HEYS came both of us were housewives. We never knew anything about business. We used to depend on our husbands for income. When HEYS stepped in, it was a great opportunity and change for both of us. Life is now easy. HEYS has helped us financially, materially and mentally."*
- Jeniffer Bristol of 47 Miles (#47 along the Linden to Mabura Hill road) said, *"I used to work in the mining area. I have six children and their father is nowhere around. I am thankful to HEYS coming to our community and giving us business opportunities. I started selling vegetables which I grew myself and today I am able to operate a business growing and selling vegetables and other groceries. This has made a big difference in my life."*

Young men and young women have both benefitted from HEYS businesses support in Region 10 ranging from snackettes, grocery shops, poultry, car wash, ice cream shop, beauty salon and supplies, game shops, DVD services, stationers, cell phone accessories, mobile shops, welding and joinery services, fuel suppliers and farming. All regions have had HEYS programmes implemented.

5.4.4 Addressing Women and Poverty - Initiatives to Reduce Women's Poverty

Women in Guyana remain the poorest of the population with Indigenous women being the poorest. Several measures have been put in place to provide opportunities for women to engage in microenterprises and to benefit from training and capacity building programmes.

Small Grants for Women-run Microenterprises

Small grants are currently offered by the Ministry of Social Protection (MOSP) to disadvantaged women for the start-up of small business to sustain the livelihoods of themselves and family.

Women of Worth and the People of Worth Entrepreneurial Resources Loan Programmes

The Women of Worth (WOW) Loan Programme and the People of Worth Entrepreneurial Resources (POWER) Loan Programme with funding from the Ministry of Finance's Poverty Alleviation Programme was managed by the Guyana Bank for Trade and Industry (GBTI).

A roll up of the GBTI records up to 2015 show that 3,422 loans were issued to 3,296 persons (including repeat borrowers) in the amount of USD 1.85 million

- 2011 - 1181 loans with a value of USD 890,000
- 2012 - 982 loans with a value of USD 411,500

- 2013 - 700 loans with a value of USD 314,000
- 2014 - 346 loans with a value of USD 147,000
- 2015 - 213 loans with a value of USD 89,000

These figures show that the number of loans is decreasing but may also indicate that this reflects the fact that women are repaying the loans before deciding to take out another. Updated Records for the period 2016 - 2018 are in process.

Stakeholder Beneficiaries within the Linden to Mabura Hill Road zone: It has not been ascertained how many Indigenous women have benefitted but women at stakeholder meetings in #47, #58 Iwokrama and Fair View held alongside the Linden to Mabura Hill road indicated to the consultant that they were aware of the programmes. These are important for them - to get them "ready for the road" in terms of socio-economic gains and "readiness" for business opportunities that the road will present.

Economic Independence / Women's Empowerment Workshops

The Government of Guyana collaborate and expand several programmes to facilitate women becoming economically independent and empowered. These include the Office of the First Lady of Guyana capacity building workshops where ***over 900 persons mainly female single parents and female young adults have been trained*** in the areas of:

- Information Communication Technology (ICT)
- Self-reliance and success in business
- First Aid
- Childcare Parenting,
- Early Childhood development
- Care for the Elderly

These are precisely some of the viable and practical skills-sets that women in the stakeholder communities alongside the road will need to acquire to meet the challenges and opportunities that an upgraded highway will bring.

5.4.5 Promotion of Economic Development/Inclusion for Linden to Mabura Hill Road Communities[30]

This strategy promotes an inclusive, supportive, sustainable and tenable economic model whose ultimate goal and central premise is people's well-being. It seeks to provide women and vulnerable groups access to credit for new businesses, business services, training and access to markets, information and technology, particularly for low-income women, between the promotion and strengthening of cooperatives in rural areas that facilitate access to credit for ventures of vulnerable groups with low-interest rates or reasonable guarantees.

Strategic Lines

1. National Insurance Plan for Vulnerable Groups
2. Equal pay for equal work
3. Land and Property Ownership
4. Financial Services and Access to Credit
5. Economic empowerment: Business Ownership, Inclusion in Trade, Industry, Mining, Commerce, and Tourism

[30] Adapted from The National Gender Equality & Social Inclusion Policy

5.4.5.1 National Minimum Wage for All Workers and 40hr Work Week

In July 2013 there was the introduction of the National Minimum Wage for regular Working Hours Order For All Workers in Guyana made under Section 8 of the Labour Act, Chapter 98:01. The Government of Guyana approved a National Minimum Wage and a forty (40) hour work week for both Private and Public sector employees.

New Minimum Wage Ordinance (2017)

As of 1 January 1 2017, the minimum wage for private sector workers in Guyana is set at G$44,200 per month. This is a 25% increase from the previous 2012 wage of G$35,000. The minimum wage for public sector workers is now set at G$50,000 per month. The work week continues to be set at 40 hours and not to exceed 5 days per week. *(Ministry of Social Protection, 2017).* Jobs are in short supply, however, and most of the people living in the direct zone of influence of the project are likely to be self-employed and those who are employed might not all be aware of the Minimum Wage and Work Week ordinances. Mabura Hill is the exception, since persons living there are mainly employed by Demerara Timbers Ltd.

Minimum Wage Categories

The Minimum Wage Order targets persons operating in the private sector categories of food, transportation, manufacturing, social services, health, education, hospitality and entertainment, security, garment, agriculture, mining, forestry and tourism sectors, among others. It was noted, however, that the minimum wage payable is not limited to workers employed in the sectors or activities listed in the schedule, but shall be payable to all workers in similar categories who are earning less than the sums specified. It also states that once a worker is in receipt of a wage at a rate that is higher than that prescribed in this Order, the employer shall continue to pay to that worker wages at such higher rate and not to reduce the rate on account of the Order.

5.4.5.2 Counting Women's Work in the Home and Gender Budgeting

Efforts are been made to place the issue of unpaid household and care work, on the national agenda so as to bring recognition to its economic value. Many NGOs are advocating for a Gender Budgeting approach to be part of the National Budget system. Both the previous and the current governments have expressed an interest in gender budgeting in response to this on-going lobby. The Women and Gender Equality Commission has been in the forefront and has facilitated two high level Parliamentary Seminars on the issue supported by UN Women and UNESCO respectively.

5.4.5.3 Social Protection Support for Vulnerable Women, Girls & Families

Over the last five years the Government of Guyana has taken several initiatives to improve access to social protection for women and girls in the areas of education, health and housing such as:

1. The Single Parent Assistance Programme (SPAP),
2. The Public Assistance Programme (PAP),
3. The Special Circumstances Programme (SCP),
4. The School Uniform Vouchers for children attending public educational institutions
5. The School Feeding Programme (SFP) which is a community supported and managed hot meal-feeding program operated by women daily and supplied with local subsistence farm and kitchen-garden products.

In the case of the (SPAP) and (PAP), single mothers are assisted to participate in training programs designed for women entrepreneurs.

Funding for this programme totalled GYD25 million each year.

5.4.5.4 The 5 B's - Boats, Buses, Bicycles, Books and Breakfasts

In July 2015, the GOG introduced a new special temporary measure project, the 5 B's (Boats, Buses, Bicycles, Books and Breakfasts) – as a measure designed to accelerate school attendance and development of disadvantaged communities in rural and hinterland areas. It is to be determined in the next round of community consultations as to whether any of the communities within the AOI has benefitted from this measure.

Traditional Concepts and Measurements of Poverty

> ***Of the 1.3 billion people who are multi-dimensionally poor, more than two-thirds of them—886 million—live in middle-income countries.*** *(Multidimensional Poverty Index)*

The traditional concept of poverty is outdated, according to a new report released July 11, 2019 by the United Nations Development Programme (UNDP) and the Oxford Poverty and Human Development Initiative (OPHI). New data demonstrate more clearly than ever that labelling countries - or even households - as rich and poor is an oversimplification.

Multi-dimensional Poverty Index

Findings from the 2019 global Multidimensional Poverty Index (MPI) sheds light on disparities in how people experience poverty, revealing vast inequalities among countries and among the poor themselves.

> *"To fight poverty, one needs to know where poor people live. They are not evenly spread across a country, not even within a household," says Achim Steiner, UNDP Administrator.*

5.4.5.5 Inequality of poverty under the same roof

The MPI goes beyond income as the sole indicator for poverty, by exploring the ways in which people experience poverty in their health, education, and standard of living. Data show that simple national averages can hide enormous inequality in patterns of poverty within countries. There is even inequality under the same roof - within the same household. Even among those living in poverty, it is necessary to understand people's different experiences of deprivation. Only then will poverty reduction policies be both efficient and effective.[31]

Inequality of poverty among the poor

There is also inequality among the poor. Findings of the 2019 global MPI also paint a detailed picture of the many differences in how - and how deeply - people experience poverty. Deprivations among the poor vary enormously: in general, higher MPI values go hand in hand with greater variation in the intensity of poverty.

Those furthest behind moving up fastest

New data also shows a positive trend: those furthest behind are moving up the fastest. Data from ten countries surveyed show that 270 million people moved out of multidimensional poverty from one survey to the next.[32]

> *"A pro-poor pattern is emerging that reduces inequalities in several Sustainable Development Goals. We looked at data for a group of ten middle- and low-income countries and we found encouraging news that the bottom 40% were moving faster than the rest," says Sabina Alkire, OPHI Director.*

5.4.6 Oil Resource

The poverty situation in Guyana may change rapidly with the expected oil wealth that Guyana is poised to benefit from the year 2020 - or it may not. Guyana has not developed a country strategy or a sovereign wealth

[31] *Pedro Conceição, Director of the Human Development Report Office at UNDP.*

[32] The 2019 global MPI paints a detailed picture of poverty for 101 countries and 1,119 subnational regions covering 76 percent of the global population, going beyond simple income-based measures to look at how people experience poverty every day. Access full data: http://hdr.undp.org/en/2019-MPI

fund or any kind of benefit-sharing policy or plan for its oil wealth and "first oil" is due to flow in 2020. Head of Exxon Mobil in Guyana said in July of this year (as reported in the Press and Media) that the company had already created 1200 jobs in Guyana - a figure yet to be verified and gender analysed.

5.5 Improved Livelihoods

This section will cover Guyana's forests and the potential for improved livelihoods for communities along the Linden to Mabura Hill roadway and for communities in the vicinity of the proposed Kurupukari Bridge.

5.5.1 Guyana Green and REDD+

Guyana is part of Amazonia and the Guiana Shield. The fact that around 85% of the territory is covered by rainforest has positioned Guyana in the forefront of Climate Change negotiations and actions and related financing benefits. Guyana established a Low Carbon Developments Strategy (LCDS) in 2009 that allowed for an Agreement with Norway for USD 250 million as a five-year term payment for environmental services from standing forests and sequestered forest carbon. This was one the world's first REDD+ investment agreements. Guyana is currently benefitting from the World Bank's Forest Carbon Partnership Facility (FCPF) by implementing its REDD+ Readiness programme. As an early signatory to the global Climate Agreement (2015), Guyana is poised to benefit significantly from the newly established global Green Climate Fund, and has developed its own Green State Development Strategy (GSDS). This emphasis on Guyana's rain forests as an economic and environmental priority through successive governments augurs well within the wider world's climate commitments and the Sustainable Development Goals of the 2030 Agenda which Includes Goal 13: Climate Action.

5.5.2 Recommendations for Road Design Options for Wildlife Conservation

The Indigenous Peoples Plan (IPP[33]) produced for the Feasibility Study (2012) contains recommendations for wildlife safety and control road design options. Additionally, Conservation International produced a report on natural resource management for said Feasibility Study which can also inform the designs for the current Linden-Mabura road designs.[34]

5.6 Low Carbon Pathway - Green State Strategy

5.6.1 Forest Conservation History

Guyana has a long, proud history of forest conservation, with its indigenous peoples as the original stewards and conservators over their 7000-year-long legacy of wise use and accumulated traditional knowledge. Kaieteur National Park (est. 1929) was the first protected area in Amazonia. Sixty years later, in 1989, Guyana made a bold offer to the international community to share the responsibility to manage the pristine million-acre Iwokrama Rainforest “in a manner that will lead to lasting ecological, economic and social benefits to the people of Guyana and to the world in general”. Throughout its history, successive governments have contributed to national forest policy and the sustainable management of its state forests. In spite of some challenges, the Guyana Forestry Commission (GFC) and its predecessor, the Guyana Forestry Department, have been recognized for their professional management of the nation’s 13.6-million-hectare commercial forest patrimony. The Guyana Monitoring, Reporting & Verification System (MRVS) for forest cover and sustainable forest management is considered one of the best in the world and a model for other tropical rain-forest countries. The Community MRV - CMRV model is an essential component of the MRVS and this has been pioneered in North Rupununi - with Fair View Village being a part of this process.

[33] The Indigenous Peoples Plan (IPP) was produced by Vanda Radzik

[34] The CI Natural Resource Management Report for the Feasibility Study 2012 has been requested by the consultant and any relevant information may be inserted and added for the final ESIA study at the discretion of the Environmental experts.

5.6.2 Low Deforestation Rates

Because of this leadership and foresight, and with the vigilance and related contributions of civil society advocates and organizations, Guyana has maintained one of the lowest deforestation rates on Earth (peaking at 0.079 in 2012 and 0.065 in 2014 and with the lowest rate recorded to date in 2018 of 0.046). Guyana has set a deforestation reference level of 0.056 as part of its national REDD+ commitment to the global Climate Agreement of 2015 and is due to be assessed in 2020.

5.6.3 Guiana Shield Biodiversity

Guyana is a constituent of the wider Guiana Shield Rainforest that also covers Suriname, French Guiana and part of Venezuela and Brazil. This rainforest is one of the largest expanses of untouched tropical rainforest in the world. It contains a high level of biodiversity with estimates in the range of more than 1,200 vertebrate species and more than 6,000 plant species present in Guyana (ITTO 2005). Many of these are endemic and/or vulnerable with 68 species on the IUCN Red List of 2011.

5.6.4 Forest Carbon Prospects, Payments for Ecosystem Services & REDD+ Financing

5.6.4.1 Forest Cover & Carbon Stocks

With the world's second highest percentage of rainforest cover (85%), Guyana commands globally important carbon stocks (19.5 GtCO2eq). As one of only a handful of countries that are net carbon sinks, Guyana's forests sequester more carbon than the nation's human activities generate. Guyana's 18.48 million forested hectares in total hold carbon in unusually high density (up to 350 tons/hectare), and store some 5.31 gigatons of carbon. That amounts to approximately 6,638 tons/person, the second highest forest carbon stock per capita of any country on Earth.

5.6.4.2 Reference Level for Deforestation

Historically Guyana has experienced very low rates of deforestation with the FAO reporting zero rates of deforestation back to 1990. The estimated rate recorded between 2010 and 2011 was 0.054% (GFC 2012).

5.6.5 Mining as the chief driver of deforestation

The majority of deforestation (93%) has been attributed to increased mining activity according to recently verified reports. Gold and bauxite made up over 60% of all exports by value in 2012. Most of Guyana's forested area (84%) is under state ownership and managed by the GFC. The majority of the remaining 14% of forested area is held through communal rights and community ownership by Guyana's Indigenous Peoples. However, in spite of national laws and regulations governing mining, there are many breaches carried out with impunity and the GGMC - the regulatory agency - has not been able to effectively rein in the corruption and lack of compliance in the mining industry in both gold and bauxite mining.

5.6.6 Payments for Eco-system Services

Also, importantly are Guyana's eco-system services in abundance and the potential payments for these. A REDD+ payment for standing forests and their forest carbon sequestration services garnered a 250 million US dollar payment in tranches over a 5-year period into the Guyana REDD+ Investment Fund (GRIF) established through an agreement between Guyana and Norway. Some of the Linden-Mabura stakeholder communities benefitted from this in terms of solar panels for households and a few other projects. But there is much greater potential for income from Eco-System Services such as fresh-water provisioning, forest and wildlife conservation, and aesthetics through preservation of landscape (highly important to the eco-tourism business.

5.6.7 World Bank Forest Carbon Partnership Facility investment in REDD+ Readiness

The World Bank's Forest Carbon Partnership Facility (FCPF) is being administered through the IDB office in Guyana and directed by the Ministry of Natural Resources. Amongst the components of the programme are a REDD+ Strategy, REDD+ Capacity building for Indigenous Peoples Organisations, Forest Carbon Rights and Benefit-Sharing and REDD+ Demonstration Projects. There is potential for the forest-dependent stakeholder communities living alongside the Linden to Mabura Hill road to benefit from REDD+ projects when these get going in the second phase / financing phase of the FCPF REDD+ funding cycle. There were three REDD+ Community Demonstration projects approved. One was in Region 10, Muritaro Village to have a full forest inventory done to gauge the various benefits that the community could derive from the forest. Another in Region 9, Shulinab Village was to develop a wildfire management plan to better safeguard forest and savannah resources from devastation from fire. One was in Siriki Sands/New Haven Forest Co-Op in Essequibo, Region 2 which was the development of agro-forestry for the *acai (manicole)* berry for natural food processing as a small business. All of these REDD+ "demo" projects are well suited to the Linden to Mabura Hill and Fair View / Kurupukari communities and might be replicated or inspire other relevant and viable REDD+ livelihood and benefit-sharing projects.

5.7 Social Development / Social Services

Human Development Index: In UNDP's Human Development Report of 2014 the country's value on the Human Development Index (HDI) was 0.638, ranking Guyana in position 121 among 187 countries. Despite the fact that the latest value shows an improvement of 0.87% when compared to the value in 2000, the country has been stagnated in the same ranking position since 2008.

Gender Inequality Index: In terms of Gender Inequality Index (GII), Guyana is ranked 113 (among the 187 countries), with value 0.524.

5.7.1 Health

The right to healthcare free of charge is guaranteed in the country's Constitution.

In Guyana, the Ministry of Public Health (MoPH) is responsible for setting national policy, regulation, and standards; for building and initial furbishing of facilities; and for initial financing of 100% of the employment of doctors, nurses, and medical extension officers (medex) (Government of Guyana, 2014). At regional level, the Regional Health Authority (RHA) has the autonomy to assess, plan and implement health services and manage the facilities for a defined population in a defined geographic area, including day-to-day management of the facilities and employment of all other staff working in the health sector. (ISAGS and UNASUR, June 2014).

5.7.1.1 Health Vision 2020

The country's main framework for health is the Health Vision 2020 (Ministry of Public Health, Dec 2013) that sets the strategy and overall planning for the health sector. The document prioritises focus on the reduction of maternal and child mortalities, and the improvement of health for adolescents.

5.7.1.2 National Gender Equality and Social Inclusion Policy Objective for Health, Wellness and Healthcare

This strategy seeks to promote care and prevention services for vulnerable groups with community participation. The access of vulnerable groups to medical services is not only limited by the ***lack of nearby infrastructure****, but also to the barriers of accessibility due to physical impediments, in particular for persons with disabilities and the elderly, and in cases in which economic conditions make it impossible for pregnant women to receive medical exams in primary centres.* ***Mobility is therefore a determining factor in access***

to health services, hence the need to generate community transport to support the transfer of vulnerable groups.

Strategic Lines

- Elderly Care
- Maternal mortality
- Services for vulnerable groups and access to reliable and safe transportation, especially for pregnant women.
- New-born and mothers' malnutrition
- Health care services
- Services for victims of violence
- Mental health and substance abuse
- Virus and infections

5.7.1.3 Five Level Spectrum of Health Care

There are five levels of health care in Guyana. Each provides a specialised spectrum of services to patients. The system prescribes referrals to go from one level to the next level and that counter referral should take place accompanied by the necessary information on diagnosis and treatment. This is a very bureaucratic system and lends itself to frequent (and unnecessary) bottlenecks.[35] Figure 14 shows the health structure, referral system and number of facilities in Guyana.

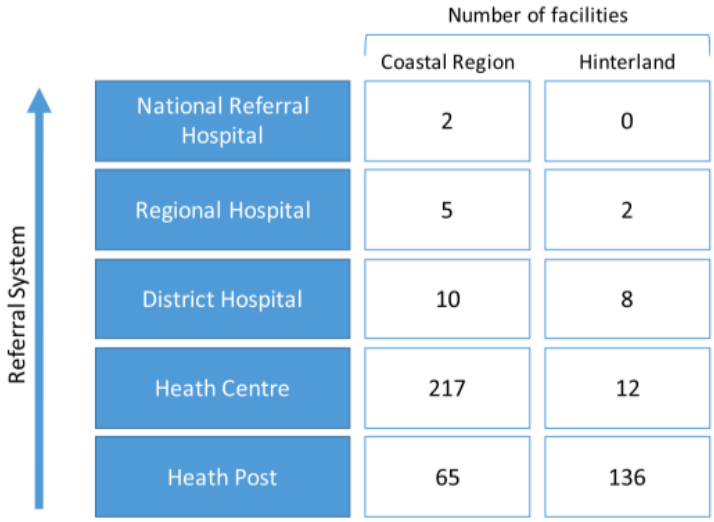


Figure 14: Guyana health structure, referral system and number of facilities
Source: ISAGS and UNASUR, June 2014

5.7.1.4 Limited Hinterland Access to Advanced Health Care and Services

Although the Hinterland population has numerous facilities compared to the small proportion of the total population, these guarantee only local access to limited health services. For access to a broader range of diagnostic and treatment services individuals of the Hinterland will need to overcome large distances and travel frequently over rivers, by road and sometimes by air.

(ISAGS & UNASUR, June 2014).

[35] UNICEF Situational Analysis, 2018

5.7.1.5 Community Health Workers

The Community Health Workers (CHWs) are front-line workers, mainly situated at Health Posts in the hinterland regions where the indigenous population live. Generally, CHWs are recruited from the village/community and receive some basic training. However, this is limited and so are the resources at the Health Posts. Often basic supplies are either lacking or stocks have not been delivered in a timely manner. This causes problems with expired medications etc.

5.7.1.6 Situation of Health Posts and Community Health Workers along the Linden to Mabura Hill Roadway

For the Health Posts situated alongside the Linden to Mabura Hill roadway - none had essential supplies such as oxygen, sutures, saline or even snake-bite kits. There were no rape kits or "morning after pill" in stock. Noticeably, the isolated interior communities situated alongside the Linden to Mabura Hill roadway are in jeopardy when it comes to high-risk pregnancies and other emergency cases - especially in terms of road accidents and related emergencies.

The nearest hospital for residents of #47, #58/Great Falls and Mabura Hill was in Linden over two hours away by vehicle on a good road in dry season and up to four hours away on a degraded road in rainy season. Communities at Kurupukari including Fair View Village, Iwokrama and MMC have to go to the Annai Cottage Clinic (3 hours away) or to the main District Hospital in Lethem - five to six hours way - or more - depending on condition of road and weather. One village #47 has an ambulance and an ambulance driver in place. There were no clinics or cottage hospitals between Linden and Mabura Hill, or between Kurupukari and Annai. The CHWs at #47 and #58/Great Falls, at Mabura Hill and Fair View were dedicated but under-resourced and underpaid. The Medex at Iwokrama was pleased at the newly constructed Health Post there, but, there are continuing challenges in terms of medical supplies, drugs and the necessities for health care in a high-risk environment.

5.7.1.7 Maternal Health Care Services

Maternal as well as other primary health consultations – are provided free of cost in public facilities. Overall, in 2014 there were 364 antenatal care sites, along with 43 regular delivery sites in the 10 regions of Guyana. However, none of these services are in the vicinity of the small communities along the Mabura Hill road corridor or available at the small Health Posts therein. Deliveries therefore also occur at home or in the community. The only referral institution for high-risk pregnancy and emergency cases is Georgetown Public Hospital. *(Source: Government of Guyana, 2014).*

5.7.1.8 Sexual and reproductive health and rights

- Contraceptive methods (which include, intra uterine device placements, Injections, pills, condoms among others) have been promoted to women and men in isolated communities, through the Maternal Child Health (MCH) programme and at all the public health facilities across the four hinterland Regions.
- A review of the practices and attitudes of staff at Sexual and Reproductive Health facilities in Guyana was conducted to determine the barriers to access of Sexual and Reproductive Health services.
- Gay men and Female Sex Workers (FSW) were trained and empowered to be part of the sensitization team targeting health care providers.
- The Ministry of Public Health has completed a draft Sexual and Reproductive Health Policy which will seek to address all issues regarding the access to information on sexual and reproductive health inclusive of sexual orientation. *(Source Gender Bureau 2018)*

5.7.1.9 Remote Area Medical Flying Ambulance Service in Rupununi, Region 9

In the Rupununi, Region 9, there is also the life-saving RAM air-lift and evacuation service, with a light-aircraft and highly trained pilot operating this service. RAM was founded by Stan Brock who once worked at Dadanawa Ranch in South Rupununi and vowed to help save lives of the peoples of the Rupununi after witnessing deaths there of the Wapichan people because of lack of medical services and the vast distances to travel for medical attention. The service is an independently resourced volunteer one with a Board of Guyanese and operates in partnership with RAM USA. It is entirely funded by donations and contributions. It also has linkages with the Regional Health Services of the Rupununi and its communications & referral systems. It is, however, only used for emergencies. The plane and pilot are based in Lethem. The Iwokrama/Fair View Airstrip provides access for the RAM flying ambulance emergency service.

- It is anticipated that RAM may play an important role in accident and emergency services along the Linden-Mabura Hill-Lethem Road.

5.7.1.10 Guyana Health@50 Progress Report

168,240 malaria cases, 1,255 of dengue, nearly 100 cases of filaria in five-year span

Vector-borne diseases are a major public health threat, with Guyana recording at least one positive case of malaria within every hour. It was pointed out by President David Granger that the vector, which is mainly the mosquito, generally has no border and would cause devastating effects on the human populace, adding that the risks and threats are changing constantly. Air travel, illegal transport, shipping are all factors that increase Guyana's risk of contracting new vector borne disease. The importance of the partnership with WHO / PAHO and the Public Health Ministry was highlighted in combating these diseases.

"The extension of public infrastructure…and mining and logging and the inland travelling all contribute to the possibility of the invasion of new species into Guyana," (President Granger)

5.7.1.11 PAHO Health Analysis of Guyana

According to analysis from the Pan American Health Organization (PAHO), the country's health system performance and health outcomes have improved over the years, but challenges remain, especially related to data management and quality of care. Formal data needed for monitoring and evaluating health system performance at the regional level are limited, and information flows among central, regional, and facility levels are fragmented and not fully integrated. In addition, data from the private sector are not systematically collected, analysed, and integrated. With respect to quality of care, while protocols and guidelines exist, and training is conducted, inadequate monitoring and enforcement of standards and loss of trained health human resources present barriers to sustained improvement (*PAHO, 2012*).

5.7.1.12 Government Perspective on Health Challenges

The challenges of data availability, quality and timeliness remain a major hurdle in programme targeting and policy formulation.

The challenges faced by the public health sector are many and varied: shortage of drugs and problems of procurement; continued strain on the National Referral Hospital; health infrastructure deficits; and disparities between the hinterland and coastland.

In terms of vulnerable people: Female Sex Workers (FSW) and HIV positive persons face double stigma; FSW are reluctant to disclose their true occupation due to anticipated stigma; attitudes of staff or other patients can be intimidating for FSW and HIV positive persons; dress codes at health facilities place hardship on transgendered and FSW; and denial and self-stigma.

(Source Ministry of Social Protection/Gender Bureau 2018)

5.7.2 Education

The Ministry of Education (MOE) is dedicated to ensuring that all citizens of Guyana, regardless of age, race, gender, creed, physical or mental disability, or socio-economic status are given the best possible opportunity to achieve their full potential. (MOE Website)

5.7.3 Primary Education

Primary education is mandatory in Guyana, covering children between the ages of 6 and 11. Due to delays in analysing the 2012 Census, the country does not have available an official net enrolment rate (NER) for children in primary education. The lack of official rates does not allow for a proper discussion on the efficiency of the system.

In the school year 2011/2012: 94,843 boys and girls were enrolled in the six grades of primary education, 49% of them were girls. The vast majority of pupils (93%) were enrolled in free public government schools. On average, 85% of the children attending the first class of primary school in 2014 attended preschool in the previous year, an increase when compared to 2006 when only 65% of the children had attended preschool. Among those enrolled at school, 97% of them were attending the classes regularly. Also, around 96% of the children who start grade 1 in the past reached grade 6 (last grade of primary education in Guyana), showing an improvement when compared to 2006, when 71% of the children reached grade 6[36]. Table 18 shows the Primary School population estimation by age groups for Guyana in 2012.

Table 18: Primary School population estimation by age groups in Guyana, 2012

Age	Boys	Boys % Total Population	Girls	Girls % Total Population	Total	% Total Pop
0-4	37,864	10.2%	33,910	9.0%	71,774	9.6%
5-9	38,345	10.3%	33,703	9.0%	72,048	9.6%
10-14	38,350	10.3%	36,454	9.7%	74,804	10.0%
15-19	42,796	11.5%	40,258	10.7%	83,054	11.1%
20-24	32,380	8.7%	32,539	8.7%	64,919	8.7%
Child Population	157,355	42.2%	144,325	38.5%	301,680	40.3%
Adolescent Population (10-19)	81,146	21.8%	76,712	20.4%	157,858	21.1%
Youth Population (15- 24)	75,176	20.2%	72,797	19.4%	147,973	19.8%
Adult Population (18+)	214,274	57.5%	229,898	61.3%	444,171	59.4%

Source: Bureau of Statistics

5.7.3.1 Quality Education

While access to primary education is important, access to quality education is fundamental for the sustainable development of the country. Using the National Grade Six Assessment as proxy of quality of the primary education, grades between 2009 and 2013 for students from the Hinterland and Coastal areas have improved for Mathematics, English and Science. Nonetheless, the gap in grades between students has increased. For example, while the gap in Mathematics between Hinterland and Coastal areas students was 15 percentage points in 2009, in 2013 that difference was enlarged to 24 percentage points. This indicates that instead of having the inequality reduced, it has in fact increased.[37]

[36] Bureau of Statistics & UNICEF

[37] UNICEF Situational Analysis 2018

5.7.3.2 Children with Special Needs

Guyana does not have an account of how many children with special needs there are in the country, or how many are in need of formal education. Small-scale surveys have identified that 15% of all persons with special needs have never attended school, and the proportion increases to 42% among those children younger than 16 years of age. The country has a limited number of institutions that provide special education, and access to them is difficult due to their location – most are in Georgetown – and due the associated cost related to transport children to and from the schools. There are also social and cultural practices and beliefs that hamper a more inclusive education in Guyana. For some parents, the fact that they have a child who requires special attention is seen as a burden and considered to be shameful. Adding to that, bullying is normal, with children presenting negative attitudes towards those who need special education.

Therefore, inclusive education and training of teachers for its provision remain severely limited, particularly for children with sensory, cognitive, and/or mental impairments, which leads to the majority of children with disabilities staying at home, resulting in isolation, stigmatization and compromised access to employment opportunities and social services. The reality is that children with disabilities have difficulties in accessing not only schools, but also health services, employment and even social and recreational opportunities. The country's infrastructures are not accessible for children and adults with motor impairments; and even in the country's capital, sidewalks, buildings and roads are not completely accessible. (*UNICEF Situational Analysis-2018)*

5.7.3.3 Corporal Punishment

In Guyana, corporal punishment is still legal – with the exception of the courts and the juvenile justice system, where it has been repealed from the laws. In 2014, 70% of children were identified as suffering some sort of corporal punishment. Boys are more likely to receive violent discipline than girls. Violent discipline is widespread in society, and it is independent of the household's socio- economic characteristics, and the region where the child lives. There have been grave reports in the Press and Media and acknowledged by the Ministry of Education that corporal punishment has caused severe wounding and hospitalisation of children both on the coast and hinterland. Guyana remains the only country in all of South America where there has been no laws or policies enacted on corporal punishment. The former Minister of Education (Dr Rupert Roopnaraine, 2015-2017) made bold attempts to stamp it out from schools and presentations on alternatives to the violent disciplining of children in schools as well as the review of a policy in the 1970s that was implemented in the Teacher Training College at the time through the then Ministry of Education's Early Childhood Development Education programme that was being implemented at the time with the "Escuela Nueva" model adapted. The former Minister believes that he was able to abolish Corporal Punishment under his watch - but there does not appear to be much evidence of this.

5.7.3.4 Early Childhood Development

Early Childhood Development Index

The 2014 Early Childhood Development Index (ECDI) identified that around 86% of children aged 36-59 months in Guyana are developmentally on track in terms of physical growth, literacy and numeracy skills, socio-emotional development and readiness to learn, with few differences based on socio-economic characteristics and Regions. For example, children (i) from Amerindian families; (ii) from the poorest families; and (iii) living in the interior of the country have the smallest ECDI (73.2%, 78% and 78.5%, respectively). In terms of regions, children living in Regions 1, 7, 8 and 9 are far beyond the average for the country. The results also show the importance of children to attend ECE institutions: the ECDI for children attending ECE was 91.4% in comparison to 76.5% of those children not enrolled in early childhood education programmes. (UNICEF, 2014)

Education Facilities for Communities within the Linden to Mabura Hill Road and Kurupukari

The Constitution of Guyana proclaims that “every citizen has the right to a free education from nursery to university”. There is a Nursery and a Primary School in each of the communities and villages along the Linden to Mabura Hill road and at Fair View in the Kurupukari area. There are no Secondary Schools in this area. What exists are the "Primary Tops", where students benefit from a more advanced learning curriculum up to the age of 15. The nearest Secondary Schools are in Linden in Region 10 and in Annai in Region 9. The current estimated time taken to travel from Fairview to Annai is 2 hours, but this will be reduced to forty-five minutes with a paved road.

The 2012 Feasibility Study states the following: *"Nursery school attendance is very high and this trend continues at the primary school level. However, this begins to decline with age group advancement. This lack of school attendance in the higher age groups is as a result of the significant lesser amount of secondary schools and lack of trade schools and tertiary level institutions within the area. From the age group of 15-19, students begin to drop out or simply not attend secondary school".*

Bina Hill Institute - Youth Learning Centre

There is also the Bina Hill Institute (BHI) - Youth Learning Centre (YLC) situated in Annai which is an innovative live-in school that caters to out-of-school indigenous youth - offering a second-chance for those who have failed CXC or never got the chance to go to Secondary school. The BHI-YLC offers a practical course curriculum that teaches subjects conducive to jobs within the interior, such as sustainable and climate-smart agriculture, sustainable forestry, eco-tourism, natural resource management as well as traditional skills, native language, sewing, wood carving, home economics and music and IT. Leadership, gender equality, sexual & reproductive health and rights are mainstreamed. It is a two-year course with an integrated internship/apprenticeship period. The operating costs of the YLC is now supported by the Ministry of Indigenous Peoples Affairs and was the visionary brain-child of the current Minister - Mr Sydney Allicock, himself from Surama/Annai in the North Rupununi.

The Hinterland Green State Development Centre

This is a new development that is intended to provide technical training for Indigenous Peoples. It is also situated in Annai and will accept students from all Regions in Guyana. it will offer certification in the various skills taught including auto-mechanic, electrical, IT, construction skills, carpentry, solar panel installation and maintenance, etc.

Technical Institute in Linden

There is the well-established Technical Institute in Linden, which caters for all types of technical and vocational skills and is well regarded for its level of training and certification.

Access to Secondary School Annex and Technical Training Facilities

An upgraded, paved road will allow for easier access to Secondary School education in Linden for children living in communities and villages along the Linden to Mabura Hill road. In the longer term, and with the potential for increased population and other settled communities alongside the roadway, some thought might be given by the Ministry of Education for the establishment of a Secondary School in the one of the communities alongside the road - or an Annex to the Secondary School in Linden as well as some kind of Technical Education Facility. For Fair View, access to the Annai Secondary school will be made much easier and faster, likely allowing for Fair View children to commute daily, once there is a dedicated School Bus service with a safe and sober driver in place. Figure 15 shows the location of schools along the Linden to Lethem road corridor.

Recommended Strategy for Education, Training and Skills Development[38]

Promote access to an inclusive and quality education.

It is necessary that all citizens have the right to a free education from nursery to university.

The State of Guyana must prioritize actions that guarantee compliance with the rights of vulnerable groups, since the lack of access to this right will deepen the situation of exclusion and places them in conditions of extreme vulnerability, possibilities of oppression and subordination.

The communities of people along the highway are poor with high levels of unemployment and when employed lacking in "decent work" to use the ILO terminology. Targeted education for these communities for "readying" them for the road is essential.

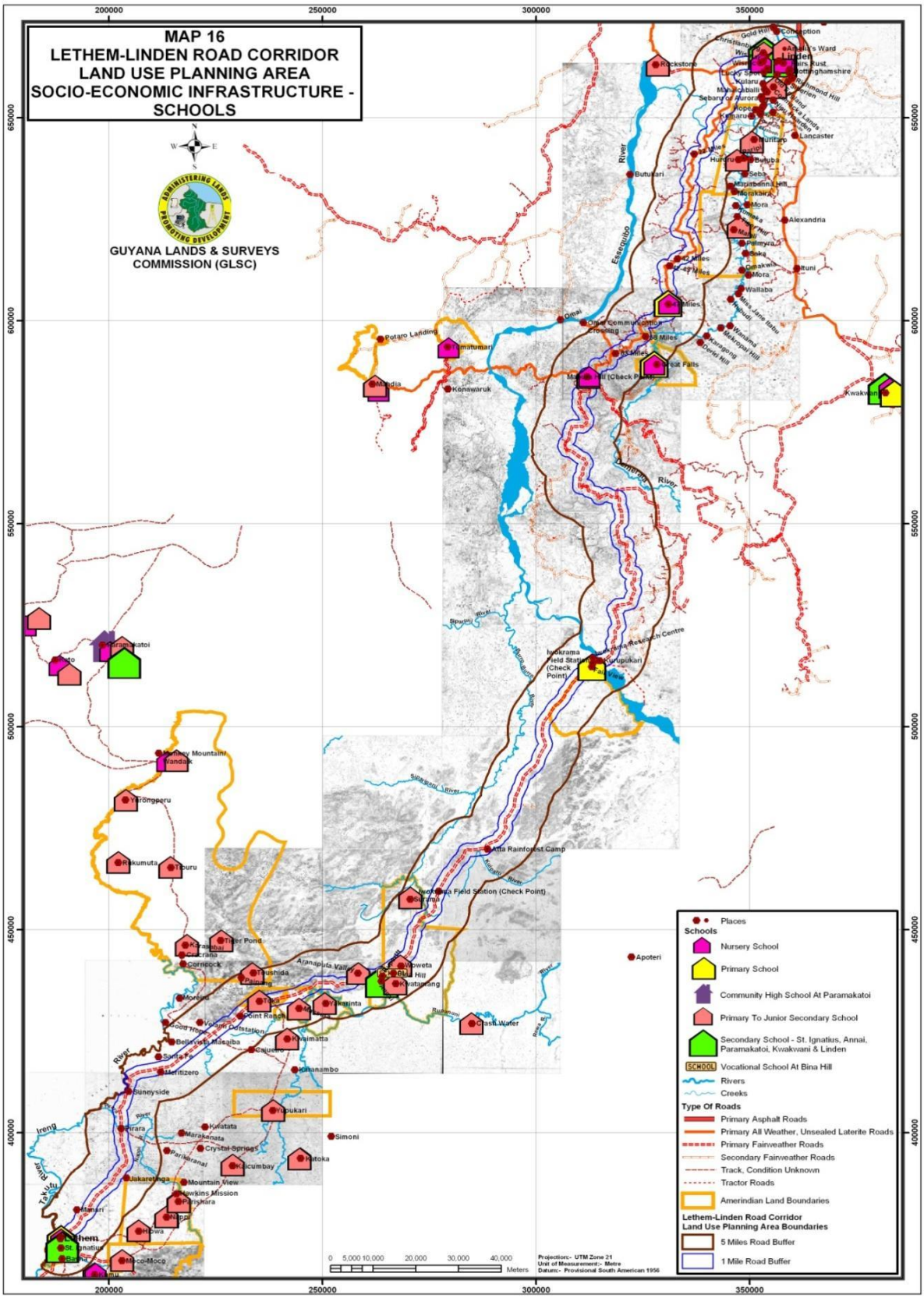
Capacity building, environmental education, knowledge of laws and constitutional rights as well as technical and vocational skills are essential.

Strategic Lines

1. Literacy
2. Educational curriculum with inclusive criteria and sensitization
3. Accessible educational institutions for vulnerable groups
4. Primary and secondary education
5. Higher education
6. Digital gap
7. Specialized education

[38] *Adapted from the National Gender and Social Inclusion Policy*

Figure 15: Schools along the Linden to Lethem road corridor



5.8 Addressing Multidimensional Violence against Women and Gender Based Violence

5.8.1 Violence Against Women

Violence Against Women (VAW) and Gender-Based Violence (GBV) are often categorised as Health Issues but also cut across all other dimensions and intersections in society.

According to a recent Caribbean-wide survey conducted by UN Women, Guyana has the highest level of violence against women in the Caribbean. *(UN Women Report 2019 - awaiting publication)*

5.8.2 Legal Instruments for Protection Against VAW / GBV

5.8.2.1 The Domestic Violence Act of Guyana

The Domestic Violence Act of Guyana enacted in 1996 was one of Guyana's chief country commitments to the Beijing Platform of Action (1995). Guyana was one of the first Caribbean countries to pass such a law.

5.8.2.2 Convention to Eliminate All Forms of Discrimination Against Women (CEDAW)

The Convention on the Elimination of all Forms of Discrimination Against Women (CEDAW) is an international treaty adopted in 1979 by the United Nations General Assembly. Described as an international bill of rights for women, it was instituted on 3 September 1981 and has been ratified by 189 states. Guyana was one of the first countries to sign and ratify the CEDAW. The GOG presented its CEDAW Country Report on July 12, 2019 in Geneva. A Shadow Report was also presented by Immaculata Casimero, a representative of Indigenous Women from the South Rupununi District Council (SRDC). The final Reports along with the Concluding Considerations of the High-Level UN CEDAW Panel of Experts was made publicly available in late July. Any recommendations therein relevant to the Feasibility / SIA for the Linden to Mabura Hill road will be added to this draft report.

5.8.2.3 Convention of Belém do Pará

Guyana also signed the Inter-American Convention on the Prevention, Punishment, and Eradication of Violence against Women, known as the Convention of Belém do Pará, Brazil, (where it was adopted on June 9, 1994). Belém do Pará defines violence against women, establishes that women have the right to live a life free of violence and that violence against women constitutes a violation of human rights and fundamental freedoms.

5.8.2.4 Supporting Entities

The Government of Guyana continues to provide financial support to shelters managed by NGOs. NGOs provide short–term accommodation, counselling, court advocacy and training for women and girls. NGOs such as Help and Shelter and Red Thread continue to be lead advocates on addressing VAW and GBV, and though under-resourced, have proved effective in their work, in following through on court cases and providing direct court support to victims/survivors of VAW/GBV. Recently, these two NGOs have engaged the National Toshaos Council (NTC) including the elected Women Toshaos in workshops that have used the simplified versions of The Sexual Offences Act and the Household Guide to the Domestic Violence Act which they have produced. The current Toshao of Great Falls/#58 is female and has attended recent workshops on Gender and Legislation such as the Domestic Violence Act and Sexual Offences Act.

(Women & Gender Equality Commission 2019).

There are, however, no known community-based services provided for victims of Domestic Violence, Sexual Offences or other related acts of Gender-Based Violence in the communities situated along the Linden to Mabura Hill road. Services do, however, exist in Linden. Therefore, often times women are discouraged to report instances of domestic violence due to the distance they must travel to access

services in Linden. Consequently, with the construction of the road these services will be easily accessible as NGOs and other bodies will be able to hold workshops and establish centers more readily.

5.8.3 Reported Measures Taken by Government for Boosting Capacity of Police

The Government reports that it has facilitated another measure for addressing violence against women which has been boosting the capacity of the Guyana Police Force to adequately prosecute perpetrators. Police stations are constantly being upgraded across the country to handle domestic violence interviews. The Guyana Police Force has taken measures to:

- Establish Domestic Violence and Sexual Offence Units at Police Force Headquarters
- Train Ranks and encourage more people-friendly precincts
- Remodel key precincts with designated private spaces to facilitate reporting such cases
- Work with Non-Governmental Organisations and the Ministry of Social protection.

5.8.3.1 Remodelled Police Stations for Reporting by Victims of Gender-Based Violence

The Government reports that eighteen police stations have been remodelled to fit special rooms for victims of gender-based violence to make their reports in a comfortable, confidential and user-friendly environment.

Such facilities, however, do not appear to exist at Mabura Hill Police Outpost or Annai Police Station.

5.8.3.2 Police Poster on the DVA prominently displayed at Mabura Hill Police Station

A Domestic Violence Poster designed by the Police Force itself was prominently and proudly displayed in the Mabura Hill Police Outpost / Checkpoint during the 2012 Feasibility Study.[39] Sgt Jackson recently reported that the poster has been water damaged and a refurbished poster is being sourced for continuing display in the Mabura Hill Station.

Continuing Lack of Professionalism by Some Police and Frontline Workers

However, women and girls still regularly report that they encounter problems with the professionalism of frontline workers when reporting issues of violence.

5.8.3.3 National Task Force for the Prevention of Sexual Violence (NTFPSV)

The GOG has established the NTFPSV in 2010. The task force was recommissioned in 2016, and developed a national plan of action for domestic violence and sexual offenses and also approves the protocols for the Medical practitioners, Police Officers, the Judiciary and Prosecutors.

Dysfunctional Task Force

However, from the NGO perspective, the Task Force is dysfunctional. NGO representatives designated to serve on this Task Force have reported that it has only ever met twice that they know of.[40]

5.8.3.4 Government-funded Safe House and Transitional Facilities for Victims

The Ministry of Social Protection reports that it has made significant strides with regard to care facility services in establishing one safe house and two transitional facilities located outside the capital.

[39] The police poster on the Domestic Violence Act (DVA) referred to above, was one of the outputs from a police training/gender sensitisation project on the DVA and its implementation by the police, sponsored by the Canada-Caribbean Gender Equality Programme (CGEP 2005)

[40] Red Thread and Help & Shelter.

It appears that these are on the Coast. Their locations are intended to be secret to stop perpetrators from tracking down the persons they abuse. However, Toshaos and Women Councillors in the stakeholder communities along the interior Linden to Mabura Hill roadway are not aware of any such facilities that are available or accessible[41].

5.8.3.5 Amendments to Sexual Offences Act and Establishment of Sexual Offences Court

In 2013, the Sexual Offences Act 2010 Chapter 8:03 was subjected to proposed amendments and judicial review to address gaps that surfaced during its implementation in the courts. The Sexual Offences court was launched on November 13, 2017 at the Georgetown High Court on the same day the model guidelines for Sexual Offenses cases which are now being implemented in several regions were also launched.

5.8.3.6 Legal Aid

Regarding women's access to justice, a legal aid facility has been established by the Guyana Legal Aid Clinic (GLAC), an NGO, in five of the country's ten regions: Regions 2, 4, 5, 6 and 10**.**

- In 2011, UNICEF collaborated with the GLAC to promote the human rights and expand children's legal aid services.
- The Ministry of Legal Affairs and the Attorney General Chambers provides paralegals in the hinterland to supplement legal aid services.

Legal Aid is difficult to access in the interior. Only one person living in one of the interior communities along the Linden to Mabura Hill roadway appears to have benefited from it and this was through rights advocate friend living in Georgetown. The Community Paralegals are minimally trained and serve as volunteers - so while the concept is good, the actual practice on the ground and benefits to victims of DV/GBV is very limited. A paralegal refresher course - taking into account new laws and amendments - with more access to resources and support and employment (at least on a part-time basis) and an independent evaluation of both Legal Aid and Paralegals in the interior is recommended.

5.8.3.7 Innovative Measures for Access to Justice for Hinterland Communities

Justice Roxane George-Wiltshire had made reference to other countries that had "mobile courts" which included service provisions such as counselling, legal aid, NGO court support personnel, etc. The idea was to have specially outfitted buses and boats that would mobilise courts and related services by road and river to the more isolated community clusters in the interior. Such provisioning would increase the reach and scope for access to justice. Such innovation would need to go hand in hand with greater knowledge and understanding of the citizens' constitutional rights and the laws, policies and rights of Guyanese. Such knowledge and understanding is very limited throughout Guyana - and particularly in the hinterland. The above are recommendations of the Women and Gender Equality Commission supplied to the Parliament for consideration and action. *(WGEC - Constitutional Rights Commission).*

5.9 Human Trafficking / Trafficking in Persons

The terms "trafficking in persons," "human trafficking," and "modern slavery" are considered to be interchangeable umbrella terms that refer to both sex and labour trafficking.

Human trafficking is the trade of humans for the purpose of forced labour, sexual slavery, or commercial sexual exploitation for the trafficker or others. Human trafficking can occur within a country or trans-nationally. Human trafficking is a crime against the person because of the violation of the victim's rights of movement

[41] Information solicited through key informant interviews conducted by the consultant.

through coercion and because of their commercial exploitation. Human trafficking is thought to be one of the fastest-growing activities of trans-national criminal organizations (Guyana Country Trafficking Report, 2019).

5.9.1 The Guyana Situation

Legislation: "Combating Trafficking of Persons" Act (2005) criminalized sex and labour trafficking.

Responsible State Agency: The Ministry of Social Protection (MoSP) is the lead agency responsible for coordinating trafficking efforts, overseeing the Anti-Trafficking Unit (ATU), and participating on the government's Ministerial Task Force on Trafficking in Persons.

5.9.1.1 Trafficking in Persons Guyana Profile (2019)

As reported over the last five years, human traffickers exploit domestic and foreign victims in Guyana, and traffickers exploit victims from Guyana abroad. Women and children from Guyana, Brazil, the Dominican Republic, Haiti, Suriname, and Venezuela become sex trafficking victims in mining communities in the interior and urban areas. The government notes a large increase in the number of trafficking victims from Venezuela. Traffickers exploit victims in forced labour in the mining, agriculture, and forestry sectors, as well as in domestic service and shops. While both sex trafficking and forced labour occur in interior mining communities, limited government presence in the country's interior renders the full extent of trafficking unknown. Children are particularly vulnerable to sex and labour trafficking. Traffickers exploit Guyanese nationals in sex and labour trafficking in Jamaica, Suriname, and other Caribbean countries.

5.9.2 Guyana Trafficking Report 2019

The US State Department produces an annual Global Report and individual Country Reports.

5.9.2.1 Tier 1 Status

The Government of Guyana fully meets the minimum standards for the elimination of trafficking. The government continued to demonstrate serious and sustained efforts during the reporting period; therefore, Guyana remained on Tier 1 - a classification related to State response and compliance with the relevant law.

- **Positive Trends:** The government demonstrated serious and sustained efforts by increasing funding for victim assistance, identifying and assisting more victims for the third consecutive year, and opening and operating a trafficking shelter outside of the capital area.
- **Negative Trends:** Although the government meets the minimum standards, it did not provide adequate protection and shelter outside the capital, or for child and male victims. The number of trafficking investigations and new prosecutions decreased, and the number of successful convictions remained low.

5.9.2.2 Prioritized Recommendations

The following were slated for priority action in Guyana:

- Finalise, implement, and train law enforcement officials and front-line responders in written victim identification and referral procedures.
- Fund specialized victim services, in particular for child, adult male, and Venezuelan victims.
- Vigorously investigate and prosecute sex and labour trafficking cases, including those involving child victims.
- Hold convicted traffickers, including complicit public officials, accountable by imposing strong sentences.
- Hold police and law enforcement officials accountable for intimidation of victims in shelters including restricted movement, lack of access to family visits, or telephone services.

- Provide additional protection for victims to testify against traffickers in a way that minimizes re-traumatization.
- Investigate and report on the cases reported to the trafficking hotline and by labour inspectors.

5.9.3 Prosecution

The Combating Trafficking of Persons Act of 2005 criminalized sex trafficking and labour trafficking and prescribed penalties of three years to life imprisonment. These penalties were sufficiently stringent and, with respect to sex trafficking, commensurate with those prescribed for other serious crimes, such as rape.

5.9.4 Protection

- The government increased efforts to identify and protect victims. However, victim assistance remained a concern, especially in areas outside the capital and for Venezuelan, child, and male victims.
- The government identified 156 victims in 2018 (106 for sex trafficking and 50 for labour trafficking), compared with 131 identified victims in 2017.
- The government referred 93 victims to shelter and psychological services, compared with 115 in 2017. The government screened 11 potential child trafficking victims (10 sex trafficking and one labour trafficking) in 2018.
- Despite the noticeable increase of victims from Venezuela, the government lacked standard operating procedures for protecting foreign trafficking victims.
- There were no adequate public or private shelters for male or child victims, although the government has identified a facility for male victims.

5.9.5 Prevention

The government has increased efforts to prevent trafficking. The government established an anti-trafficking unit with three trained staff within the Geology and Mines Commission to register and categorize workers in the interior and conduct spontaneous checks. The government approved a new national action plan for 2019 but did not report on activities under the plan by the end of the reporting period. The government last conducted research into trafficking in 2016.

- Authorities facilitated several awareness sessions focused on the mining and logging sectors outside the capital. Authorities conducted unannounced labour inspections in the capital and the interior, but it was unclear if measures to prevent forced labour and regulate foreign and domestic recruiters were sufficient or effective.
- The government drafted its first national child labour policy and plans to release it in 2019.

5.9.6 Stakeholder Perspectives

5.9.6.1 Concerns and Cases

In every consultation held, the issue of trafficking was raised as a concern by men and women alike. There have been a few cases reported where Iwokrama Rangers, familiar with the villages, spotted suspected victims of trafficking and were able to alert authorities through the NRDDB, for instance. In at least one case a girl under 18 years of age from a North Rupununi village was rescued from a bar in Mahaicony, Region 5; three different regions and three different rivers away from her village, having been duped by a woman owning one of the buses traversing the Lethem-Georgetown route. The case was reported to the Government authority at the time and to the Police, and the trafficker taken to the Ministry responsible for TIP at the time, but no prosecution was made. This was some years ago, and since then, there has been significant improvement. But the danger of unsuspecting youth and the deep cunning and clever network of the traffickers pose a real and present danger - enabled by increased transportation routes and transportation providers.

5.9.6.2 Recommendations

The following are stakeholder inputs and suggestions for deterring TIP:

- The Georgetown-Linden-Mabura Hill-Mahdia-Lethem route is known to be used by traffickers, and a smoother, faster roadway may enhance this criminal trade.
- To deter this, stakeholder recommendations entailed training and sensitisation of local persons and police officers in TIP procedures.
- Having trained persons from the Anti-Trafficking Unit (ATU) at strategic points along the highway, such as at the Iwokrama Ranger Station at Kurupukari where a police outpost already exists; and at the Mabura Hill Police Station; as well as at checkpoints in Linden, Lethem and Mahdia.
- Hotlines would need to be set up to link these check-points to each other and to the national hotline / monitoring system so that TIP alerts along the roadway can be activated.
- It will be useful to engage the MOSP / ATU as a stakeholder in phase two of the consultations so that its inputs can be taken on board for the finalised ESIA and ESMP for the project.

5.9.7 Traffic Routes

The map in Figure 16 shows the main traffic routes currently existing in Guyana. The Linden-Lethem Roadway is the longest and its extension from Georgetown effectively traverses the entire country.

Figure 16: Guyana traffic routes

5.10 Transport Facilities

A wide range of transportation services ply the Linden to Mabura Hill roadway and onwards through Kurupukari to Lethem.

5.10.1 Passenger Minibuses

The majority of road users use minibus transportation in all of Guyana, and particularly along the Linden to Mabura Hill roadway and its extended routes to Lethem and Mahdia, since the type and condition of the road does not presently encourage a high proportion of cars to use it. Though a few do provide "hire-car" services. A number of villages along the Lethem route also have invested in community mini-buses to service their own villagers. But these do not normally traverse the route to Georgetown. These passenger minibuses are identified and labelled by number according to route.

The Georgetown-Lethem Route is # 94. Amongst the best known and most regular are: Cindy's Bus Service; "Bangladash" Bus Service; Paul Ward Bus Service, Carly's Bus Service to name a few[42].

The **Mahdia-Georgetown route is #73**; and the **Georgetown-Linden route # 4**2.

There is also a great deal of solidarity and fraternity amongst the mini-bus operators. They also usually travel in cohorts along the Lethem and Mahdia routes so as to be able to assist each other in terms of break-downs and stick-in-mud hazards along the very deteriorated roadway.

5.10.1.1 United Minibus Union

There is an active minibus association - the United Minibus Union (UMU).

A preliminary consultation meeting was held with Mr Eon Andrews, President of the United Minibus Union (UMU) in conjunction with the National Road Safety Commission. It was reported that the lack of care and high level of speeding by mini-buses are a cause of great concern by both organisations. It was noted that enforcement was slack and bribery and corruption a norm.

"Minibus speeding and infringement of traffic laws is the norm. It is important to have a standard code of conduct set for the minibus operators those operators — since the system is currently 'out of control'"

(UMU President)

A meeting with some of the Mini-bus drivers / owners is to be organised by the President of the UMU in phase two when the preliminary designs of roadway and bridge are in hand.

5.10.1.2 Code of Conduct for Minibus Operators

The Code of Conduct for the United Minibus Union (UMU) was launched in February 2019. The purpose of the Code of Conduct is to improve the quality safety and efficiency of public transportation in Guyana and to make the public transport system accessible to all commuters on a non-discriminatory basis. Among the key areas addressed in the Code of Conduct are:

1. Driving in a safe manner and taking reasonable care for the safety of all passengers.
2. Behaving with civility and propriety towards all passengers and communicating in a professional and courteous manner at all times.
3. Providing reasonable directions to ensure the safety and comfort of all passengers, including students.

[42] At least one of the named bus services above has been reported to the authorities for Trafficking in Persons.

4. Providing safety, by not, either through action or inaction, causing or allowing any injury, loss or damage to persons or property to occur.
5. Administering the rules applicable to the bus consistently and impartially.
6. Operators will not be allowed to wear inappropriate clothing, exposing themselves.
7. Operators will now be mandated to wear a uniform, along with an identification badge, which should include the name of the organization or association.
8. Operators will not use indecent language and treat passengers in a hostile manner.
9. Operators will help the elderly, if needed, and not force them to hurry to be seated
10. Treat foreigners who speak different languages in a respectable and hospitable manner.
11. The code of conduct also states that persons belonging to vulnerable groups such as children and the differently-abled (PWD) will be treated with care.
12. The new document will also prohibit minibus drivers from making stops, except at bus stops.
13. Music is expected to be played at comfortable levels for their passengers.
14. No derogatory images or words should be displayed on the exterior or interior of the buses.
15. The code of conduct also reinforces other laws, with regards to overloading and others.
16. The fare structures must be posted and visible to passengers.
17. When an incident of misbehaviour occurs, it must be recorded using the Incident Report Form.
18. If a serious incident occurs, the bus driver will stop the bus and contact police on 000 and/or the bus operator and await instructions.
19. Students should be advised to stay in the bus until assistance has arrived.
20. Passengers are now being asked to contact the Guyana Police Force, should the code of conduct be violated by these operators.

5.10.2 Trucks, Containers, Canters, SUVs and Cars, Motor-cycles, Bicycles

- Trucking along the Linden to Mabura Hill roadway is multi-dimensional. There are the goods supply trucks that transport food stuff, fuel, household appliances, furnishings and a wide array of items that are either ordered privately for delivery to households or shops and other sales outlets, etc. Some communities/villages along the Linden-Lethem Highway also own trucks
- Trucks are also owned or hired to transport logs from GFC or Village concessions. There are GFC stations that are expected to monitor and check these trucks for compliance with GFC policies and regulations.
- Trucks are also engaged in the Mining businesses.
- Heavy duty containerised vehicles and fuel containers also traverse the roadway.
- SUVs comprise a significant transportation entity - these are a mix of privately owned, community-owned and government / agency owned as well as some owned by NGOs.
- Cars, mainly in the dry season, also increasingly using the road - private and hire cars/taxis.
- Motor-cycles are frequent transport carriers. These are privately owned by families.
- Bicycles are also used - but usually, only between villages/communities

5.10.3 The current condition of the Linden-Lethem Roadway

Comments from **Minibus operators, Region 9 Vice Chairman and Mayor of Mahdia:**

Commuters continue to grapple with deplorable roads…Loggers/logging trucks contribute to the present situation. Traversing the Linden to Lethem trail is proving to be too time-consuming and even dangerous given the current rainy season coupled with the damages being done by loggers whose heavy-laden trucks destroy the pathways.

Just two months ago, several minibus operators plying the Lethem and Mahdia routes complained bitterly about the deteriorating conditions of the trail which they are forced to use to transport passengers and goods as a means of earning their daily bread.

The bus operators described the trail as a "death trap" and criticised the Public Infrastructure Ministry for paying zero interest in conducting long-term repairs to that trail which is the only access to those areas.

(Press Reports August 5, 2019)

Comments from **Region 9 Regional Vice Chairman (VC) Carl Singh (Upper Takutu-Upper Essequibo):**

"Previously, on a regular day, a trip from Lethem to Linden would average between 12 and 15 hours. But, at present, given the deplorable state of this route, it takes almost twice as long to travel to and from those locations. Now it is taking 20 to 24 or 25 hours. I drove out of town a few days ago, a land cruiser took 20 to 22 hours. I even had to pull about four minibuses that had trouble on the road with my vehicle."

The Region 9 Regional VC said that the Mekdeci Mining Company (MMC) is conducting some work on the trail but is not enough. He further stated that in light of the numerous complaints by persons travelling that route along with complaints by the bus operators, his Regional Office had both spoken and written to the Natural Resources Minister, Raphael Trotman, some six weeks ago about the pressing issue but there has been no feedback. Singh pointed out that Minister Trotman has responsibility for the forestry sector and that is why the Regional Office of Region 9 sought his assistance with the heavily laden logging trucks.

Mayor of Mahdia, David Adams commented that the trail is in its usual state, however, vehicles are still able to traverse. He explained that during the rainy season, some attention needs to be paid to the trail on a particular stretch between Mahdia and Mabura Hill, which is in dire need of repair. He noted, however, that there are no plans in place for such rehabilitation works by the Town Council. "Getting in is very difficult and some works have to be done in the short term to offer relief to those traversing," he said.

5.10.3.1 Recommendation for MOPI

These very recent comments from two prominent regional authorities indicate the current deplorable state of the road. It might therefore be of value to have a stakeholder meeting with the Region 9 Council. It might also be politic for the MOPI to consider some kind of major, on-going remedial work on the road in the interim period between Road designs and construction period. This is because it will likely take a minimum of three years to construct just the paved road from Linden to Mabura Hill. There is need for some sensible interim solutions to this road which has now waited over seven years since the last major Feasibility Study was completed in 2012.

5.11 Road Safety

Guyana has the third highest rate of road traffic deaths per capita in the world.

"I demand that you manage speed on my road: Build or modify roads which calm traffic"

This combined slogan was part of the interactive, action-oriented movement of the World Health Organisation at its Global 5th Road Safety Week. (May 2019).

The slogan is very relevant to Guyana where speeding on all roads is out of control.

SDG Goal 3 Good Health and Wellbeing: Target 3.2 aspires to reduce global road traffic deaths and injuries by 50% by the year 2020.

SDG Goal 11 Sustainable Cities and Communities: Target 11.2 commits by the year 2030 to provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and elders.

World Health Organisation (WHO) Global Status Report on Road Safety 2018

The below provides highlights of The Global Status Report on Road Safety launched by WHO in December 2018:

- The number of annual road traffic deaths has reached 1.35 million.
- Road traffic injuries are now the leading killer of people aged 5-29 years.
- The burden is disproportionately borne by pedestrians, cyclists and motorcyclists, in particular those living in developing countries.
- The price paid for mobility is too high, especially because proven measures exist.
- The Sustainable Development Goal (SDG) target 3.6, to halve road traffic deaths by 2020, will not be achieved.

PAHO www.unroadsafetyweek.org

Pan American Health Organisation (PAHO) Report 2017

The below provides highlights of the Pan American Health Organisation (PAHO) Report 2017:

- Road crashes kill about 1.3 million people worldwide every year and severely injure an estimated 50 million.
- Out of ten lives lost in traffic, nine are lost in low- and middle- income countries.
- The increasing share of vulnerable road users such as seniors, pedestrian, cyclists and motorcyclists that become victims of road traffic raises particular concerns.
- Reliable data on traffic crashes is crucial for effective action on road safety. Without hard facts about the scale of the problem, the exposure to crash risks and the effectiveness of policies the problems cannot be addressed at the core.

5.11.1 National Road Safety Situation

Guyana Police record increase in fatal accidents for first half of 2019

Police Press Report July 6, 2019[43]

- There has been a slight increase in fatal accidents recorded in the country for the first half of 2019 when compared to the same period for last year
- Over 75 per cent of these fatal accidents were caused by driving under the influence of alcohol and speeding, a combination of these two
- 42 persons who died from a fatal accident were males while 10 were females. Of these 52 deaths recorded for 2019 so far, four were children
- *"These tragedies could have been prevented" (Traffic Chief Iles)*
- The most recent fatal accident occurred on the evening of July 3 after a truck carrying logs turned turtle while climbing a hill on the Linden-Lethem trail killing the 35-year-old driver.

Facts and Figures: Guyana Road Accidents and Road Fatalities

Charge to Guyanese from President Granger and Traffic Chief Isles (2019)

- In Guyana, fatalities from road traffic crashes is among the top 10 causes of death
- It is the number one cause of death among persons between the ages of 5 – 14 and second cause of death among persons ages 15 – 24
- The Guyana Police Force records some 15.88 deaths per year per 100,000 persons
- The GPF says that in this country, the leading causes of traffic accidents are speeding and driving while under the influence of alcohol
- Other major causes are driving while distracted by use of a cellphone, pedestrian inattentiveness, and failure to heed traffic signs and warnings.
- In the last 15 years, more than 2,000 Guyanese have been killed on the roadways.
- The prevalence of builders' waste, vendors, stray animals, poor architecture of roads, poorly lit roadways among other factors contribute to making our roads hazardous.
- Guyana occupies the fifth place in the Western Hemisphere for road fatalities, and we have one of the smallest populations in the world
- We have a road fatality rate that is four times that of Barbados.
- There has been a 20.8 per cent increase in fatal accidents and a 19.2 per cent increase in deaths resulting from fatal accidents.
- All Guyanese have a part to play in reducing the number of traffic incidents, and we need to take that duty seriously.

5.11.2 Pan American Health Organisation: Fifth UN Global Road Safety Week

[43] Information provided by Deputy Police Commissioner and Traffic Chief, Linden Isles, Police Press Report July 6, 2019

Speed Limits, Road Safety & Traffic Management

The Pan American Health Organization (PAHO) says more needs to be done in the Americas, including the Caribbean, to address traffic management as this is the key to saving lives and making cities more liveable.

"The region of the Americas has made progress in adopting standards that limit speed in urban areas, but it needs to further strengthen the application of these standards to reduce deaths and injuries due to traffic."
(Eugenia Rodriguez, PAHO's regional advisor on road safety)

Maximum Speed Limits of Less than 50km in Urban Areas

PAHO noted that 17 countries in the Americas have already set maximum speed limits of less than 50 km/h in urban areas, "which conform to best practices", adding that three countries have given local authorities leeway to reduce the limits further. *"Control at the local level is important, so lower speed limits can be set in populated or vulnerable areas such as those near schools or health facilities," PAHO said. "However, laws on speed limits must be accompanied by strict compliance, so that they are effective and thus save lives."*

Speed Management Measures: Building Roads with Features to Slow Traffic

Speed management measures include building/modifying roads to include features that slow traffic, e.g. roundabouts and speed bumps; establishing speed limits appropriate to the function of each road; and enforcing speed limits through the use of manual and automated controls.

Technologies built into vehicles for speed management

Speed management measures comprise installing in-vehicle technologies in new cars, such as intelligent speed assistance and autonomous emergency braking. A road safety technical package, which details 22 key evidence-based measures considered most likely to impact on road traffic deaths and injuries, including a number linked to managing speed.

"Save Lives: #SlowDown"

The "Save Lives: #SlowDown" campaign is to draw attention to the dangers of speed and the measures which should be put in place to address this awareness about the dangers of speed. Activities include dissemination of messages in media/social networks, transport systems and schools.

Road safety fairs and caravans

Include presentations in public places, signage work in urban areas, and promotion of commitments by local authorities to reduce speed limits.

School Campaigns

School campaigns are being held in Brazil, and parliamentarians are involved in activities in several countries.

"Slow Down Days"

"Slow Down Days" are being held in Colombia and Trinidad and Tobago.

Guyana would benefit from adopting these measures and slogans. It is suggested that these slogans can be part of the signage alongside the roadway.

5.11.3 Guyana National Road Safety Council

The Guyana National Road Safety Council (GNRSC) works in tandem with the Guyana Police Force, Traffic Department and with the Ministry of Public Security (formerly Home Affairs). Ms Ramona Doorgen is its current Coordinator and Ms Carlotta Walton of Linden, a member, has been in attendance at the SRKN stakeholder engagement consultations. The Council also participates in the PAHO and WHO data collection and activities and is listed as a key agency in the Annual Road Safety global reports. The GNRSC is identified as one of the key stakeholders for the Linden to Mabura Hill Road Upgrade project.

5.11.4 National Road Safety Action Plan 2017 - 2019

The GNRSC launched its National Road Safety Action Plan (2017 - 2019) on May 3, 2017.

At the launch, The Minister of Public Security announced that drivers who are on trial for causing death by dangerous driving will have their licences suspended pending the outcome of the court cases. Under the current regulations, the Minister has the power to disqualify persons from driving who cause road deaths by dangerous driving including a period of suspension from driving. The Minister pledged to use these powers at the Launch of the 3-year Action Plan of the GNRSC. The Laws also allow magistrates to disqualify drivers convicted of causing road accidents resulting in road deaths. However, records of conviction show that this is rarely done. Calls have been made that there needs to be compulsory imposition of this law. Key stakeholders include the Ministries of Public Security, Education, Public Health, Public Infrastructure and Communities, and the National Bureau of Standards and the Guyana Revenue Authority.

- The Guyana Road Safety Action Plan will contribute to the global Decade of Action for Road Safety, 2011-2020. Its main goal is to reduce death on the roads by 50 per cent. The Road Safety Action Plan will also complement the National Road Safety Strategy, 2013-2020

At the time of the launch of the Road Safety Plan on June 8, 2017, Police reports show 38 road deaths, 28 of which are said to be caused by speeding and drunk driving for the year up to April 30, 2017.

5.11.5 Enforcement Calls

"The Road Safety Council is calling for more rigorous enforcement by the Guyana Police Force and is saying that there should be a widespread call for greater enforcement…the Road Safety Council knows and any research would show you that enforcement is the main key to the reduction of crashes on our roadways."

Cassandra Persaud, motor car driver, license-holder commented: *"The roads in Guyana are deplorable. We have come to accept things of inferior quality in Guyana. Just this morning while driving I fell into a hole in the middle of the road covered with water! What is worse is that the heavy downpour widens the already gargantuan potholes. What is sad and often enough, enraging, is the fact that we have such high incidence of road fatalities. What angers me more are the errant drivers, lax rule of law concerning the same, and no clear demarcations and maintenance of our roadways." She added that even though all the bitter complaints are repeatedly made, the Government seems unable to adequately address the issue".*

5.11.6 Road traffic mortality rate

Shows the estimated 2016 road traffic mortality rate (per 100,000) population) by country in the Region of the Americas. Guyana was the country with the fifth highest road traffic deaths recorded for the Americas. Two other CARICOM Caribbean countries were even higher, with St Lucia topping the charts. Barbados recorded the lowest number of road fatalities in the Americas.

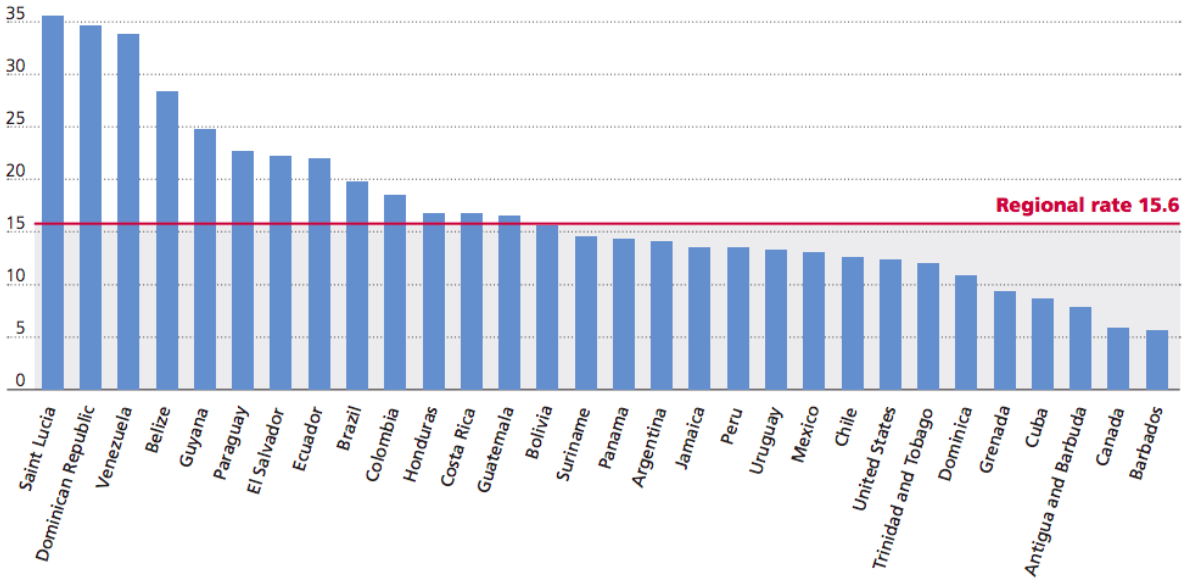


Figure 17: Estimated road traffic mortality rate (per 100,000) population) by country in the region of the Americas, 2016

5.11.7 Registered vehicle rate

Guyana is the country with the lowest number of registered vehicles in all of the Americas. It is therefore of significance to note that Guyana, in spite of a very low population and a comparatively low quantity of cars, has such a high rate of road traffic deaths. Trinidad & Tobago has the fourth highest number of registered vehicles in the Americas. Barbados ranked 8 out of 30 countries in terms of quantity of vehicles yet held the record for the least road traffic deaths.

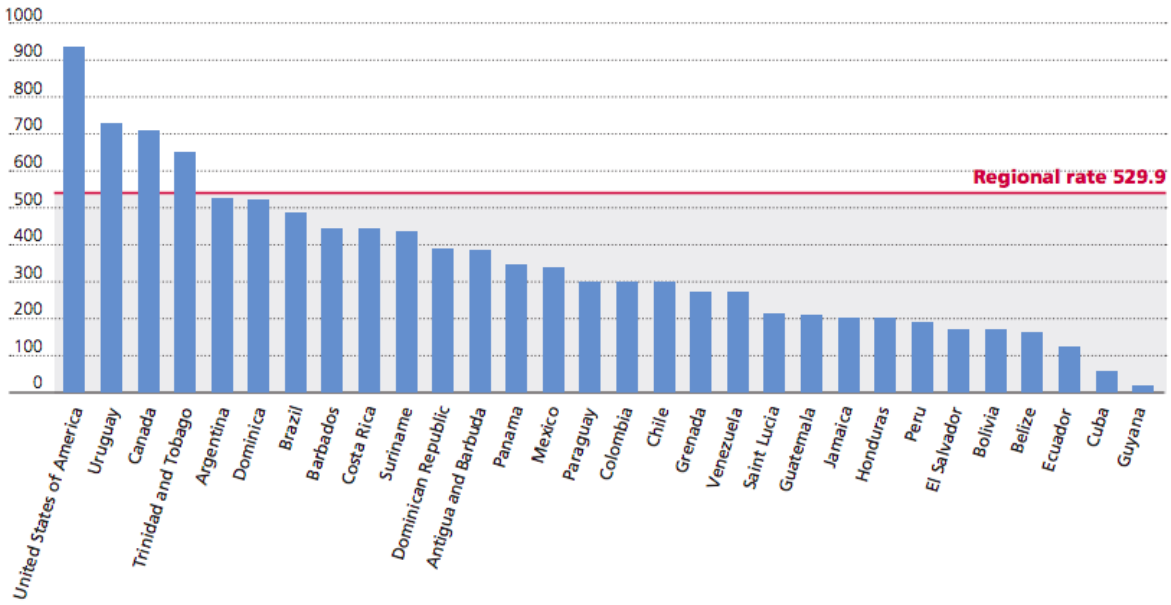


Figure 18: Registered vehicle rate (per 1,000 population), by country, Region of the Americas, 2016

How is Guyana Measuring Up?

In terms of social impacts deriving from the project, the prior and following information on road safety is intended to help develop and serve as a baseline for analysing the degree to which the Linden to Mabura Hill upgraded roadway (and the wider Linden-Lethem road link) will measure up to the standards and commitments that Guyana has made in terms of the PAHO/WHO road safety frameworks. The MOPI, Ministry of Public Security, the Guyana Police Force and the Guyana National Road Safety Council are all engaged in improving road safety and security and in improving enforcement measures in keeping with legislative and regulatory edicts. New roads and upgraded roads are expected to comply with improved structural and design standards and safeguards. The aim is to track the positive and negative impacts and effects of the Linden to Mabura Hill roadway on its users especially the most vulnerable groups identified, women, elders, youth and children.

Road Traffic Deaths

Figure **19: Traffic deaths recorded for the year 2007**, and Figure 21 show graphs comparing the number of traffic deaths recorded for the years 2007, 2010 and 2016 respectively.

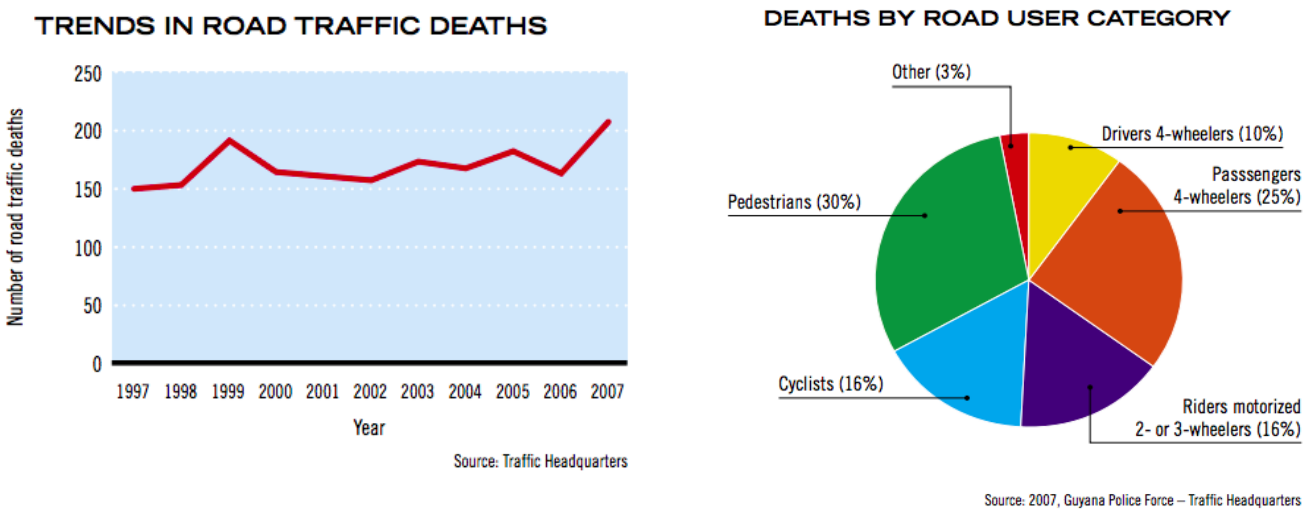


Figure 19: Traffic deaths recorded for the year 2007
Source: Guyana Police Force records

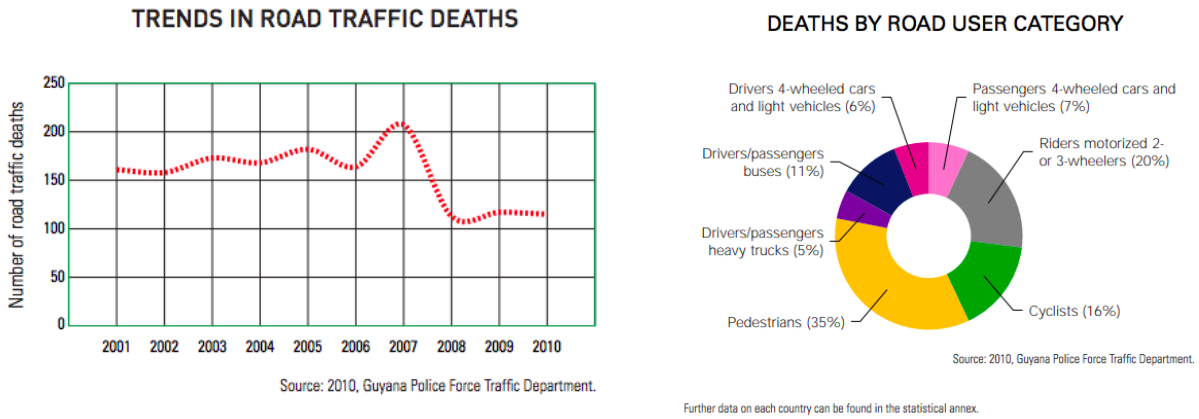


Figure 20: Traffic deaths recorded for the year 2010
Source: Guyana Police Force records

Graphs: There was a significant downward trend in road traffic deaths between 2007, when it peaked, and 2010 where it levels off. This is a positive development. Though the incidence of road deaths in Guyana is still unacceptably high.

Pie Chart/Doughnut Analysis: Pedestrians accounted for by far the greatest number of road traffic deaths in both 2007 (30%) and 2010 (35%). Motor-cyclists was the next highest category with 16% recorded in 2007 and increased fatalities in 2010 (20%). Cyclists (bicycle riders) were recorded at 16% deaths in both years. Drivers and passengers of minibuses were recorded at 11% in 2010, while in 2007 the deaths of passengers in both cars and minibuses combined was computed at 25% - a very high figure. Deaths of drivers of heavy trucks were recorded at 5% in 2010.

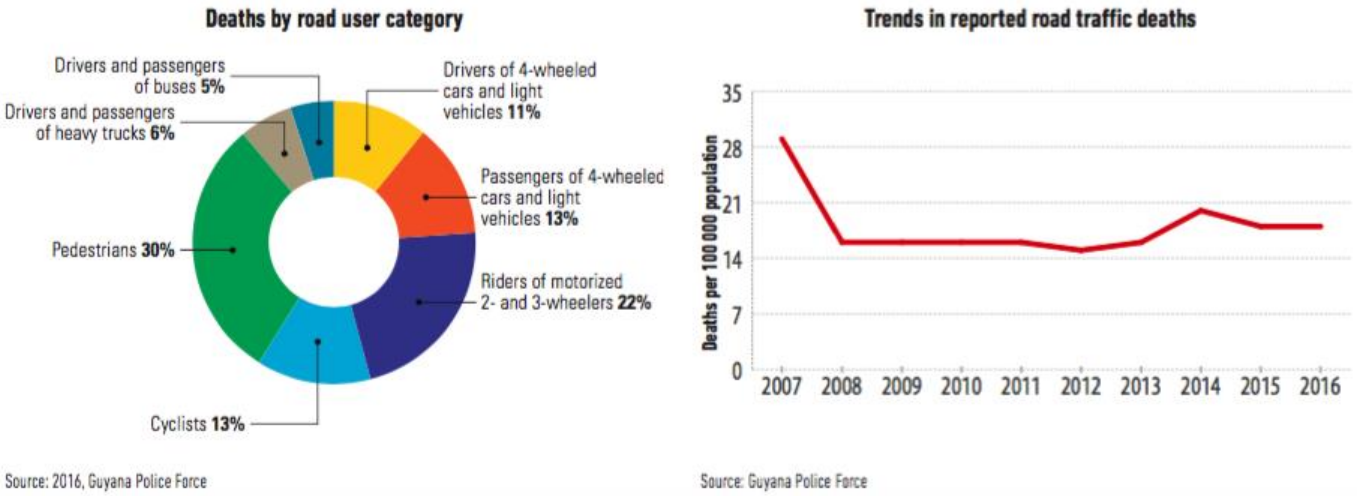


Figure 21: Traffic deaths recorded for the year 2016
Source: PAHO Status Report 2018

Guyana figures for 2016 (which are the most recent given) show a 5% decrease in the deaths of pedestrians from 2010. However, there was an increase by 2% in the death rate of motor-cyclists. Deaths of pedal cyclists decreased by 3% in 2016. This downward trend was also reflected for minibus fatalities which decreased by 6%. However, there was a marked increase in road deaths of both passengers and drivers of cars by 6% and 5% respectively. The level of fatalities by heavy trucks remained at 5%.

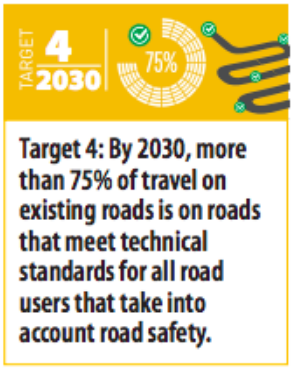
5.11.8 Guyana's Compliance Status with PAHO Standard Safety Measures (2016)

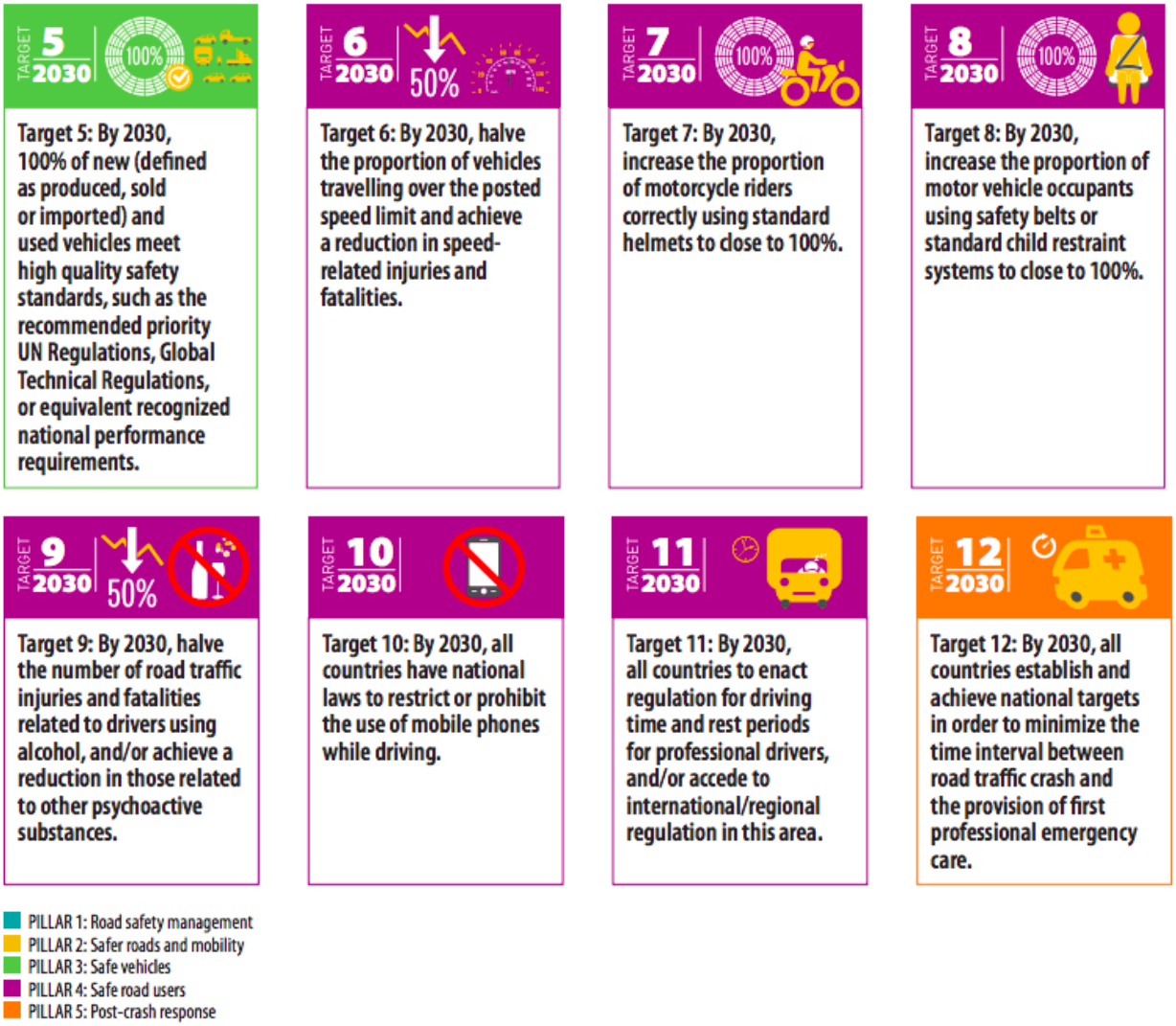
INSTITUTIONAL FRAMEWORK	
Lead agency	Ministry of Public Security
Funded in national budget	Yes
National road safety strategy	Yes
Funding to implement strategy	Partially funded
Fatality reduction target	50% (2011-2020)
SAFER ROADS AND MOBILITY	
Audits or star rating required for new road infrastructure	Yes
Design standards for the safety of pedestrians / cyclists	Partial
Inspections / star rating of existing roads	No
Investments to upgrade high risk locations	No
Policies & investment in urban public transport	No
SAFER VEHICLES	
Total registered vehicles for 2013	15 694
Cars and 4-wheeled light vehicles	8 846
Motorized 2- and 3-wheelers	3 505
Heavy trucks	1 356
Buses	785
Other	1 202
Vehicle standards applied (UNECE WP.29)	
Frontal impact standard	No
Electronic stability control	No
Pedestrian protection	No
Motorcycle anti-lock braking system	No

SAFER ROAD USERS	
National speed limit law	Yes[b]
Max urban speed limit	~ 64 km/h
Max rural speed limit	~ 64 km/h
Max motorway speed limit	No
Local authorities can modify limits	No
Enforcement	0 1 2 3 4 5 6 (7) 8 9 10
Predominant type of enforcement	Manual
National drink-driving law	Yes
BAC limit – general population	≤ 0.08 g/dl
BAC limit – young or novice drivers	≤ 0.08 g/dl
Random breath testing carried out	Yes[c]
Testing carried out in case of fatal crash	No
Enforcement	0 1 2 3 4 5 6 (7) 8 9 10
% road traffic deaths involving alcohol	17%[d]
National motorcycle helmet law	No
Applies to drivers and passengers	–
Helmet fastening required	–
Helmet standard referred to and/or specified	–
Children passengers on motorcycles	Not restricted
Enforcement	–
Helmet wearing rate	50% Drivers[d], 20% Passengers[d]
National seat-belt law	Yes
Applies to front and rear seat occupants	No
Enforcement	0 1 2 3 4 5 6 7 (8) 9 10
Seat-belt wearing rate	95% Drivers[d], 95% Front seats[d]

Global Voluntary Road Safety Targets: Road Safety Risk Factors & Service Delivery (2017)

Following the request of the United Nations General Assembly on November 22, 2017, Member States (including Guyana) reached consensus on 12 global road targets. They are organised into five colour-coded "pillars". Pillar 1: Road safety management (blue); Pillar 2: Safer roads and mobility (yellow); Pillar 3: Safe vehicles (green); Pillar 4: Safe road users (purple); Pillar 5: Post-crash response (orange).





5.11.8.1 Recommendation

In order to comply with the above commitments, it is recommended that sensitisation sessions promoting and advocating them be held with the MOPI, MOSP, MOE, MOH, Guyana Police Force and Traffic Department as well as with the Guyana National Road Safety Council and Minibus Union etc. School programmes to build knowledge of these as well as basic road safety rules for school children are likewise recommended. As far as possible, these should also be integrated in national road safety strategies and actions plans. NGOs such as Mothers in Black, the Alicea Foundation, ChildLink and UNICEF can take a lead.

A Children's Declaration was presented and published in May 2019. It reads in part*: "Why are thousands of children killed and injured on the roads around the world every single day? Because not enough is being done. You, our leaders, need to listen and act. ... Drinking and driving is dangerous. Speeding is dangerous. People who care about children should not do these things, no one should. The police should do more to protect us and arrest people who speed and drink and drive. We must be kept safe all the time - when we're out with our families, when we're going to play or going to school..."*

This can be used in a *Guyana #Kid's Safety* outreach initiative and a Guyana Children's Declaration developed and disseminated.

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6 Physical Environment Baseline

6.1 Project Environment

6.1.1 Physical Setting

Guyana is located on the eastern end of the Amazon Basin and is bordered by Venezuela to the west, Suriname to the east and Brazil to the South. The upgrade of the LMH road and the construction of a crossing at Kurupukari are part of a larger road network connecting Georgetown to Lethem in the south. As previously discussed, the Georgetown to Lethem road is the critical north-south link between the hinterland and the coastal belt, enhancing access to the seaport at Georgetown and the town of Lethem by the border with Brazil. When completed, the Georgetown to Lethem road will also connect Guyana to Brazil. Due to the length of the alignment, the Georgetown to Lethem road will pass through a range of physical settings. Major works on the LMH section of the alignment commenced more than 50 years ago. In 1979, the Ministry of Works and Hydraulics (now the Ministry of Public Infrastructure), with assistance of the CDB, completed construction of an all-weather laterite road with timber bridges on a 112.7km section of the road from LMH. In the early 1990s, the entirety of the 125 km road between Linden and Mabura Hill was rebuilt by Omai Gold Mines Ltd.

Currently, the LMH road is located on the watershed between the Demerara and Essequibo Rivers. Mile 0 starts in Wismar, Linden (approximately 105 km from Georgetown) and ends at Mabura Hill covering 125km. The town of Linden is the largest settlement which directly interacts with the road at its starting point. Settlements along the alignment are sparse with small communities located at the Mile #47 and Mile #58 villages. The Mabura Hill community is located at the end of the alignment and was built around DTL logging company.

The Kurupukari Crossing is located a further 108km south from Mabura Hill and is the link between the east and western banks of the Essequibo River on the Linden to Lethem Road. On the eastern bank of the Kurupukari Crossing is the base for MMC. MMC operates the toll gate and pontoon crossing. The company also undertakes road repair projects and contracts including maintenance works of the LMH road. In recent years, several small-scale vending and dry good trading enterprises and bars have developed in the vicinity of the MMC compound. The IIC, a national protected area, is situated on the western bank of the Essequibo River at the Kurupukari Crossing. Fair View Amerindian Village is also situated on the western bank of the Kurupukari Crossing and is located within the boundaries of the protected area.

6.1.2 Geomorphology and Soils

Guyana is located on the northeast coast of South America and most of its geological formations is comprised or underlain by rocks which date back to the Precambrian period. Geological formations are part of the Precambrian Guiana Shield which lies between the Orinoco and Amazon Rivers and encompasses all or portions of neighbouring countries Suriname, French Guiana, Venezuela, Brazil and Columbia, aggregating to an area of 1.6 million km^2.

From Linden to Mabura Hill, the existing road mainly traverses white and brown sands underlain by younger granites, metabasic dykes, sills and flows. Faulting is much more prevalent in this section with most faults trending north-west to south-east[44]. Further, the LMH Road traverses one of five recognised physiographic units of Guyana, *the white sand plateau.* The white sand plateau is composed of pliocene and pleistocene deltaic deposits of sands and clays interbedded with kaolinite clay and bauxite with higher elevations towards

[44] Ministry of Finance, 2000. Study for the Upgrading and Completion of the Guyana – Brazil Road: Technical Appendices III Description of the Existing Route.

the south of Guyana. The surface is composed of a combination of white quartz sand ('White Sands') which covers much of the area between Linden and Kurupukari[45].

According to a Land Capability Map prepared by the Guyana Lands and Surveys Commission (GLSC), most of the soils along the LMH road are classified as Category III or IV. The Category III soils are generally poor for agricultural purposes and often require fertilization to cultivate crops. These soils occur in both savannah and forest areas and are of variable depth, drainage, colour and texture which have developed mainly in transported materials and areas of low natural fertility, mainly undulating and gently undulating upland and terrace sites. Soils classified as IV are non-agricultural soils encountered in savannah and forest. These soils are shallow lateritic gravels soils and are encountered on mountains and hill lithosols and in areas of deep sterile excessively drained sands. However, there are a few isolated areas along the road in the vicinity of Linden, Mile #47 and Mile 57 villages where soils may be classified as Categories I or II which are considered good for agricultural purposes[46]. The soils at the project areas are shown in Figure 22.

In addition, the White Sands Plateau is comprised of two types of sand: white sands which extends to the Essequibo River and covers the majority of the area, and brown sands which is interspersed in pockets. The white and brown sands have a very low fertility, low pH, low cation exchange capacity and drainage ranges from excessively drained (albic Arenosols) to poorly drained floodplains (gleyic Cambisols)[47].

The existing LMH Road has no drainage system and rainwater runs off the surface of the road. At some sections of the road makeshift turnout drains have been created and some of these drains have significantly eroded. At other sections of the road, pits have been dug on the land at either side into which water drains. At several locations, runoff has led to the formation of gullies which eroded the road edge. It is anticipated that much of the road upgrade will be constructed within the existing road corridor, however some vegetation clearance will be required to accommodate the proposed road and utility corridor. Significant erosion was not observed at the Kurupukari Crossing. Furthermore, compaction of soils along the LMH Road were not observed.

As part of the feasibility study, geotechnical and pavement investigations were done in 2019 and which indicate potential for ground profiles along sections of the road as follows:

Linden to Mabura Hill

- 0.1 to 0.4m thickness of either dark brownish red, stiff to very stiff, slightly sandy, gravelly clay laterite made ground, or, dark brownish red, stiff, very sandy, slightly gravelly clay laterite made ground; overlying;
- 4m to 8m of very loose and loose, whitish grey, gravelly sand. Sand is medium and coarse, high sphericity, subangular. Gravel is fine to medium, angular to sub-angular of various lithologies; overlying (where present);
- 2m to 8m of spongy to firm, dark brown and black, sandy fibrous peat; overlying;
- 2 to 8m of firm to stiff, greyish white, slightly sandy, gravelly clay; variably loose, greyish white, slightly clayey sand. Gravel is fine to medium, angular to sub-angular. Sand is fine; overlying;
- 1m+ proven of green and white, extremely weak, very thinly bedded, de-structured bedrock.

Kurupukari

[45] ERM, 1995. Environmental and Social Impact Assessment – Linden – Lethem Road, Guyana. pg Secton 5.2 The Physical Environment

[46] SCN-Lavalin International Inc, 2011. Environmental and Social Impact Assessment (ESIA) Final Report

[47] Ibid, pg 95

- 0.1 to 1.0m thickness of dark brownish red, stiff to very stiff, slightly sandy, gravelly clay laterite made ground, overlying;
- 0.3m to 19m4 of soft to firm, becoming stiff, whitish grey, mottled red and brown, gravelly clay with occasional thick bands of greyish white sand. Sand is fine and angular, gravel is medium, angular of a weak lithology (possible lithorelicts); overlying;
- 2.4m+ Very weak, greyish blue, distinctly weathered, locally de-structured, extremely closely bedded mudstone.
- Details on geotechnical investigations are provided in Section 2.7 of the Feasibility Study Report. [48]

6.1.3 Topography

The existing road between Linden and Mabura Hill is located between the Essequibo and Demerara Rivers. Indeed, the alignment follows the watershed of the two rivers between Linden and Mabura Hill[49] and closely follows the route of the Essequibo River. According to the topographical map of Guyana, there is some variation in topography of the route but it is mainly flat to rolling. However, hilly terrain and higher elevations occur between Mile #58 village and Mabura Hill.

A topographic survey of the existing LMH Road and 1km approach roads to the Kurupukari River Crossing was carried out between March15 and May 10 2019 to aide understanding of the local topography. The survey picked up all relevant details within a 100m band centred on the existing road corridor whilst extending 100m along existing roads at each end of the corridor to facilitate tie-ins and 50m for all intersecting roads. Other than the occasional rolling hill or river valley, gradients are very gentle throughout the current alignment of the road. On a regional scale, the gradients of the land surrounding Kurupukari are very gentle. However, on a local scale there are occasional gently sloped heights and hollows of circa ±5m variance. These local scale variations appear to be the result of quarrying activities for local developments, local variation in the underlying geology and the effect of the Essequibo River hydraulics at rapids. Typically, the banks of the Essequibo River are between 10 and 20 degrees gradient. This gradient is also seen in the last 30 to 40 m of the northern and southern highway approaches to the Essequibo River.[50]

The topography of the project areas can be observed in Figure 23.

[48] Extracted from Mott MacDonald, November 2019, Feasibility Study Report, Linden to Mabura Hill Road Upgrade and River Crossing at Kurupukari, pg 18-20 – Section 2.7. Geotechnical Investigation

[49] Ministry of Finance, 2000. Study for the Upgrading and Completion of the Guyana – Brazil Road: Technical Appendices III Description of the Existing Route.

[50] Extracted from Mott MacDonald, November 2019, Feasibility Study Report, Linden to Mabura Hill Road Upgrade and River Crossing at Kurupukari, pg 15-16 – Section 2.3.Topography

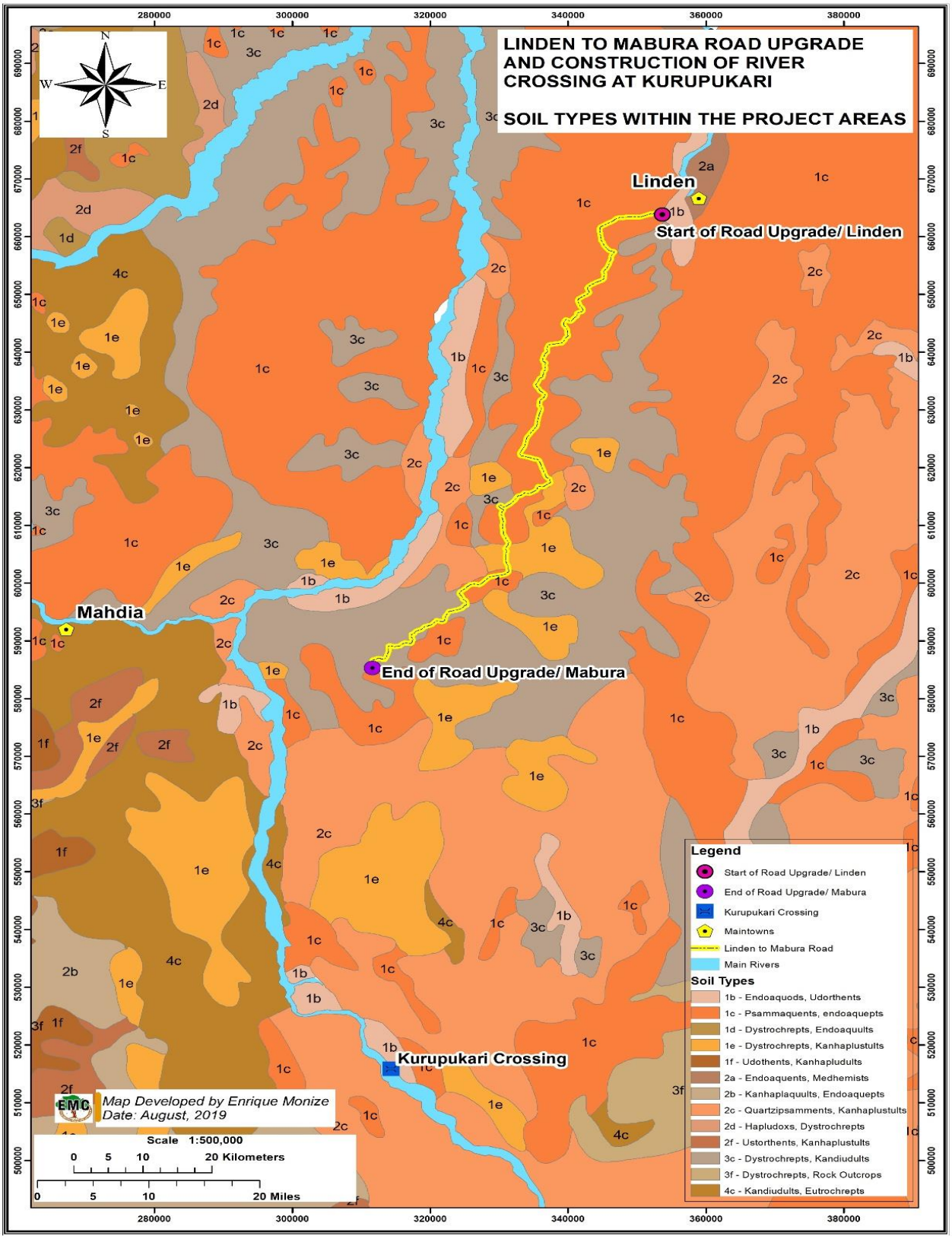


Figure 22: Soil types at the project areas

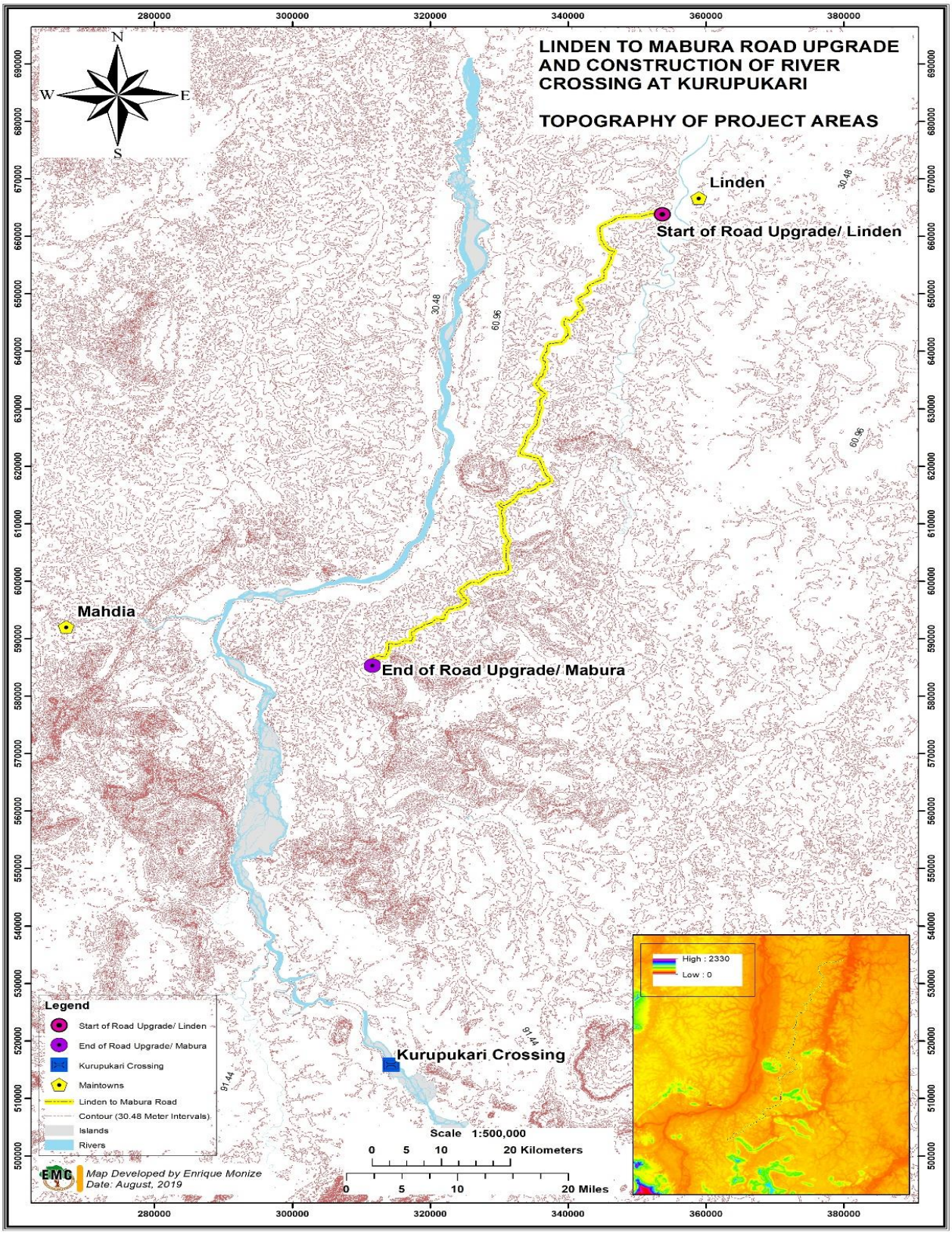


Figure 23: Topography of the Project Areas

6.1.4 Surface Hydrology

The general area along the LMH Road is drained by small streams which eventually flow into the Essequibo or Demerara Rivers. The areas to the west of the road is drained towards the Essequibo River while the area to the east is drained towards the Demerara River. The surface water drainage network can be observed in Figure 27.

Along the LMH Road there are nine existing cross drainage structures composed of eight culverts and one log bridge. Five main crossings are located at km 66 (Mile 40), km 69 (Mile 41), km 78 (Cassandra Crossing), km 80 (Mile 47) and km 107 (a log bridge) and comprise the following:

- Ch 72+750 (Mile 40): Two High Density Polyethylene (HDPE) pipes of approximately 0.6m diameter are present beneath the current road alignment.
- Ch 75+550 (Mile 41): Two corrugated HDPE pipes of 0.6m diameter sit alongside five smooth walled HDPE pipes of a similar diameter.
- Ch 85+720 (Cassandra Crossing): The road crosses a saddle on a high embankment with a small reinforced concrete culvert of about 1.0m width at the base.
- Ch 87+080 (Located in the village of Mile #47): The road passes over a twin 1.5m diameter precast pipe culvert with headwall and wingwalls of reinforced concrete.
- Ch 115+240 (Mile 64, log bridge): In this location there is a heavily damaged and partially blocked log bridge of about 11m span which appeared to have had multiple repairs.

There also four small culverts that provide surface drainage locally to the LMH Road e.g. to drain small cuttings. These small culverts are located at chainage 98+900, 99+610, 99+960, and 100+170 respectively.

Stream flows at the 9 culvert locations can be found in Table 7 and Table 8 of the Preliminary Design Report (pages 39 and 40) and presented in Table 19 below and consider a range of return period events including climate change allowance.

Table 19: Major Cross Drainage Flows

Cross Drainage ID	Chainage	Discharge (m^3/s)			
		1 in 50	1 in 50 2050CC*	1 in 100	1 in 100 2050CC*
1	72+750	23	25	30	32
2	75+550	129	138	166	177
3	85+720	12	12	14	14
4	87+080	26	27	30	31
5	115+240	72	77	92	99

Source: Mott MacDonald

*2050CC = mid-century climate change allowance

Table 19 shows that 1 in 50 year + CC flows range between 12m^3/s and 138 m^3/s for the scenario that includes mid-century climate change impacts. For the minor culverts, 1 in 50 year + CC flows are outlined in Table 8 of the Preliminary Design Report and Table 20 overleaf.

Table 20: Minor Cross Drainage Flow

Culvert ID	#6	#7	#8	#9
Chainage	98+910	99+610	99+960	100+170
1:50 + 2050CC	0.5	1.4	1.3	1.4

Source: Mott MacDonald Feasibility Study Report

**For culvert ID #9, based on the current resolution of the SRTM no catchment delineation was possible. Therefore, for conservativeness, it is recommended to consider the same discharge as culvert #7.

According to the Hydrology Report, pg 8, the catchment areas corresponding to the five crossings do not exceed 50 km^2. Two of them exceed 20km^2 and two others are less than 5km^2. These are presented in Table 2 of the report and presented in Table 21.

Table 21: Main Catchment Characteristics

Structure ID	River	Coordinates	Catchment area (km^2)	Elevation range (m)	Average elevation (m)	Average catchment slope (%)
Kurupukari crossing	Essequibo River	04:39:37N 58:40:45W	48,863	48 - 1147	219	10.4
Culvert 01	Unknown river	05:33:38N 58:30:30W	6.7	58 - 107	84	3.3
Culvert 02	Unknown river	05:32:39N 58:31:34W	44.3	53 - 262	97	3.8
Culvert 03	Unknown river	05:28:21N 58:31:34W	1.8	47 - 252	148	14.9
Culvert 04	Unknown river	05:27:37N 58:31:38W	4.0	68 - 259	153	15.6
Culvert 05	Unknown river	05:19:26N 58:40:29W	23.1	62 - 310	107	6.4

Source: Mott MacDonald analysis

In 2010, the bridges over the crossings at Ch 72+750 (Mile 40) and Ch 75+550 (Mile 41) were damaged because of extreme rainfall which caused flash flooding in the creeks. The bridge at Ch 72+750 (Mile 40) was partially collapsed and was passable with difficulty. However, the culvert at Ch 87+080, which is located in the Mile #47 Village, was completely blown out rendering the crossing impassable and thereby temporarily preventing travelling along this section of the roadway. Prior to this, in 2004, the culvert at Ch 87+080 also washed out. During the stakeholders' consultations, villagers of Mile #47 Village indicated that the culvert in the Village frequently overflows during periods of heavy rainfall resulting in flooding of some sections of the Village. Stakeholder feedback also revealed that there is cross-flow over the road surface which increases erosion risk along the road edge.

The Kurupukari Crossing is located approximately 108 km south from Mabura Hill. The catchment area upstream of the Kurupukari Crossing on the Essequibo River has been estimated to be 48,863km^2. The Kurupukari Crossing is the link between the eastern and western banks of the Essequibo River on the Linden to Lethem Road. The overall distance between the eastern and western banks of the Essequibo River is approximately 600m. Several rapids are present upstream of site of the crossing. Downstream there is a mixture of rock bars, islands and channels which may influence water levels at the crossing.

Blackwater rivers and creeks occur mainly in the white sand forest areas and are characterized as such due to high level of organic compounds derived from the tannins of forest leaf litter. Moreover, water levels at the crossings have been reported to rise and fall rapidly during the wet seasons.

Data is limited on groundwater resources in the project areas. However, the Guyana Water Incorporated (GWI) recently established a well in the Mile #58 Village.

Source: Inception Report (dated May 19, 2019)

Figure 24: HDPE Pipes at Mile 61

Source: Inception Report (dated May 19, 2019)

Figure 25: Culvert at Km 80 (Located in Mile #40 Village)

Source: Inception Report (dated May 19, 2019)

Figure 26: East Bank of the Kurupukari River with the Ferry Crossing

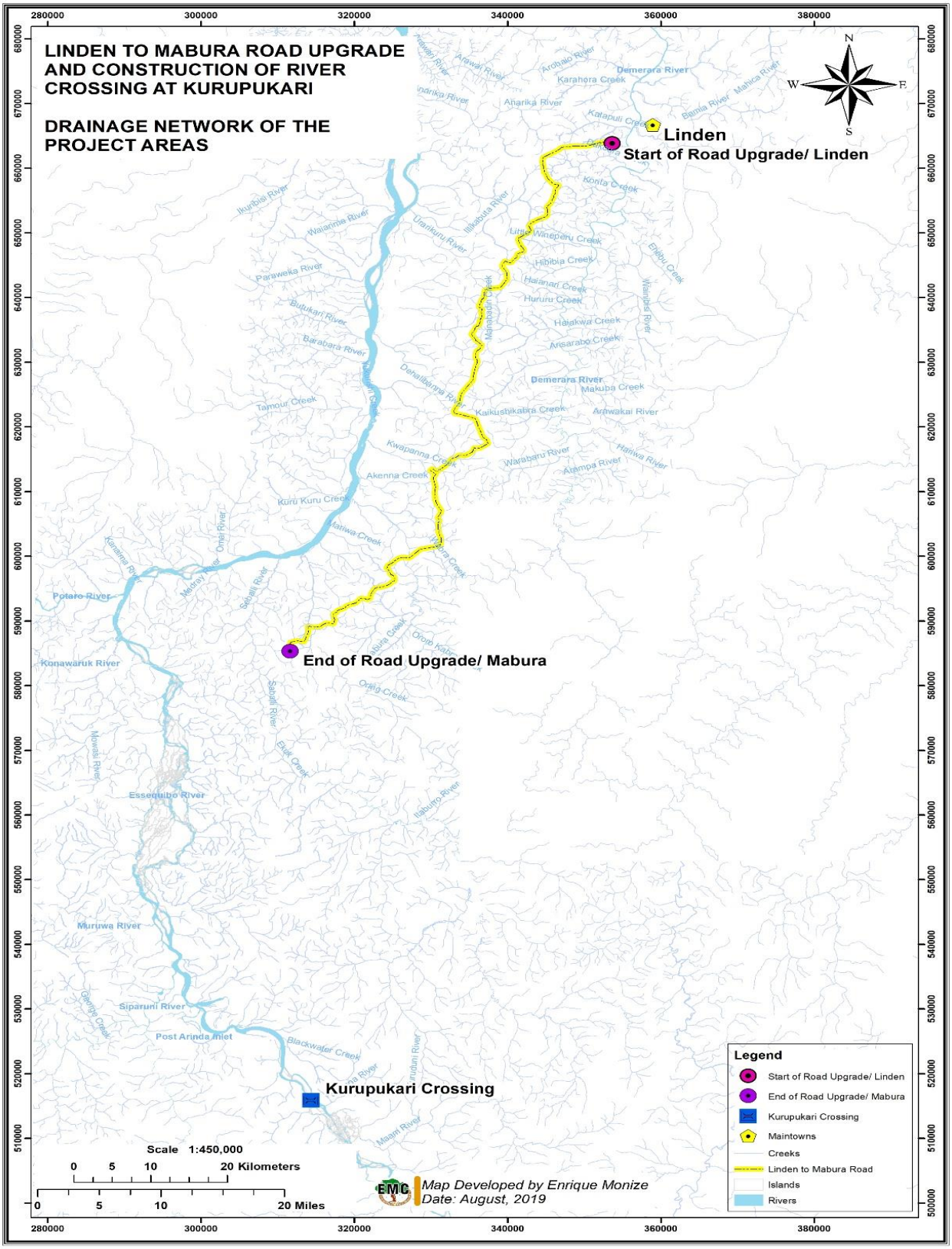


Figure 27: Surface Water Drainage of the Project Areas

6.1.5 Climate

Guyana is located in the equatorial trough zone and has a wet tropical climate characterized by warm temperatures and abundant precipitation. Air temperatures range between 16°C and 34°C with the lower range of temperatures being observed in higher regions. The primary factor influencing Guyana's climate and particularly its precipitation patterns is the Inter-Tropical Convergence Zone (ITCZ), a cloud and rain-bearing belt of rising air where south-easterly and north-easterly trade winds converge. Most places in Guyana experience a bimodal annual cycle of rainfall with distinct wet seasons. The first rainy season is the primary wet season and extends from mid-April to the end of July and the secondary wet season occurs from mid-November to January. The periods in between are often referred to as primary dry (long) season and secondary (short) dry season respectively. However, rainfall can occur at any time. A unimodal annual wet cycle (mid-April to August) is observed over the southernmost part of Guyana – the Rupununi Savannahs.[51] The LMH Road falls within one of three climatic zones in Guyana and which is *the wet/dry tropical forests* characterised by hotter days, cooler nights and annual precipitation between 1,778 mm and 2,800 mm.

There is no weather station operated by the Hydrometeorological Department of the Ministry of Agriculture along the road alignment or at the Kurupukari Crossing. Alternatively, data was utilized from weather stations located in Georgetown near the coast; Timehri located inland to the north of Linden as well as three stations located towards the south-west of the country, namely Annai, Surama and Lethem. The two northern stations provide between 50 and 60 years of continuous records which are likely to provide better estimates of long-term trends. Among the southern stations, only Lethem is associated with a 20-year series of continuous data.[52] This is presented in Figure 28 which shows observed trend in annual rainfall at recording stations.

Based on data collected at the national level, adverse climate change impacts have already been observed at the national level and within the Area of Influence (AoI) of the project. Since the 1960s, at the national level, temperatures have increased and the number of hot days and hot nights occurring in all seasons but primarily during the primary dry season (August to October) also increased. Since the 1960s, observed climate data shows increases in mean annual precipitation, with an average rate of increase across Guyana of 4.8mm per month, an increase of 2.7% per decade. Due to data constraints, there is no significant evidence of heavy 1-day or 5-day precipitation events. However, heavy precipitation events were reported to have washed away culverts and bridges at multiple locations along the roadway making travel to and from Linden difficult or impossible.[53]

Projections of future climate change indicate that these trends will continue. National level projections using the SRES scenarios[54] showed mean annual temperature increases by up to 2.0 ˚C by the 2030s, up to 3.3˚C by the 2060s, and up to 6.0˚C by the 2090s. The frequency with which hot days and nights occur were also projected to increase by 18 – 56% by the 1960s and by 19 to 79 percent by the 2090s. Projections for precipitation took account of the Fifth Assessment Report prepared by the Intergovernmental Panel on Climate Change (IPCC)[55], the national-level predictions and models generated by the Climatic Research Unit of the University of East Anglia (CRU)[56]. According to the IPCC, annual precipitation is projected to decrease in the northern regions of South America. Both the national-level projections and CRU models support the finding that average annual precipitation is expected to decrease although there is not a clear direction of the trend. However, based on findings of the Hydrological Study, projected heavy precipitation events changes in 1-day

[51] Government of Guyana, 2012. Government of Guyana, 2012. Second National Communication to the United Nations Framework Convention to Climate Change.

[52] Mott MacDonald. 2019. Climate Vulnerability Assessment Report, Linden to Mabura Hill Road Upgrade and River Crossing at Kurupukari, Section 6 Hydrological Assessment

[53] McSweeney,C; New, M; Lizcano, G, 2010. UNDP Climate Change Country Profiles Guyana.

[54] Ibid

[55] Intergovernmental Panel on Climate Change, 2014. AR5 Climate Change 2014: Impacts, Adaptation and Vulnerability, Chapter 27, Page 1799.

[56] Osborne et al, 2016. Climate Information for Guyana.

and 5-day maximum rainfall for the Kurupukari catchment area are estimated in the order of 28 and 16% by the end of the century. For the area between Linden to Mabura, projected changes in 1-day maximum precipitations are expected to be around 4% by mid-century and 14% by the end of the century.

As a consequence, the following climate change projections were considered relevant to the project's AoI:

- Increased average annual temperatures by mid-century and end-of-century.
- Increased frequency with which hot days occur by mid-century and end-century.
- Decreased average annual precipitation.
- Increased proportion of precipitation that falls in heavy events.

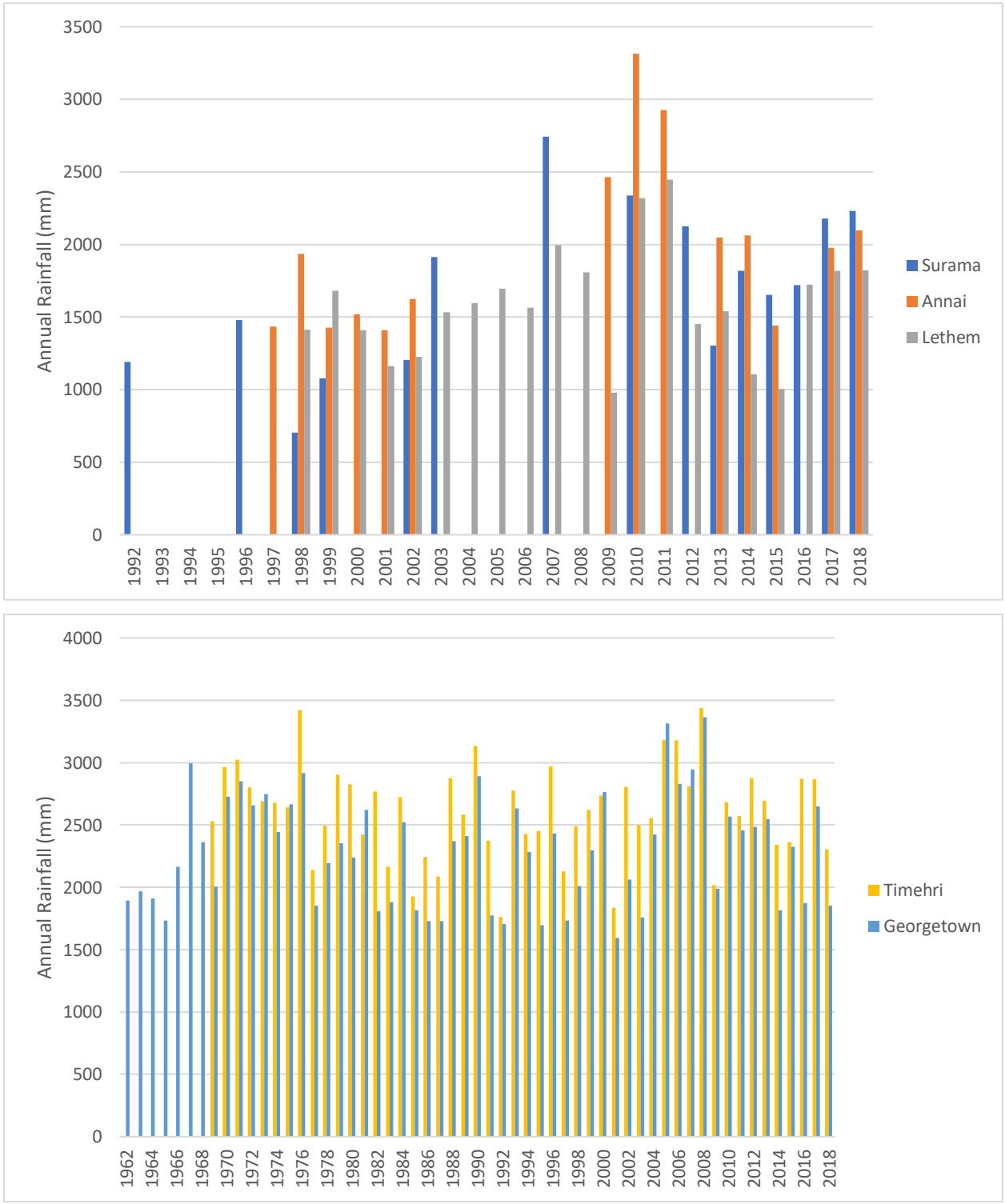


Figure 28: Observed trend in annual rainfall at recording stations (top graph: southern stations – bottom graph: northern stations)
Source: Analysis by Mott MacDonald

6.1.6 Air Quality

During the dry seasons there are significant emissions of dust generated when both light and heavy vehicles traverse the LMH road and the access road leading to the Kurupukari Crossing, particularly on the eastern bank of the Essequibo River.

Figure 29: Dust Emissions along the LMH road

6.2 Biological Environment

Guyana has a rich biological diversity and high endemism due to a unique combination of factors related to its location at the edge of the biologically rich Amazon basin, lying atop the geologically old and stable Guiana Shield, and adjacent to the marine and coastal environment of the Caribbean/Atlantic seaboard. Further, according to GFC, approximately 85% of Guyana's total land area is covered with forests[57] indicating that historically there has been a low incidence of conversion of natural habitats to other land uses.

In 2014, CI conducted a Biodiversity and Ecosystem Assessment of the Georgetown to Lethem road to identify the critical habitats and species located in a 52,659 km^2 area of influence in the environs of the existing road alignment. The assessment also highlighted potential impacts on biodiversity and ecosystem services that may arise as a result of upgrading the Georgetown to Lethem road. According to the assessment report, 14 habitat types and 211 species with key biodiversity features were identified in the area of influence. Further, four priority ecosystem services were identified. In addition, the assessment also identified 11 priority areas all of which are located south of the Essequibo River at the Kurupukari Crossing. One of these priority areas is the Iwokrama protected area which is located on the western bank of the Kurupukari Crossing[58]. All other priority areas are located south of the project sites.

Historically, the forested area surrounding the Linden and Mabura Hill road has been subject to anthropogenic activities which include charcoal production, clearance for subsistence agriculture, fuel wood production and logging with potential impacts on biodiversity. Further, primary production in 'blackwater' creeks, as found in the crossings along the LMH road, is lower with the result that fewer aquatic species concentrate in them[59].

[57] Guyana Forestry Commission, 2018. Monitoring, Reporting and Verification System Interim Measures Report Year 7.

[58] Conservation International, 2014. Biodiversity and Ecosystem Services Assessment Final Report.

[59] ERM, 1995. Environmental and Social Impact Assessment – Linden – Lethem Road, Guyana. Section 5.2 The Physical Environment

6.2.1 Flora

According to CI's assessment report, there are 14 distinct units of vegetation along the Georgetown to Lethem roadway as informed by the Vegetation Map of Guyana prepared by ter Steege in 2001.

The LMH road falls within the White Sands Plateau which is characterized primarily by white sand/'wallaba' forest with the presence of mixed lowland forest and pockets of swamp/ 'mora' forest[60]. Vegetation occurring within the area of influence of the LMH road may be further classified as Dakama Forest, Wallaba Forest, Mixed Forest and Marsh Forest. Similarly, vegetation classes of Marsh Forest and Mixed Forest are found in the eastern and western banks of the Essequibo River at the Kurupukari Crossing. Species of trees typically found in these vegetation units are presented in Table 28. The vegetation types around the project areas can be observed in Figure 30.

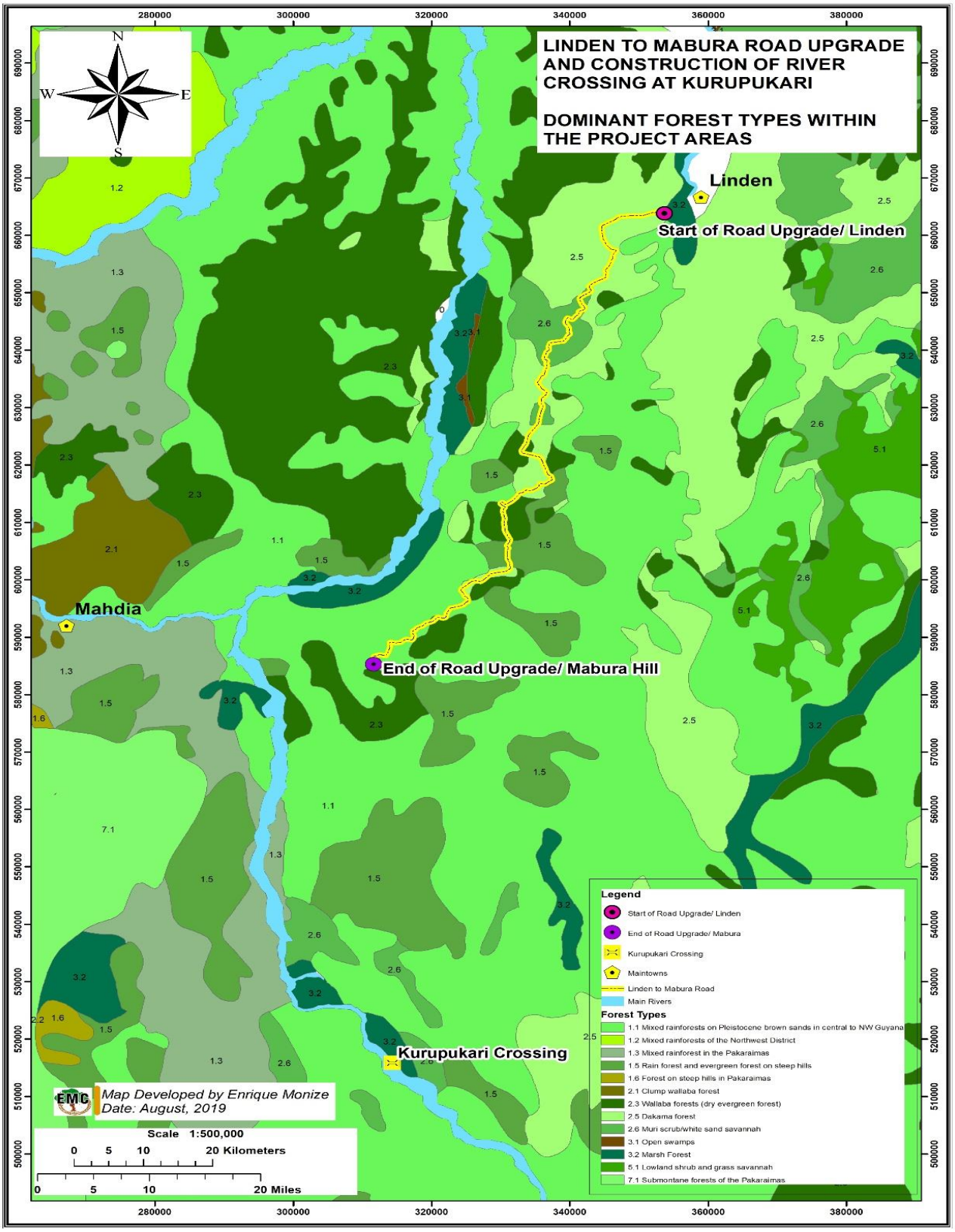
Table 22: Vegetation Types on the LMH Road[49]

Habitat Type	Description
Mixed Forest	Forests on the brown sands of the Berbice formation are almost invariably characterised by species of *Eschweilera* and *Licania*. Species, which may be locally dominant are *Eschweilera sagotiana, E. decolorans, E. confertiflora, Licania alba, L. majuscula, L. laxiflora, Chlorocardium rodiei, Mora gonggrijpii, Alexa imperatricis, Swartzia schomburgkii, S. leiocalycina, Catostemma commune, Eperua falcata, Pouteria guianensis, P. cladantha, Aspidosperma excelsum* and *Pentaclethra macroloba.* In central Guyana, common trees are *Eschweilera spp., Licania spp., Swartzia spp., Mora gonggrijpii* and *Chlorocardium rodiei*. On lateritic soils in central Guyana a local endemic, *Vouacapoua macropetala*, forms extensive stands with *Eschweilera sagotiana, Licania laxiflora, Sterculia rugosa, Poecilanthe hostmanii and Pentaclethra macroloba.*
White sand / Wallaba Forests	White sand forest, also referred to as 'wallaba forest', is considered 'climax' vegetation on the nutrient poor white sands where they exist in an essentially closed nutrient cycle; nutrients are gradually leached away until they are almost entirely held within the biomass. Common other species in the canopy layer are *Catostemma fragrans, C. altsonii, Licania buxifolia, Talisia squarrosa, Ormosia coutinhoi, Eschweilera corrugata, Aspidosperma excelsum, Terminalia amazonia, Chamaecrista adiantifolia, Chamaecrista apocouita, Swartzia spp.* and *Dicymbe altsonii*.
Dakama Forest	Forest dominated by *Dimorphandra conjugata* (Dakama forest) is common on the higher parts of waterdivides from central Guyana to western Suriname. This forest type is characterised by very high standing litter crop (up to 800 ton/ha, Cooper 1982) and is very fire prone. Other species, characteristic for Dakama forests, are *Eperua falcata, Talisia squarrosa, Emmotum fagifolium* and *Swartzia bannia. Humiria balsamifera* (Muri) co-dominates the degraded Dakama forest and Dakama-Muri scrub with *Dimorphandra*.
Marsh Forests / Mora Forests	Mora forest is found in seasonally-inundated alluvial silt, clay or loam along rivers and on riverine flats throughout the lowland region. *Mora excelsa* forms extensive stands along the rivers with canopy associates of Canopy associates of the Mora forest are *Carapa guianensis, Pterocarpus officinalis, Macrolobium bifolium, Eschweilera wachenheimii, E. sagotiana, Clathrotropis brachypetala, C. macrostachya, Eperua falcata, E. rubiginosa, Catostemma commune, C. fragrans, Pentaclethra macroloba, Vatairea guianensis, Symphonia globulifera, Terminalia dichotoma* and *Tabebuia insigni*. Several palms are found in the lower strata.

[60] Ibid

[49] ERM, 1995. Environmental and Social Impact Assessment – Linden – Lethem Road, Guyana. Section 5.3 The Ecological Environment and Conservation International, 2014. Biodiversity and Ecosystem Services Final Report. Section 3 Habitat Assessment, page 31.

Figure 30: Vegetation Types at the Project Areas



6.2.2 Fauna

The area between Linden and Mabura Hill has been subject to anthropogenic activities and which include charcoal production, clearance for subsistence agriculture, fuelwood production and logging.

Notwithstanding, this area, similar to Kurupukari in terms of having both forest and riparian vegetation types, offers several habitats which host a diversity of birds, mammals and reptiles. While some species are utilised by indigenous communities for food there is a lucrative wildlife trade and increase in sport hunting and fishing. The most common mammals that are hunted are the labba, peccaries, tapir, deer, agouti, and capybara[61]. Species diversity is expected to be the same in the forested areas surrounding the Linden to Mabura Hill road and the Mabura Hill to Kurupukari road[62].

The CI Biodiversity and Ecosystem Assessment mapped the occurrences of critical species along the in the area of influence for the Georgetown to Lethem Road Corridor. For this study, the area of influence which guided the geographic extent for data collection on species and ecosystems covered an area of approximately 52,659 km^2 [63]and which encompassed the AoI considered in this EIA.

As previously mentioned, a total of 211 species meeting the criteria for key biodiversity features were identified as potentially occurring within the area of influence identified for the Georgetown to Lethem road. In the assessment, species range was determined by accessing data from IUCN online database and the modelling of distribution based on point locality data and expert opinion. The species were assessed against the IUCN's Red List of Threatened Species to determine whether there are critically endangered or endangered species existing within the landscape of the project. The species were also assessed in relation to the species listed by CITES.

The species of fish, birds, amphibians, reptiles and mammals for which records are found in the project sites as well as their presence on the IUCN Red List and the CITES list are presented in Table 23.

Table 23: Species of Conservation Concern in Guyana[64]

Scientific Name	Common Name	IUCN Status	CITES Listing	Guyana Endemic
Fish				
Acanthocharax microlepis				Yes
Aequidens potaroensis	Guyana Aequidens			Yes
Ancistrus leucostictus	Mana Ancistrus			Yes
Ancistrus lithurgicus				Yes
Aphyocharax erythrurus	Flametail Tetra			Yes
Aphyodite grammica				
Astyanax guianensis	Guyana Tetra			Yes
Astyanax potaroensis				Yes
Auchenipterus brevio				Yes
Brachyglanis frenata				Yes
Brachyglanis melas				Yes
Bryconamericus hyphesson				Yes

[61] SCN-Lavalin International Inc, 2011. Environmental and Social Impact Assessment (ESIA) Final Report

[62] ERM, 1995. Environmental and Social Impact Assessment – Linden – Lethem Road, Guyana. Secton 5.2 The Physical Environment

[63] Conservation International, 2014. Biodiversity and Ecosystem Services Final Report. Section 2.2 Area of Influence, pg 3.

[64] Conservation International, 2014. Biodiversity and Ecosystem Services Final Report. Appendix IV: Species of Conservation Concern in Guyana.

Scientific Name	Common Name	IUCN Status	CITES Listing	Guyana Endemic
Bunocephalus chamaizelus				Yes
Characidium pteroides				Yes
Corydoras potaroensis				Yes
Crenicichla wallacii	Slender Pike Cichlid			Yes
Hemigrammus cylindricus				Yes
Hemigrammus iota				Yes
Hyphessobrycon eos	Dawn Tetra			Yes
Hyphessobrycon minimus	Mini Tetra			Yes
Hyphessobrycon minor	White Minor			Yes
Hypostomus hemiurus				Yes
Jupiaba essequibensis				Yes
Jupiaba mucronata				Yes
Jupiaba potaroensis				Yes
Leporinus megalepis	Large-scaled Leporinus			Yes
Lithoxus lithoides	Rock Suckermouth			Yes
Loricariichthys brunneus				Yes
Loricariichthys microdon				Yes
Myleus pacu	Brown Giant Pacu			Yes
Myoglanis potaroensis				Yes
Ochmacanthus flabelliferus				Yes
Parapristella aubynei				Yes
Peckoltia braueri				Yes
Phenacogaster megalostictus	Large-spot Glass Tetra			Yes
Poecilocharax bovalii				Yes
Pseudancistrus nigrescens				Yes
Rivulus waimacui	Waimacui Rivulus			Yes
Sturisoma monopelte				Yes
Vandellia beccarii				Yes
Birds				
Accipiter poliogaster	Gray-bellied Hawk	Near Threatened	II	
Accipiter striatus			II	
Accipiter superciliosus			II	
Agamia agami	Agami Heron	Vulnerable		
Amazilia bervirostris	White-chested emerald		II	
Amazilia fimbriata	Glittering-throated emerald		II	
Amazilia leucogaster	Plain-bellied emerald		II	
Amazilia versicolor			II	
Amazilia viridigaster			II	
Amazona amazonica			II	

Scientific Name	Common Name	IUCN Status	CITES Listing	Guyana Endemic
Amazona farinosa	Mealy Parrot		II	
Amazona festiva	Festive Parrot	Vulnerable	II	
Amazona ochrocephala			II	
Anthracothorax nigricollis	Black-throated mango		II	
Anthracothorax viridigula			II	
Ara ararauna			II	
Ara chloropterus			II	
Ara macao	Scarlet macaw		I	
Aratinga pertinax			II	
Aratinga solstitialis	Sun Parakeet	Endangered	II	
Asturina nitida			II	
Athene cunicularia	Burrowing owl		II	
Brotogeris chrysoptera			II	
Bubo virginianus			II	
Burhinus bistriatus			III	
Busarellus nigricollis			II	
Buteo albicaudatus			II	
Buteo albonotatus			II	
Buteo brachyurus			II	
Buteo magnirostris			II	
Buteogallus meridionalis			II	
Buteogallus urubitinga			II	
Cairina moschata			III	
Calliphlox amethystina			II	
Campylopterus largipennis	Gray-brested saberwing		II	
Caracara cheriway			II	
Carduelis cucullata	Red Siskin	Endangered	I	
Cathartes aura	Turkey vulture			
Cathartes burrovianus	Savanna vulture			
Cathartes melambrotus	Forest vulture			
Chlorostilbon mellisugus	Blue-tailed emerald		II	
Chondrohierax uncinatus			II	
Chrysolampis mosquitus			II	
Ciccaba huhula			II	
Circus buffoni			II	
Colibri delphinae	Brown-eared violet		II	
Bicoloured Conebill	Olive-sided Flycatcher	Near Threatened		
Coragyps atratus	Black vulture			
Crax alector	Black Curassow	Vulnerable		
Daptrius ater			II	

Scientific Name	Common Name	IUCN Status	CITES Listing	Guyana Endemic
Deconychura longicauda	Long-tailed Woodcreeper	Near Threatened		
Dendrocygna autumnalis			III	
Deroptyus accipitrinus			II	
Diopsittaca nobilis			II	
Discosura longicaudus	Raquet-tailed coquette		II	
Elanoides forficatus			II	
Elanus leucurus			II	
Eudocimus ruber	Curry curry		II	
Falco deiroleucus	Orange-breasted Falcon	Near Threatened	II	
Falco femoralis			II	
Falco rufigularis	Bat falcon		II	
Falco sparverius			II	
Florisuga mellivora	White-necked jacobin		II	
Forpus modestus			II	
Forpus passerinus			II	
Gampsonyx swainsonii			II	
Geranospiza caerulescens			II	
Glaucidium brasilianum	Ferruginous pygmy owl		II	
Glaucidium hardyi			II	
Glaucis hirsutus	Rufous-breasted hermit		II	
Harpagus bidentatus			II	
Harpagus diodon			II	
Harpia harpyja	Harpy Eagle	Near Threatened	I	
Heliomaster longirostris	Long-billed starthroat		II	
Heliothryx auritus	Black-eared fairy		II	
Herpetotheres cachinnans	Laughing falcon		II	
Hylocharis cyanus	White-chinned sapphire		II	
Hylocharis sapphirina	Rufous-throated sapphire		II	
Hypocnemis cantator	Guianan Warbling-antbird	Near Threatened		
Ibycter americanus			II	
Ictinia plumbea			II	
Jabiru mycteria	Jabiru stork		I	
Leptodon cayanensis			II	
Leucopternis albicollis			II	
Leucopternis melanops			II	
Lophornis ornatus	Tufted coquette		II	
Lophostrix cristata	Crested owl		II	
Micrastur gilvicollis	Lined forest falcon		II	
Micrastur mirandollei	Slaty-backed forest falcon		II	
Micrastur ruficollis	Barred forest falcon		II	
Micrastur semitorquatus	Collared forest falcon		II	

Scientific Name	Common Name	IUCN Status	CITES Listing	Guyana Endemic
Milvago chimachima			II	
Mitu tomentosum	Crestless Curassow	Near Threatened		
Monasa astra	Black nun bird			
Morphnus guianensis	Crested Eagle	Near Threatened	II	
Myrmornis torquata	Wing-banded Antbird	Near Threatened		
Myrmotherula gutturalis	Brown-bellied Antwren	Near Threatened		
Myrmotherula surinamensis	Guianan Streaked Antwren	Vulnerable		
Nannopsittaca panychlora			II	
Odontophorus gujanensis	Marbled Wood-quail	Near Threatened		
Orthopsittaca manilata			II	
Oryzoborus angolensis	Tower tower			
Otus choliba	Tropical screech owl		II	
Otus watsonii	Tawny-bellied screech owl		II	
Pandion haliaetus			II	
Patagioenas subvinacea	Ruddy Pigeon	Vulnerable		
Periporphyrus erythromelas	Red-and-black Grosbeak	Near Threatened		
Phaethornis augusti			II	
Phaethornis bourcieri	Straight-billed hermit		II	
Phaethornis ruber	Reddish hermit		II	
Phaethornis rupurumii			II	
Phaethornis superciliosus	Long-tailed hermit		II	
Picumnus spilogaster	White-bellied Piculet	Vulnerable		
Pionites melanocephalus			II	
Pionopsitta caica			II	
Pionus fuscus			II	
Pionus menstruus			II	
Pipile cumanensis	Blue-throated Piping-guan	Vulnerable		
Polystictus pectoralis	Bearded Tachuri	Near Threatened		
Polytmus guainumbi	White-tailed golden throat		II	
Polytmus theresiae	Green-tailed golden throat		II	
Pteroglossus aracari			II	
Pteroglossus viridis			II	
Pulsatrix perspicillata			II	
Pyrilia caica	Caica Parrot	Near Threatened		
Pyrrhura picta			II	
Ramphastos toco	Toco Toucan		II	
Ramphastos tucanus			II	
Ramphastos vitellinus			II	
Rostrhamus sociabilis			II	
Rupicola rupicola	Cock of the Rock		II	
Sarcoramphus papa	King vulture		III	

Scientific Name	Common Name	IUCN Status	CITES Listing	Guyana Endemic
Spizaetus ornatus	Ornate Hawk-eagle	Near Threatened	II	
Spizaetus tyrannus	Black hawk eagle		II	
Thalurania furcata	Fork-tailed wood nymph		II	
Tinamus major	Great Tinamou	Near Threatened		
Topaza pella	Crimson topaz		II	
Touit batavicus			II	
Touit purpuratus			II	
Zebrilus undulatus	Zigzag Heron	Near Threatened		
Amphibians				
Atelopus spumarius		Vulnerable		
Rhinatrema shiv	Shiv's Caecilian			Yes
Stefania evansi	Groete Creek Tree Frog			Yes
Reptiles				
Boa constrictor			II	
Crotalus durissus			III	
Melanosuchus niger	Black Caiman	Lower Risk/conservation dependent	I/II	
Podocnemis unifilis	Yellow-spotted River Turtle	Vulnerable	II	
Mammals				
Ateles paniscus	Black Spider Monkey	Vulnerable	II	
Cebus apella			II	
Cebus olivaceus			II	
Cerdocyon thous			II	
Cuniculus paca	Labba	Least Concern	III	
Dasyprocta punctata			III	
Diclidurus ingens	Greater ghost bat			
Eira barbara			III	
Eumops maurus	Guianan bonneted bat			
Leopardus pardalis	Ocelot	Least Concern	I	
Leopardus wiedii	Margay	Near Threatened	I	
Myrmecophaga tridactyla	Giant Anteater	Vulnerable	II	
Panthera onca	Jaguar	Near Threatened	I	
Pithecia pithecia	Golden faced saki	Least Concern	II	
Priodontes maximus	Giant Armadillo	Vulnerable	I	
Pteronura brasiliensis	Giant Otter	Endangered	I	
Saguinus midas			II	
Saimiri sciureus			II	
Speothos venaticus	Bush Dog	Near Threatened	I	
Tamandua tetradactyla	Tamandua	Least Concern		
Tapirus terrestris	Brazilian Tapir	Vulnerable	II	
Tayassu pecari	White-lipped Peccary	Vulnerable	II	
Vampyressa brocki	Brock's yellow-eared bat	Least Concern		

The CI Assessment further identified a sub-set of 33 species that exhibited species-specific threats (i.e. hunting, direct persecution, harvesting, roadkill or other collection), extremely restricted ranges and/or

significant stakeholder value (e.g. charismatic or nationally important species) that would require species-specific assessment of impacts and mitigation were identified as critical species. Based on Species Range Maps prepared by CI, the EIA consultants were able to determine the critical species found from Linden to the Kurupukari Crossing or in the Iwokrama protected area proximate to the Kurupukari Crossing. These critical species are presented in Table 24.

Table 24: Critical Species located from Linden to the Kurupukari Crossing and in the Iwokrama Protected Area[65]

Scientific Name	Common Name	Location Relative to the Project Sites
Birds		
Amazona dufresniana	Blue Cheeked Amazon	Kurupukari Crossing, Iwokrama
Crax alector	Black Curassow/ Powis	All project sites
Oryzoborus angolensis	Tower tower	Kurupukari Crossing, Iwokrama
Rupicola rupicola	Guianan Cock of the Rock	All project sites
Tinamus major	Great Tinamau	Kurupukari Crossing, Iwokrama
Fish		
Arapaima gigas	Arapaima	Downstream of Kurupukari Crossing
Mammals		
Cuniculus paca	Labba	All project sites
Leopardus pardalis	Ocelot	All project sites
Mazama americana	Red Brocket Deer	All project sites
Mazama nemorivaga	Brown Brocket Deer	All project sites
Odocoileus virginianus	White Tail/Savanna deer	All project sites
Panthera onca	Jaguar	All project sites
Pteronura brasiliensis	Giant Otter	All project sites
Puma concolor	Deer tiger/Puma	All project sites
Tamandua tetradactyla	Tamandua	All project sites
Tapirus terrestris	Brazilian Tapir	All project sites
Tayassu pecari	White-lipped Peccary	All project sites
Amphibians		
Dendrobates leucomelas	Yellow-headed Poison Frog	Mabura Hill to Kurupukari

6.2.2.1 Fauna at the Kurupukari Crossing

The protected area at Iwokrama represents wetlands and river systems of global importance and has been identified by the World Bank as an 'ecological hotspot' and by IUCN as being a 'major tropical wilderness area' requiring immediate attention. At least 200 mammals, 500 birds, 420 fishes and 150 species of amphibians and reptiles have been documented in this protected area. More than 30% of the mammals and many other animals are listed as endangered under CITES. The area is known to support relatively stable population of many endangered species such as the Harpy Eagle *(Harpia harpyja)*, Capybara *(Hydrochaeris hydrochaeris)*, Jaguar *(Panthera onca)* and Giant Anteater *(Myrmecophaga tridactyla)*. In addition, over 1500 plant species documented in the Iwokrama Rainforest.[66] The IIC is located on the western bank of the Essequibo River at the Kurupukari Crossing. As a result, faunal surveys and studies conducted for the IIC have produced findings which are applicable for the project site, specifically:

[65] Conservation International, 2014. Biodiversity and Ecosystem Services Final Report. Section 4.2.1 Species Distribution Maps. Page 48.

[66] SCN-Lavalin International Inc, 2011. Environmental and Social Impact Assessment (ESIA) Final Report

- Fish surveys in the Essequibo and Siparuni Rivers;
- Reptile and Amphibian surveys of the Kurupukari Base Camp and the Three Miles Camp; and
- Survey of Birds in the Iwokrama forest.

Fishes in the Essequibo and Siparuni Rivers[67]

Four hundred species of fishes were recorded in the rivers in and around the IIC during January to February and November to December 1997. In total, 84 sites were surveyed in the Essequibo River bordering the IIC's boundary and 41 sites were surveyed in the Siparuni River along the area that borders the IIC. Many of these fish were newly recorded from Guyana and several are considered endemic. The high level of species diversity recorded in these areas can be attributed to two factors. The first factor is the wide range of habitats represented (flooded forests and savannas, rivers, creeks, ponds and oxbow lakes) can support a diverse assemblage of fish. Secondly, the Essequibo River is situated between three major ichthyofaunal regions: the Orinoco, eastern Guiana Shield, and Amazon. Flooding during the annual high-water period enables an exchange in fish species between these three systems. Appendix A.3 contains a table showing the species which were recorded in the Essequibo and Siparuni Rivers and their IUCN and CITES status.

Reptiles and Amphibians[68]

A herpetofauna survey was conducted over the wet season of May to August 1997 in the IIC by the Academy of Natural Sciences of Philadelphia. Data was collected from eight camps two of which were located close to the Kurupukari Crossing, namely the Base Camp at Kurupukari and Three Miles Camp. The reptiles and amphibians which were recorded during this survey is represented in Appendix A.

Birds[69]

According to the Academy of Natural Sciences of Philadelphia, Guyana has more than 800 species of birds and more than half of these can be found in the IIC. When bird surveys have been completed it is expected that more than 600 species will be found in the IIC. Iwokrama has relatively high densities of larger frugivorous birds such as cracids, cotingas and parrots as compared to other forested areas in the Guiana Shield or Amazonia. As a result, of the bird survey conducted over the period 1996 – 1998, 23 species of potential ecotourism value were identified as shown in A.5.

6.3 Socio-Economic Environment

6.3.1 Land Use[70]

The land use pattern in the project areas is a function of a number of factors including climate, soil type, topography and culture. The main threats from the various land uses being practiced seem to arise from mining and forestry related activities along the LMH road as small-scale gold mining is practiced in some areas in proximity to the road. The land uses practiced along the road are summarized in Table 25 and Figure 31.

Table 25: Summary of Land Uses Along the Project Route

Distance in Kilometres	Descriptions of Land Uses
0 – 27	Peri-urban residential uses. Secondary forests with uses of charcoal/fuelwood production and clearance for subsistence agriculture.

[67] Watkins et al. (2004). The Fish Fauna of the Iwokrama Forest

[68] Academy of Natural Sciences of Philadelphia, 1998. Faunal Surveys of Iwokrama.

[69] Academy of Natural Sciences of Philadelphia, 1998. Faunal Surveys of Iwokrama.

70 Informed by SCN-Lavalin Internaonal Inc, 2011. Environmental and Social Impact Assessment (ESIA) Final Report

27 – 121	Secondary forest area underlain by silica sand. Small scattered settlements are located along the alignment with subsistence agriculture.
229 (Kurupukari Crossing)	Small residential and business area on the eastern bank of the Essequibo. IIC and Fairview Village is located on the western bank.

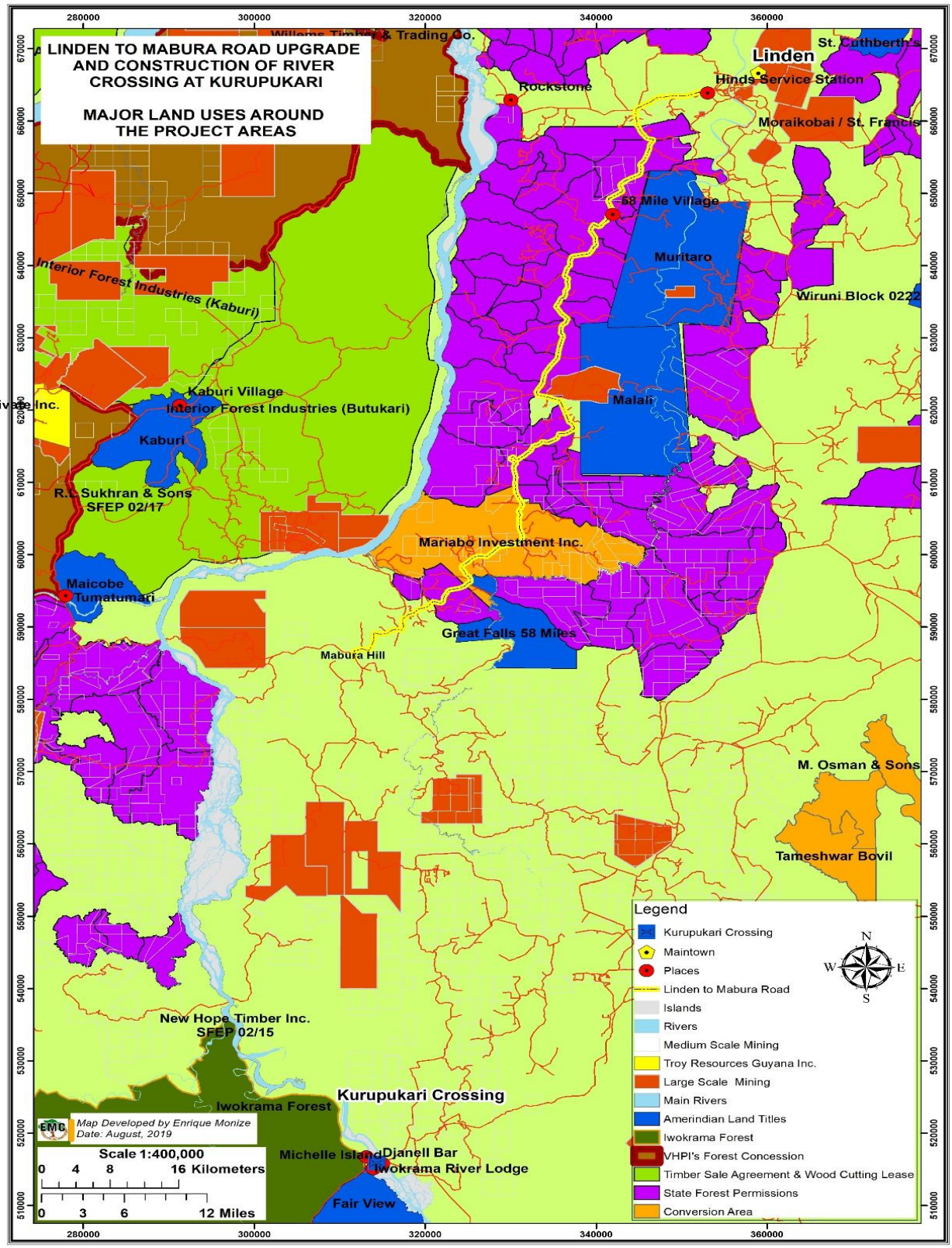


Figure 31: Land Uses around the Project Areas

6.3.2 Communities and Services[71]

The present road alignment interacts directly with four settlements, namely the Linden Township which is located at the start of the road upgrade and the Mabura Hill community which is located at the end of the road upgrade and Mile #47 Village and Mile #58 Village in between.

Linden is approximately 88 square kilometres (km^2) and is one of Guyana's 10 townships. It is located approximately 103 km from Georgetown. Linden gained township status in 1970 and is known as the "mining town" because of large-scale bauxite mining which has been occurring there for more than a century (Guyana Chronicle, 2016a). It has a population of approximately 50,000 persons. Most residents of Linden have access to running water, landline and cell phone signals and internet connectivity. Electricity is provided free of cost. Hospitals and secondary schools are located in Linden and are also accessible to residents from outlying communities in Region 10.

The village at Mabura Hill is a smaller community that developed around DTL, a large, foreign-owned forest concession. In 2016 DTL announced that it was phasing out its operations in Guyana (Guyana Chronicle, 2016b) and this may have impacts on the Mabura Hill community. Residents at Mabura Hill have access to running water, cell phone signal and electricity.[72]

The area between Linden and Mabura Hill is sparsely populated with the small settlements of Mile #47 Village and Mile #58 Village located along the periphery of the existing alignment of the road. The village has a population of 250 persons and approximately 60 percent of the total population are women. A significant number of residents earn livelihoods from the logging and mining sectors. Residents do not have access to electricity and can only access freshwater from nearby creeks and streams. There is no phone or internet service in the village. The village has a Community Health Post which is operated by a community health officer who is equipped to conduct basic medical testing (diabetes, blood pressure, etc.) and residents must travel to Linden to visit a doctor or access additional treatments. A significant quantity of the food prepared and consumed in the village comes from Linden as the soils in the village are not suitable for agriculture. However, some families practice subsistence farming.

The lands of Mile #47 Village are flat and most residences are located lower than the level of the existing road. Some residential and commercial structures were constructed in the Government reserve area (approximately 200m from the centre line of the road alignment). As a consequence, residents reported that the village frequently floods during the wet seasons. In addition, it was reported that the culvert in the village (that is, the crossing at Ch 87+080) overflows during periods of heavy rainfall and thereby results in flooding. Villagers also reported that in recent years the road was frequently in poor condition and vehicles frequently became stuck in the mud resulting in adverse impacts on their livelihoods. During the dry seasons, residents reported that significant amounts of dust generated when vehicles traverse the roadways.

Mile #58 Village falls within the titled Amerindian village of Great Falls. As a titled village, Great Falls has a Community Development Plan which outlines the development priorities of its residents. Mile #58 Village is located on the periphery of the current road alignment and some residential and commercial structures were constructed in the Government reserve area. The Great Falls Village is located further inland and is accessed by boat from Mile #58 Village. Mile #58 Village has a population of approximately 160 persons and has been in existence for more than 20 years. Some residents have access to electricity from generators. A Digicel service tower is erected in the village providing cell phone signal to residents. In 2019, Mile #58 village received potable water from GWI.

The village is a frequent stop along the trail and includes a Guyoil gas station and a popular restaurant. Like Mile #47 Village, the soils are not suitable for agriculture. Consequently, a significant quantity of the food

[71] Adapted from Mott MacDonald. 2019. Climate Vulnerability Assessment Report, Linden to Mabura Hill Road Upgrade and River Crossing at Kurupukari, Section 3 Description of the Project Sites

[72] The stakeholder engagement meeting for the Mabura Hill Community has not yet been conducted.

prepared and consumed in the village is transported to the community using the LMH Road. Subsistence farming is practiced by some resident. Mile #58 village is located on a hill and therefore is drained easily by gravity even during periods of heavy rainfall. Residents did not report any instances of flooding. During the dry seasons, residents reported that significant amounts of dust generated when vehicles traverse the roadways.

The communities in the wider project areas can be observed in Figure 32.

Figure 32: Communities in the Wider Project Area

6.3.3 Amerindian Villages[73]

Fair View Amerindian Village is the only indigenous community in close proximity to the project areas and is also situated on the western bank of the Kurupukari Crossing. It is located adjacent to the Kurupukari to Lethem Road. Fair View obtained title for its Village Lands in 2006 and its titled lands consist of approximately 21,950 hectares (ha). It is the only Amerindian territory located within the Iwokrama Protected Area Site and as such, the Village has special rights-holder relations with the Centre. Its population comprises multiple indigenous peoples including Makushi, Wapichan and Patamona as well as mixed persons. The population is approximately 232 persons with 126 males and 106 females living in approximately 41 households. Although the Fair View Village has an airstrip, the predominant mode of transportation for accessing Fair View Village from Georgetown is the Linden to Kurupukari road and the pontoon crossing at Kurupukari.

[73] Adapted from Mott MacDonald. 2019. Climate Vulnerability Assessment Report, Linden to Mabura Hill Road Upgrade and River Crossing at Kurupukari, Section 3 Description of the Project Sites

6.3.4 Archaeological Resources

The Kurupukari area is extremely important for the preservation of Guyana's cultural heritage and the following sites are considered to be of national importance:

- Kurupukari Falls: extensive deposits of *terra preta* (man-altered soils of great archaeological significance)
- Kurupukari Falls: concentration of petroglyphs dating back more than 6,000 years.[74] (Figure 33)

Other sites of archaeological importance can be found in the wider project area as displayed in Figure **34**.

Figure 33: Petroglyph in the Kurupukari Falls
Source: Iwokrama

[74] ERM, 1995. Environmental and Social Impact Assessment – Linden – Lethem Road, Guyana. pg Secton 5.2 The Physical Environment

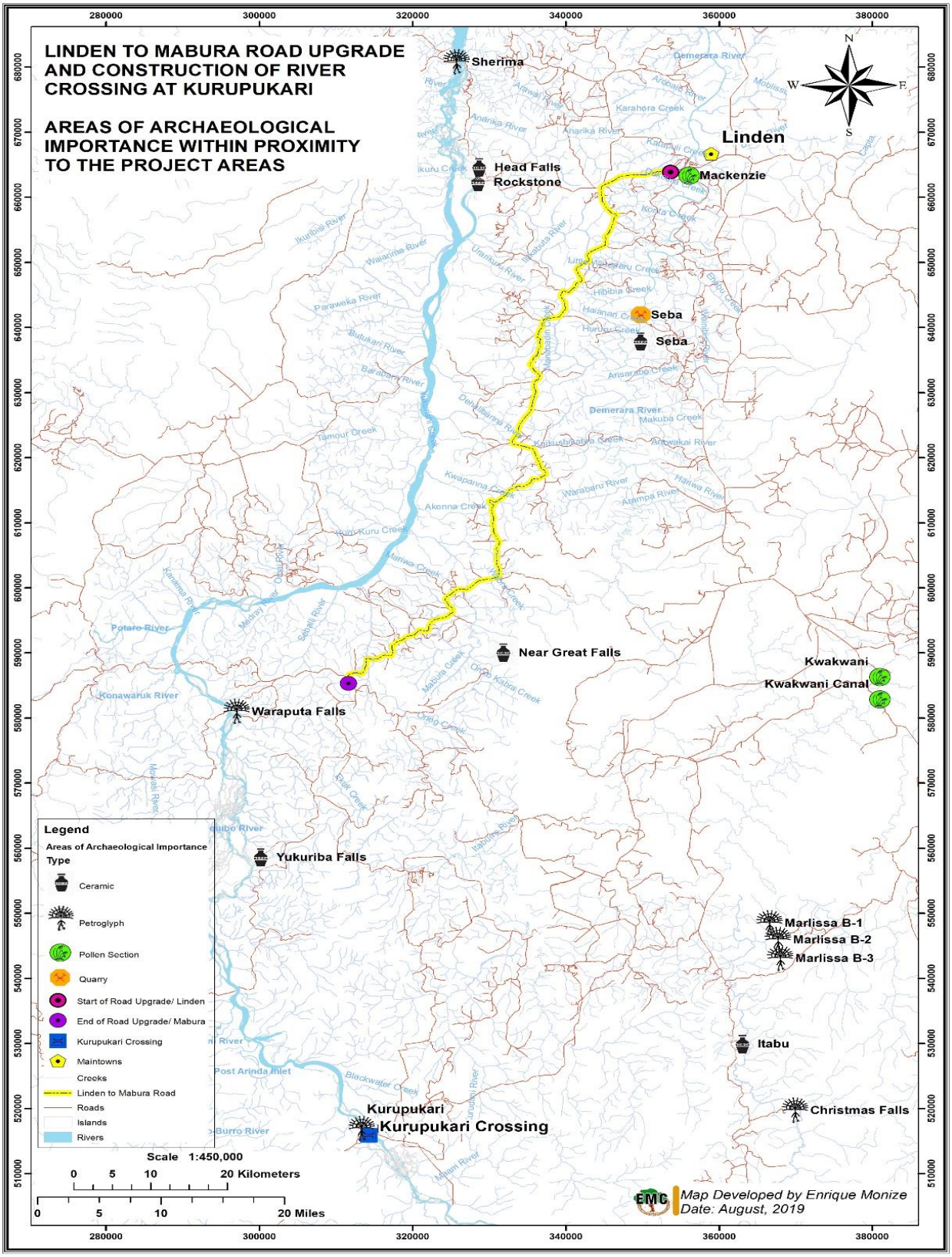


Figure 34: Archaeological Sites found in the Wider Project Area

6.3.5 Traffic[75]

Chapter 3 of the LMH Feasibility Study Report provides a review of the traffic surveys and forecasts available in the 2012 Feasibility Study and presents the results of the traffic surveys carried out in April 2019 as part of the study. Traffic forecasts are discussed and take account of the 2012 results along with historic trends, normal traffic, generated traffic from the upgraded road and diversion of cargo traffic from the port of Manaus in Brazil to a proposed deepwater port near Georgetown in Guyana. Traffic volumes are presented with and without diverted traffic in 2024 and 2029 for the following four sections of the road:

- Linden to Rockstone
- Rockstone to Mile #58 Village
- Mile #58 Village to Mabura Hill
- Kurupukari

Without diverted traffic the average annual daily traffic (AADT) increases by approximately 250% from 2020 to 2039 as follows:

- LMH Road – From between 200-320 vehicles in 2020 to between 500-790 vehicles in 2039 (depending on section of road);
- Kurupukari – From 90 vehicles in 2020 to 222 vehicles in 2039. With diverted traffic the AADT is much higher in 2039;
- LMH Road – Between 1,560 and 1,850 vehicles in 2039 (depending on section of road); and
- Kurupukari – 1,281 vehicles in 2039.

However, the Feasibility Study Report does indicate that short-term traffic counts carried out only in 2010 and 2019 are not a reliable indicator of long-term trends.[76]

[75] Extracted from Mott MacDonald, November 2019, Feasibility Study Report, Linden to Mabura Hill Road Upgrade and River Crossing at Kurupukari, pg 4-15– Executive Summary

[76] Extracted from Mott MacDonald, November 2019, Feasibility Study Report, Linden to Mabura Hill Road Upgrade and River Crossing at Kurupukari, pg 40– Section 3.3 Updated Traffic Forecasts

7 Socio-Economic Impact Assessment

7.1 Methodology

7.1.1 Literature Reviews & Referencing

The detailed TOR for the consultancy states:

1.1 (a) Review of secondary data from reports, studies, gender assessments, poverty assessments, census reports, labour force surveys, and relevant policy documents such as legislation, regulations, standards and policies in the areas of gender and social development including: vulnerable groups of women, youth, PWDs; indigenous peoples; and human trafficking victims.

Desk reviews of previous reports, studies and plans was done on a continuum to inform the Feasibility Study and Social Impact Analysis. As far as possible current reports and policies will be sourced and used. These will include:

- Bureau of Statistics / Census 2012 Compendium
- Low Carbon Development Strategy - LCDS (2009 & revisions)
- Green State Development Strategy - GSDS (2016)
- National Poverty Reduction Strategy (revised 2011)
- Ministry of Health Vision 2020
- Linden-Lethem (LL) Road Feasibility Study & ESIA (2012)
- Indigenous Peoples Plan (IPP) for the Feasibility Study of the LL Road (2012)
- UNICEF Situational Analysis of Amerindian Children and Women (2018)
- National Gender Equality and Social Inclusion Policy (2019)
- WGEC Report to Parliament (2018)
- CEDAW Country Report, NGO Shadow Report & Concluding Considerations (2019)
- Paris Climate Agreement (2015)
- IADB Survey on Amerindian Well-Being (2014)
- UN Women Caribbean & Guyana Surveys
- Bejing+25 Guyana Country Report
- National Commission on Disability (NCD) Reports
- PAHO/WHO Health Reports & Guyana Health Vision 2020
- Ministry of Education Strategy to 2020
- Trafficking in Persons 2019 US State Department Monitoring Report
- WHO/PAHO Road Safety Reports and Guyana Police Force Reports

1.1 (b) Collection of primary data through participatory consultations

The collection of data through participatory consultations was specified by the TOR for all categories of stakeholders in order to introduce the project, facilitate feedback, and gauge perception of the project in order to gain/strengthen buy-in. Interviews, focus groups and other appropriate, differential participatory methodologies may be employed for state and nonstate stakeholders. Facilitation of participation through the provision of transportation and child care as well as appropriate timing should be ensured.

7.1.2 Methods of Stakeholder Engagement Utilised

7.1.2.1 Overview of Approach to Participatory Social and Gender-inclusive Consultations

Robust Stakeholder Participation: The Stakeholder Engagements are conducted in a highly participatory - free-flow conversation style allowing stakeholders to engage the team of consultants and ministry representatives; as well as with each other in discussion. Light facilitation was provided to encourage maximum stakeholder voicing of opinion, concerns, issues and recommendations. The atmosphere was free, open, frank and transparent with a high degree of interest, thoughtfulness, experience and expertise demonstrated by stakeholders throughout this first round of phase one consultations.

MOPI, EPA and Consultant's Participation: A joint team of MOPI, EPA and SRKN Consultants were present at each and every stakeholder engagement session[77]. Responses were provided on the spot by the team to stakeholders. No attempt at defensiveness by the Consulting Team or Ministry of Public Infrastructure or EPA officials was experienced. The exchanges were honest, civil, informative and well-received by both the team and the stakeholders.

Gender-balanced Representation: There was a good degree of gender parity in terms of representation at each session with an encouraging level of women's leadership involved during most of the discussions as well as a reasonable balance of youth and elder participation.

Verbatim Notes and Feedback Reports: The sessions were recorded and transcribed by independent Rapporteurs assigned by the social/gender consultant to each session so that verbatim notes were acquired. Attendance Registers were taken at each session. Feedback Reports were produced by the Social and Gender specialist from each session with photographs in most cases. A "roll-up" participation analysis with simple quantitative, sex-disaggregated participation and occupations was included in each Feedback Report.

Matrix of Stakeholder Inputs: Out of these Stakeholder Consultation reports was generated a Matrix / Check-List of stakeholder issues and recommendations with responses from consultants and ministry representatives and a status column. This Matrix was provided to Mott MacDonald, SRKN and the MOPI with the intention of having Stakeholder inputs taken up and reflected in the road and bridge designs.

7.1.2.2 Standardised Process for Community Consultations

The following elements comprised the standard process for the community consultations.

- **Community Contact Persons:** The consultant established contact with a key leader in each of the communities as well as with the local government authorities (RDC, NDC Town Council) as well as with the agencies identified as the Multi-Stakeholder/ Inter-Agency Group. These Contact persons were also used as Key Informants for pre and post community-based consultations. SRKN also assisted with the contact process.
- **Typology of Stakeholders:** The consultant asked the contact persons/community mobilisers to ensure the following type of participants were invited to the meeting, as far as possible:
  - Community leaders (elected and non-elected), a general balance of men and women, youth and elders, teachers, health workers, women and youth group representatives, other social organisations, pastors, social/welfare workers, community-based representatives of GFC, GGMC, GRA and other government agencies, police, and PWD.
- **Date, Time and Venue:** The date, time and venue of the consultations were decided by the stakeholder group itself.

[77] Exception being the Mabura Hill community consultation held on August 17, 2019. The road was in a poor state and the Team of SRKN and Social consultant and her rapporteur took 14 hours going and coming - with 11 of those hours spent on the trail from Linden to Mabura. It was a pity MOPI and EPA representatives did not make it for a first-hand experience of the road condition.

- **Flyers:** Simple flyers were produced announcing the meeting, its purpose and agenda and encouraging participation by community members. These were packaged and delivered to the community contact persons to assist with communications and mobilisation for the meetings.
- **Snacks:** Locally prepared snacks for participants were catered and shared after the community stakeholder consultations.
- **Agenda:** A standard agenda was used for each engagement, which included a welcome by a community host or official, reciting of the national pledge (and sometimes a prayer); followed by brief introductions of stakeholders and team. A PowerPoint Presentation was then delivered by the SRKN Director/Team Leader that provided an overview of the project, its various components and activities and a rolling status briefing on completion of tasks and findings. Slides were included from the respective SRKN specialists on Environment/Climate and Social/Gender. The floor was then open to the stakeholders for questions, clarifications, comments and recommendations. The engagements lasted approximately two and a half hours with three-quarters of the time dedicated to the stakeholders and their views.

7.1.2.3 Types and methods of stakeholder engagement

A variety of types/methods of stakeholder engagement was employed accordingly. These included: Key Informants, Stakeholder Engagements and Community Conversations, Focus Groups, Cluster Groups, Round Tables and Multi-Stakeholder/Inter-Agency sessions. The stakeholder engagements are being carried out in three phases as described below.

Three Face to Face Phases

Emphasis was placed on face to face stakeholder engagement sessions over the duration of the project cycle which is to be carried out in three phases. These are:

Phase One: Preliminary/Introductory Consultations (April - July 2019)

This Phase entailed a first round of stakeholder engagements with focus on the following:

- **Introduction of the Project and its Scope of Work:** This was communicated in plain English to maximise comprehension and user-friendly information, encourage conversation, questioning, raising of concerns and issues related to the road and facilitating direct stakeholder input, recommendations, ideas and visioning of a road that will meet their expectations and aspirations. That directly informed the ESIA. This was especially important at the community level - with those stakeholders directly within the zone of influence of the roadway.
- **Information-gathering and verification:** This was an important ingredient in Phase One. As far as possible - all identified stakeholders were contacted / engaged in this first introductory and information-gathering round. Information gathering, updating and verifying informed content for both the ESIA. Some of this will also be continued into phase 2.
- **National Inter-Agency / Multi-Stakeholder Forum:** A simple but important multi-stakeholder forum comprising central government ministries and agencies, relevant private sector entities, environmental agencies and civil society organisations was convened in a central location in Georgetown (GFC Multiplex building in Kingston). This served as a project launch to introduce the scope and the limitations of the project, emphasising the design aspect that comprises said project. Management of stakeholder expectations was therefore integrated into the process from its inception.
- **Separate meetings with RDC of Region 10 and the Linden Mayor and Town Council:** These were held and in phase two sessions will be organised with any relevant Region 10 NDCs and NGOs.
- **A Kurupukari Community Cluster meeting:** A community cluster meeting was held comprising Iwokrama staff, Fair View villagers, MMC, local small business owners around Kurupukari, Iwokrama Timber managers/operators and key representatives. The "kick-off" cluster meeting was held at Iwokrama River Lodge.

- **Community Consultations were held with four communities:** Mile #47 Community, Great Falls / Mile #58 Village, Fair View Village and Mabura Hill community.

Phase Two: Feedback and Review Consultations (Decmeber 2019)

The prelimnary designs for the road upgrade and Kurupukari crossing were presented at an inter-agency meeting in Georgetown on 4 November 2019 attended by representatives from the majority of the stakeholders on the scheme, with the exception of Mabura Hill, Mile #47 and #58 villages. The design at this stage had taken on board previous stakeholeder feedback and was positively received.

Phase Three: Finalisation of Designs and Final Stakeholder Round (TBC)

During this Phase, the main activities will focus on presentation of the final designs for the road and bridge and the final ESIA. It is recommended that this stage still goes ahead if it can be conducted safely in light of the ongoing Covid-19 pandemic and includes a stakeholder validation workshop as discussed below:

Stakeholders' Validation Workshop

Section 3 (p) of the detailed TOR and Scope of Work mandates the following:

"Convene a stakeholders' validation workshop which is to include community groups, representatives of vulnerable population groups (indigenous peoples, women, elderly, youth, and PWDs) as well as the WSG of MPI and government agencies, to discuss the findings of the consultancy and to seek consensus and clarification on issues from participants for incorporation in the Draft Final and Final Reports.

- *As part of the stakeholders' validation workshop conduct a gender sensitisation training to report on the findings of the gender analysis."*

Suggested Approach to Validation Workshop

It is proposed that a stakeholder validation session be conducted with each identified stakeholder group as part of the presentation of the final designs for the road and bridge. Where possible and geographically feasible, stakeholder groups will be clustered into one combined consultation session.

7.1.3 Gender and Social Inclusion Approach

A gender lens has been applied to the ESIA and an attempt made at gender-mainstreaming the report and a gender perspective has guided its compilation. Wherever feasible, sex disaggregated information is provided.

Similarly, inclusion of the voice and agency of vulnerable groups, with particular reference to Indigenous Peoples, women and PWD has been attempted.

7.2 Stakeholders Perspectives of Road Safety

In all the consultations held, stakeholders expressed deep concern about the speed and recklessness on the roads. Particular concern was articulated about the overloaded logging trucks in particular as well as trucks carrying goods and fuel. There were both positive expressions about having a paved road as well as fears of increased accidents due to even more speeding on a smoother road surface. Lawlessness and recklessness were considered norms and not much confidence was expressed in terms of enforcement capabilities. It was, however, felt that with better illumination of the road with lights in the vicinity of villages/communities as well as luminous signage along the entire road, there would likely be less accidents. Widening of the road to create laybys and off-road parking areas for trucks in particular found broad consensus. Multi-agency "depots"/ compounds strategically situated along the roadway, inclusive of toll stations, tow-truck facilities, police, GRA and Social Protection personnel was a recommendation that emerged from all of the consultations. There was also a call for standardisation of vehicles outfitted with safety measures, better and more appropriate tyres etc. It was felt that incentives given to drivers and companies for buying newer and safer vehicles would go a long way in enabling safer road use and less accidents and fatalities. This would include multiple axles for

heavy-duty trucks, load-beds and containers and strict enforcement of legal weight limits. Suspension of licenses for road offenders, and stricter enforcement all round of road regulations were key stakeholder recommendations.

7.3 Right of Way

It has been ascertained by the MOPI Project Lead, Ms Dionne Amsterdam, that the standard Government Road Reserve / Right of Way is 200 ft on either side from the middle of the road. This query comes up at every stakeholder meeting; the MOPI is represented at all of these engagements - and this is the standard response provided to stakeholders.

7.3.1 Right of Way / Road Reserve and Resettlement

In terms of re-settlement: The MOPI states that, as far as possible, there will be no removal or resettlement of property, structures, communities or people. If there is a structure that is on the Government Road Reserve / ROW, that needs to be removed, then it is the policy of the Ministry to reconstruct said structure to the same value, size and materials - or, usually to enhance the structure by building it with better quality materials. This is done entirely at the expense of the Ministry. The Ministry will identify any such structures and contact the owners to let them know - and then the process will kick in. So far, this assurance from the Ministry has found no objection from stakeholders.

7.3.2 Right of Way and Titled Amerindian Lands

7.3.2.1 Options / Solutions Proposed

There was consensus for two options proposed for resolving this potential situation, which were put forward by community focus groups which are:

- Equivalent land extension should be granted by GOG for any portions of titled lands that may be designated for public road reserve and right of way required for the upgraded Linden to Lethem Road / Linden to Mabura Hill Roadway.
- Alternatively, it is also proposed to have a legal, formal co-management for the “right of way” / road reserve area to be negotiated between those villages where portions of titled lands may will be directly affected by the right of way / road reserve and the Government. This will allow for decisions and monitoring of right of way and the relevant rules and regulations, and penalties, etc. to be co-managed and monitored by the respective Village Councils / CDCs and GOG authorities.

7.3.2.2 Survey of Roadside Properties and Compensation for Removals Negotiated

- A survey of roadside properties is recommended which is to be announced on the community radio station so as to give people adequate notice.
- Required distance from right of way for any private property to be constructed to be announced at this time.
- Persons would be advised based on survey if their property needs to be removed or relocated.
- Cost assessment will need to be made and level of compensation agreed with time limits for payment of compensation and removal of property from right of way.
- Also, a public announcement or advisory by Village Councils could be made warning residents not to construct any new buildings on the designated reserve/right of way etc.
- The Community Radio Stations as well as Announcements at the Village General Meetings might be useful along with other trusted communication method. Large, visible, laminated Poster Notices could be posted up in strategic, highly visible, accessible, in the communities.

Updated excerpts above are from the IPP (2012)

7.4 Project Alternatives

7.4.1 Linden to Mabura Hill

No major realignment of the Linden to Mabura Hill roadway is proposed: So far, stakeholders seem satisfied that the current road alignments will remain approximately the same. No significant alternatives have been proposed. Stakeholders are generally satisfied that a main feature of the road design will be a "paved" road.

7.4.2 Railway Option

Future Railway: The idea of a railway has been discussed since the National Development Strategy 2000-2010. This option is not part of the TOR for the current Feasibility Study. However, it is a worthwhile option for future consideration for long-term future development. (Maybe as one of the investments that can be made from oil revenues).

7.4.3 The Kurupukari Bridge

We want a Beautiful Bridge: Stakeholder comment Iwokrama-Fair View-MMC cluster meeting

The stakeholder proposals for the bridge is that it be innovative and be a thing of beauty - suited to the aesthetics and expectations of the eco-tourism thrust of stakeholders situated in the area of influence.

All the small business people, tour guides, rangers, managers and Toshao and village councillors and other Iwokrama, Fair View and MMC participants in the discussions so far anticipate a bridge that would match the scenic beauty of the Rain Forest and River. It is expected that said bridge would contribute to the nature-tourism priorities of the area - and so be factored in as a tourism product.

There may be opportunities to consider colours of the railings, height, shape and contours that can be aesthetically pleasing as well as practical.

What is **not** wanted or envisioned is an ugly, drab, slab of concrete thrown over the beautiful and unique Essequibo River at Kurupukari - without any style or substance in keeping with the tourism livelihoods and visioning of the stakeholders expressed.

Kurupukari is one of Guyana's most historic Indigenous locations - believed to be an ancient and important trading point for the ancestors of the Makushi with carbon dating of artefacts of 7000 years ago. It is therefore important to bear this in mind and ensure that a structure in keeping with the old cultural history and modern tourism and trade dimensions are taken into keen consideration by the bridge designers,

Ideas were put forward by Kurupukari residents for a suspension bridge; and / or for a bridge that can match and surpass the Lethem-Bon Fin bridge, with its strong feature of walkways for pedestrians and height etc. And above all, for it to have pride of place as an appropriate and aesthetically pleasing landmark.

7.4.4 Location of the Bridge

Of key concern is that the location of the bridge not in any way interfere with the Kurupukari Falls / Rapids and the petroglyphs there. These petroglyphs denote an ancient heritage site of the Makushi ancestors with great historical, sacred and spiritual value, as is the Iwokrama Mountains and Forest. Stories and legends abound and have been documented over the years by researchers. The bi-lingual booklet "Iwokrama Stories" produced by woman-led Makushi Research Unit (MRU) recounts three oral histories as to how Iwokrama got its name, including the most famous with the two brothers, the giant beast, the war and from which derives the "Place of Refuge" moniker. Kurupukari is considered by archaeologists and anthropologists as one of the most ancient trading sites with carbon dating of pottery and petroglyphs dated to some 7,000 years ago. A theory is put forward by Dr Denis Williams that the inscriptions of the Kurupukari petroglyphs refer to trading routes and expeditions with counts of catch and profusion of fish and aquatic stock. Kurupukari, the original name of Fair View, and part of the Iwokrama Protected Area is a key tourism destination operated by the community of Fair View using small village boats and the local knowledge and pride associated with this site that provides income for Fair View residents.

It is also a fact that researchers, anthropologists and archaeologists frequently request permission to study the falls and its petroglyphs. The Kurupukari Falls and Petroglyphs are a designated, official Heritage Site and is within the titled village lands of Fair View Village that are within the Protected Area of the Iwokrama Forest. These types of expeditions and research programmes also bring jobs and revenues to the Fair View community.

In several of the stakeholder engagement sessions - from Linden to Fair View - the Kurupukari rapids and petroglyphs were referred to and concern expressed about non-interference with the site in terms of impacts of the siting of the proposed Bridge over the Kurupukari Crossing. Feedback from Mott MacDonald / SRKN engineers expressly indicate that the siting of the bridge will in no way affect or impact upon the rapids and the petroglyphs. Stakeholders are also requesting a degree of appropriate aesthetics to be incorporated into the bridge designs in order to harmonise with the landscape of the area.

(Photographs from Iwokrama stock)

7.5 Stakeholder Locations in the Zone of Influence

7.5.1 Identified Stakeholder Locations

Identified are the following entities situated within the Linden to Mabura Hill Roadway/Project Zone.

1. **Linden Town and the Ward of Wismar**, where the road project commences;
2. **#47 Community**;
3. **#58 / Great Falls Village**, which is a titled Amerindian Village;

4. **Mabura*:*** Mabura Hill Community - a logging community related to the DTL Logging Concession and sawmill - situated at Mabura Hill. The police personnel at Mabura Hill Police Station are important stakeholders;
5. **Mekdeci Mining Company (MMC):** a part of the bigger Mekdeci Group of Companies - operates the Kurupukari Pontoon Crossing and Toll Gate/Barrier at the Kurupukari Crossing on the right bank of the Essequibo. MMC is also awarded periodic road repair and road maintenance contracts by both the National and Regional authorities;
6. **Cluster of small-scale businesses proximate to the Kurupukari crossing:** These include roadside vending, food preparation, accommodation/hospitality services, and other small businesses on the northern end of the Kurukupari crossing.
7. **Iwokrama International Centre for Rain Forest Conservation and Development**
    a. Iwokrama River Lodge, Training and Research Centre;
    b. Iwokrama Sustainable Timber Operation - McVantage Mill Site
    c. Iwokrama Ranger Station (RS1) / Police outpost at Kurupukari;
8. **Fair View Village:** (An Amerindian Village located within the Iwokrama Protected Area)

7.5.2 Population of Communities within Linden to Mabura Hill Road

1. **Wismar:** a ward of Linden town, governed by a Regional Democratic Council (RDC, Region 10) and a Mayor and Town Council. A total estimated population of 50,000 for Linden was provided for by Town Councillors in July 2019[78];
2. **#47 Village:** A community of mixed ethnicity governed by a Community Development Council with a current, verified population[79] of 210 persons - 95 females and 115 males;
3. **Great Falls / #58 Village:** A titled Amerindian Village governed by a Village Council with a verified population of 267 persons comprising 123 females and 144 males[80];
4. **Mabura Hill:** A logging community of mixed ethnicity governed by a Community Development Council with an unverified estimated population of 1,000[81];
    a. **Police Outpost at Mabura Hill[82]:** There is a Police Outpost at Mabura Hill with a few ranks which serves as a checkpoint for all vehicles and passengers and goods being transported on the Linden to Mabura Hill roadway.
5. **Fair View Village:** A titled Amerindian Village of varied Indigenous settl**ers** governed by a Village Council with a population of 348 persons[83];

Additionally, there are important organisational entities and settler communities in the vicinity of the Kurupukari Crossing, Upper Essequibo River which include:

6. **Iwokrama International Centre for Rain Forest Conservation and Development:**
    a. **Iwokrama River Lodge and Research Centre:** The Iwokrama International Centre for Rain Forest Conservation and Development (IIC) which is a Protected Area governed by the Iwokrama Act (1996) The Iwokrama River Lodge and Research Centre is situated at Kurupukari on the Lethem bank of the Essequibo River with an estimated field staff of 66 persons that includes Rangers, Tour Guides, Forestry Monitors, Managers, Drivers, Cooks and Cleaners, etc.

[78] Figures supplied by Linden Town Councillors (July 2019); awaiting verified figures from Mayor's Office/
[79] Figures supplied by #47 Councillor Maylene Couchman (July 2019)
[80] Figures supplied by Great Falls #58 Toshao Nicole Daniel (July 2019)
[81] Awaiting verified figures from Mabura Community - current estimate is considered excessive.
[82] Awaiting verified figures from relevant Police Division;
[83] Figures supplied by Fair View Toshao Martin Carter (July 2019); awaiting disaggregated figures;

b. **Iwokrama Ranger Station 1 (RS1) / Police Check Point:** This serves as the check point at the northern end of the Iwokrama Forest Road Corridor. It also accommodates a small contingent of four persons: usually 2 Police ranks and 2 GRA officers.
c. **Iwokrama Mill Site:** There is also the Iwokrama Timber Mill Site operated in partnership with McVantage and Farfan & Mendes with a staff of some 50+ persons. The Mill site is situated close-by which is part of Iwokrama's sustainable forestry operations under certification from the Forest Stewardship Council (FSC). It is also part of the Europe Union's Forest Law Enforcement, Governance and Trade (EU FLEGT) facility - which aims to reduce illegal logging by strengthening sustainable and legal forest management, improving governance and promoting trade in legally produced timber. And for the first time it will be an offence to import or place illegally harvested timber and timber products onto the EU market.

7. **MMC[84]:** There is the Mekdeci Mining & Construction company (MMC) that operates the ferry crossing at Kurupukari and whose staff occupy the MMC Compound at the location.
8. **Kurupukari Small-Business Enterprises[85]:** There is a growing settlement on the northern side of the Kurupukari crossing of small, ad hoc, businesses such as restaurants, guest house, vending and hospitality service providers etc.

7.6 Stakeholder Community Profiles

There are three bona fide Communities situated alongside the Linden to Mabura Hill Roadway zone which are generally considered to be amongst the poorer communities in Guyana. (Wismar is also one of the poorer Wards of Linden).

Profiles of Three Key Stakeholder Communities

Four villages / communities span three of Guyana's Administrative Regions:

1. **Linden / Wismar #47** and **#58 / Great Falls** are situated in **Region 10** and administered by the Region 10 RDC
   a. *The Profile of the **Mabura Hill** Community, also administered by **Region 10**, will be developed and inserted in the Final Draft of the SIA. Data is still being collected.*
2. **Fair View / Iwokrama** is located in **Region 8** but it is administered through the **Region 9** RDC and relate to the North Rupununi District Development Board (NRDDB)

7.6.1 Profile of #47 community[86]

Population: 210 persons inclusive of children. 95 females:115 males

Consultation Participation Analysis:

Face to face community consultation held on April 25, 2019 in the Primary School building.

Head count of 60 persons was recorded.

Total signed on to Register = 48 persons; 24 Women (F) 24 Men (M). (50:50 Gender Parity in terms of participation). An estimated 50% of the total households in #47 village participated in the consultation.

Social Services: The standing of Social Services is limited and inadequate in 2019 as evidenced from information culled from community consultations for this project.

[84] Awaiting verified figures

[85] No data exists that would allow for disaggregation.

[86] Information compiled from research, stakeholder consultation and key informant interviews

Water: For instance, #47 has no potable, piped water in its village. Residents say they have to go 2 miles to fetch water from the nearest clean creek or 4 miles to the other clean water source. (There is a small mining operation within # 47 that has polluted other freshwater resources.)
Electricity: There is also no electricity since #47 is off the GPL grid. There were privately owned solar panels and one community solar lighting plant near the front of the village that produced some light.

Employment/Occupation: Unemployment was reported as being high, with very limited opportunities for youth. There are 10 persons owning/operating small businesses. Occupations recorded on the consultation register include: Housewives, Labourers, Miners, Drivers including Drivers of Tractors and Ambulance; Mechanics, Shop owners, Loggers, Community Health Worker, Farmers, CDC Secretary & Councillors.

Women and Youth Organisations: There were no women or youth groups in the community - except for one sports team.

Social Protection/ Social Services: In terms of social protection, there appeared to be no services or service providers.

Security: The nearest police outpost was at Mabura Hill.

Health: The nearest hospital was in Linden. There was an under-resourced community health post and a Community Health Worker (CHW). However, the CHW was not trained in malaria testing. There was an ambulance and ambulance driver resident in the village.

Education: There is one combined Primary/Nursery School with a low enrolment of 32 children.

Few of the residents have benefitted from secondary school or tertiary level education. There is a Primary/Nursery School in the village, but the quality of education is low (as is generally the case in rural and hinterland areas). The nearest Secondary School is in Linden where there is also a Technical Institute.

Access to Justice: The nearest Magistrates' Court is in Linden. There were no lawyers, or counsellors, child protection services, domestic violence prevention or reporting or counselling services, no sexual assault reporting, court support or counselling services or qualified social workers. Similarly, in terms of Trafficking in Persons, for which the current roadway is a conduit and which an improved, paved, roadway is likely to contribute to an increased trade in trafficked persons.

Telecommunications: There is a cell tower at Mabura Hill from which #47 residents can access Wi-Fi and cell phone service. But this is erratic with a common feature of 'dropped calls'.

Banking: There are no banking services. The nearest bank is in Linden

Governance: #47 is governed by an elected Community Development Council (CDC).

#47 is not a gazetted community and the Linden to Mabura Hill Roadway is also not gazetted.

Ethnicity: Ethnically, it is a "Mixed" village - originally made up of settlers from both the coast and hinterland. Small scale mining, logging, farming and vending are the main sources of income.

Well-Being Snapshot: An informal, rapid assessment snapshot of the sense of well-being of residents of #47 was polled during the community consultation. On a scale of 1 to 5 with 1 being the lowest value and 5 being the highest, participants were asked to score their general sense of well-being as a resident of #47. The average score computed was 2.5 on the low end of the scale.

Decision-Making: #47 is without any organised women's groups or organisations, however judging from the experience of mobilising for the consultation and from the level of both quantity and quality of participation - there are strong women leaders and confident women both young and elders who are recognised and respected in the community. The elected Deputy / Secretary of the CDC is a woman.

Economic Standing/Occupation of Women: Given the few professions and paid public sector existing in the village, the posts of Teacher, and Health Worker are held by women. Most women described themselves as housewives on the register - but in informal interviews after the consultation - it was reported that most are engaged in some form of self-employment such as informal vending, farming, and as shop owners/operators. None of the women had benefitted from any loan programmes or microenterprise start-up investment.

Hinterland Youth Employment Services (HEYS)

HEYS is a Youth Empowerment Enterprise programme that is implemented by the Ministry of Indigenous Peoples Affairs (MoIPA). It was reported that a number of youth had benefitted from this programme. One young woman was featured in the national Press and Media and her project showcased as a very successful one by the HEYS/MoIPA. (Since then, however, she has had to leave the community on account of severe domestic violence by her partner. The lack of social services and access to justice is sadly borne out in this case.) Other HEYS entrepreneurs' small businesses include such as grocery/variety shops and poultry rearing.

Unpaid work inside the home: As per usual, this is manifest, with community women carrying the brunt of household management, child and husband/partner care, care of elderly and care of sick. The lack of potable, piped water and lack of electricity is an additional burden on all women in the community.

Morton Simmonds: - (Living almost 20 years in the #47 village, and is an ambulance driver).

Comments and Concerns: He says he is happy to know there will be a better road, since for the past 2 years the road is very difficult to use. Sometimes travellers have to get out of vehicles transporting them to walk through pools of water. Some people's vehicles get stuck in the mud. "We are suffering because of the road". There are drivers who are careless, and are a danger to school-children and residents alike. He is concerned, however, that a better road would cause even more speeding and related increase in accidents. He states that there is a garbage littering problem. He specifically mentions mini-buses out of which there is dumping / throwing of garbage which leads to an increase in mosquitoes, which can breed and thrive in the remnants of bottled drinks dumped on the road, if there is liquid left in them.

Recommendations for Safety:

His suggestions for safety are speed bumps, reduction in speed limits, some sort of physical measures to curb speeding (rumble strips), signs and clear, and luminous markings on signage along the roadway.

7.6.2 Profile of #58 / Great Falls

Great Falls was issued its Land Title on 23 September 2005. Great Falls is mentioned in the 1969 Lands Commission Report and is recorded as having a population of approximately 50 Akawaio persons at the time.

This is a titled and demarcated Amerindian Community with an elected Toshao and Village Council. The current Toshao is a woman, Nicole Daniel. Great Falls' titled lands encompass the roadside area at #58 with its well patronised restaurant and clean wash-room/toilet facilities run by Peter and Ruth and family; Also at this location is the GuyOil gas station, a benab that generally offers very good, hospitable road-side rest, and there is also parking facilities for trucks and other vehicles.

Population: 267 persons. Females 123: Males 144
Consultation Participation Analysis: (Community consultation held on April 25, 2019 at #58 Benab) Total Signed on Register = 40 persons; 20 Women (F) 20 Men (M). 50:50 Gender Parity
Social Services: Similarly, to # 47, these are in low supply.
Education: Primary School - one in Great Falls itself and one at #58.
Water: There is piped water supplied by the government in Great Falls Village. At the #58 junction situated on the roadway, private businesses had installed their own water systems.

Electricity: There is no electricity supplied - off grid of GPL. Private entrepreneurs situated at #58 run generators for power supply. Some households received solar panels from the LCDS, but these no longer function. Some households still depend on kerosene wall lamps.
Hydro-electricity prospect: A prospect in the offing is hydro-electricity from the waterfall on the village lands from which the Village takes its name. Surveys are currently being undertaken to assess the community's viability for "run of the river" small-scale hydro plants.
Employment/Occupation: Main livelihood / occupation is logging.
Various Other Occupations recorded in Register: Toshao; Housewives; Teacher; Community Health Worker; Labourers; Miners; Loggers; Farmers; Drivers; Operators; Security; Entrepreneurs; Boat-builders; Students; Auto-electrical mechanic.
Women and Youth Organisations: There are no women or youth organisations.
Social Protection/ Social Services: These are in very low supply - virtually non-existent.
Health: Health Post and CHW
Access to Justice: Very low level. No easy access to legal, police or court services. Toshao is a designated "rural constable" - but has no specialised training or support systems in place.
Education: Primary School
Telecommunications: Cell phone tower at Mabura Hill. Intermittent service. No Internet.
Banking: There are no banking services or ATMs. The nearest bank is in Linden.
Governance: Great Falls is an Amerindian Village governed by an elected Toshao and Village Council and guided by the Amerindian Act of 2006.
Ethnicity: Indigenous (Arawak)and mixed.
Decision-Making: The elected Toshao is a woman - one of only 14 elected women toshaos nation-wide. There are also women councillors elected to the Village Council.
Economic Standing/Occupation of Women: Most have registered as housewives and subsistence farmers. There is very little other economic activity apart from small-scale vending of homemade food stuff and selling of surplus farm produce.
Uncounted/Unpaid Work inside the home and farm etc.: Prevalent.

7.6.3 Update on Development and Projects in Great Falls / #58 Village[87]

Figure 35: Photo of the GuyOil gas station at # 58, Great Falls (Leon Leung)

#58 Miles, a section of Great Falls has been gradually transforming over the years and today boasts of a gas station, a nursery and primary school, a playground with pavilion where villagers converge in the afternoon, a church, a restaurant, and a health centre. Accessing water in the dry season is a challenge as there is only one well in the village, which is utilised by all the residents. The nearest creek is about a mile away from their village. Some villagers who do not have or cannot afford access to transportation to the creek have been making the journey on foot, fetching water back to the village in buckets. However, during the consultation held in April, 2019 the GWI were busy digging up the road at #58 to put in water pipes. The community had been engaged in an appeal to the government authorities for a water supply system with water tanks and distribution / connection pipes.

There were also concerns that there was only one teacher at the Primary School; and the community felt that this was inadequate. The school is a primary top, a school that teaches secondary school content, but does not offer *the Caribbean Secondary Education Certificate* (CSEC) examinations. The Mabura Mission Primary School Annex / Secondary has about 50 students, and according to the residents, from talks with regional officials, moves are being made to get the school to offer the CSEC.

[87] Information sourced from Key Informant Interview with Toshao Nicole Daniel and from Synieka Thorne & DPI

The Village has been progressing rapidly. Ten years ago there was no grocery store, and villagers had nowhere to buy rations inside the village, some having to stay without when their supplies ran out. There was hardly any transportation then either with residents having to travel all the way into the Great Falls village itself, some 11 miles away. In years gone by, this journey required them travelling by boat and foot, taking some three days to go and return.

The popular 58 Miles junction of Great Falls village is a place for relaxation for those road travellers plying the Lethem-Georgetown route. Life today is much easier as residents have access to transportation, some have their own transportation and there is also a village-owned bus.

Figure 36: Peter and Ruth Restaurant, 58 Village

A few years ago Digicel planted a tower at Mabura Hill and residents are now enjoying clear signal. Some residents who are “hooked up” to the Internet were seen checking their mail and browsing Facebook. #58 Miles residents rely primarily on logging and mining for a living but they also engage in farming, fishing and hunting. According to the residents, the village is very peaceful, but there are a few cases of drug and alcohol abuse and the culprits are the older folks. Crime in the village is relatively low, almost non-existent, and some residents attribute this to their Christian faith.

Figure 37: ICT Hub

However, the residents say that they are not too pleased with the services at the health centre. Sometimes, there are no drugs for malaria. Requests for medical drugs are made by the health centres, to the region, but the region has been slow in honouring the requests in a timely manner. The shortcoming is vexing, the residents say, noting that it is one of the problems regional officials have to correct with urgency. However, they expressed gratitude for the supply of nets to safeguard against the "army of mosquitoes" in #58 Miles.

On February 8th the community of Great Falls itself (not the roadside section of the village lands known as # 58), was connected to the World Wide Web with the establishment of two community Information and Communications Technology (ICT) Hubs. The buildings to house the ICT Hubs are being constructed by the Village Council at the cost of $2M. The National Data Management Authority, under the auspices of the Ministry of Public Telecommunications, will install the computers, solar panels and other equipment once the buildings are completed. Persons are also being trained to manage the facilities. One of the hubs which will benefit some 300 persons will be located in central Great Falls, while the other will be located in the 58 Miles community which also lies within the Great Falls Village lands. Toshao Nicole Daniels explained that the building at 58 Miles was completed by the second week in February, after which construction on the other at Great Falls commenced.

Primary School Teacher, Shevonne Williams, expressed much appreciation to the government for the initiative which she said will be a plus for the youths in the village. It is seen as a big step for the Great Falls children boosting their knowledge and connectivity. A computer and printer were also donated, which allows the school to have the tools to print its own materials, instead of travelling for four to five hours on a return trip to Linden

Town to have a document printed. The government is also looking at implementing an e-health project which will allow doctors, nurses and community health workers to communicate with health specialists in the city and around the world on medical issues they may encounter. There is also the e-commerce aspect where the village can promote the area as a tourism destination, and the farmers can showcase their produce online. Villagers will also have access to government services online.

7.6.4 Community-based tourism to boost Great Falls economy

Great Falls Village is working to develop its community-based tourism project as a means of boosting the village economy. This is according to Toshao of the village, Nicole Daniels, who said that the aim is to give tourists an authentic nature experience, while at the same time earning revenue for the community. The site identified for the project is located about 15 minutes up the river from the village. It has a waterfall and a mountain surrounded by lush greenery.

Toshao Daniels explained that village tours, nature walks, sports fishing, hiking and kayaking are some of the activities tourists will experience once the project is rolled out by year-end. She added that through the government's Capital Grant of $3M, in 2018, the Village Council started the construction of three of four cabins at the site, using traditional materials. The Council also purchased an outboard engine and will be acquiring a boat for the project. **"This year, 2019, we will put our Presidential Grant towards completing the project. We want to get this project up and running as soon as possible. We want to construct a main-building for the kitchen, additional rooms and other facilities for our visitors. Currently, we have tourists coming into the village to visit our falls, but they just come for a day because we don't have the facilities for them to stay longer."**

Apart from generating income, this project will also support the preservation of the culture of the Indigenous people living in the village, as there will be craft and traditional food on sale accompanied with entertainment such as traditional songs and dances. It will also encourage cross-cultural understanding between the villagers and the visitors, environmental protection and enhanced livelihood of the people.

During the stakeholder consultations with the villagers, the news that the road would be upgraded to a paved one was generally welcomed. Issues and concerns about safety, speeding, lack of lights and potentially increased crime due to easier access by unwanted criminals were also raised. It was felt that the nearby Mabura Police Station should also be upgraded in order to cope with the increased volume of traffic and related issues. Community Police and Highway Patrol were also recommended as was the hope that the community would benefit from jobs during the road construction phase.

7.6.5 Environmental Clubs

NOTE: Nether # 47 Community nor Great Falls #58 Village have a youth group. At the Consultation sessions, the EPA representative promoted the idea of Wildlife Clubs and offered to assist in setting these up for students.

EPA Team Representative - Mr Charles:

Community Road Safety Education

Environmental Protection Agency - Guyana

We recommend persons with the council to work along with the police and educate children and citizens to have road safety programs implemented in the community, in schools, it could be done once a week and would educate children about basic road safety. Educational programs are very important

Offer to help set up Environmental Clubs

At the EPA, we have an education department all across Guyana which works with people in communities. We provide training for youths and school children in Environmental Clubs that we will help you set up - if you are interested. If you extend an invitation to us we have a program that we can use to help establish these environmental clubs and develop a structure for sustainable development and we will handle the cost. We provide training in practical environmental skills and activities - things that you can actually use.

7.7 Profile of Fair View Village

Population: 348 persons; (awaiting disaggregated information)

Water: Piped water in village

Electricity: Solar Panels and Generators

Employment/Occupation: Forest Rangers, Boat Captains, Bowmen, Tour Guides, House-keepers, Cooks, Cleaners, Surveyors, Researchers, Managers, Village Councillors, Shop keepers, Farmers, Housewives, Teachers, Health Worker, Drivers/Mechanics; (Several FV residents are employed by Iwokrama at the River Lodge (Tourism, Research & Training Centre) and at Iwokrama-McVantage Mill Site.

Women and Youth Organisations: Women's Group and Makushi Researcher(s); Junior Wildlife Club organised through the School; Sports Teams;

Social Protection/ Access to Justice/Social Services: Low level. No legal or counselling or court support facilities. Some basic paralegal and TIP training.

Health: Health Clinic and CHWs

Education: Primary School and one Trained Teacher (HM)

Telecommunications: GTT Cell tower at Kurupukari; No available/reliable Internet

Banking: No banking or ATM services. Nearest Bank is in Lethem

Governance/ Decision-Making: Elected Village Council and guided by the Amerindian Act of 2006. (Now being revised.

Ethnicity: Indigenous (several nations - Arawak, Patamona, Makushi, Wapichan, Akawaio etc. Also mixed race.

Uncounted/Unpaid Work inside the home: Prevalent

7.7.1 Fair View Village Location & History[88]

Fair View Amerindian Village is situated on the Lethem bank of the Essequibo River at the crossing and is also known historically as Kurupukari. It is located adjacent to the Linden-Lethem Road which was first completed in 1992. Fair View obtained title for its Village Lands in 2006. Its titled lands consist of approximately 21,950.82 hectares. Fair View owns its own lands and resources wholly and in perpetuity; and took the collective Village decision to remain within the Iwokrama Protected Area. It is the only Indigenous / Amerindian territory located within the Iwokrama Forest Site and as such has special rights-holder relations with the Iwokrama International Centre for Rain Forest Conservation and Development. This also entails rights to first call on Iwokrama jobs and benefits from Iwokrama timber and tourism benefits.

Figure 38 contains a map showing the location of Fair View in relation to the Iwokrama Forest Reserve and the North Rupununi Communities that are represented by the North Rupununi District Development Board (NRDDB).

[88] Source of Information: Fair View Social Monitoring Report (2018)

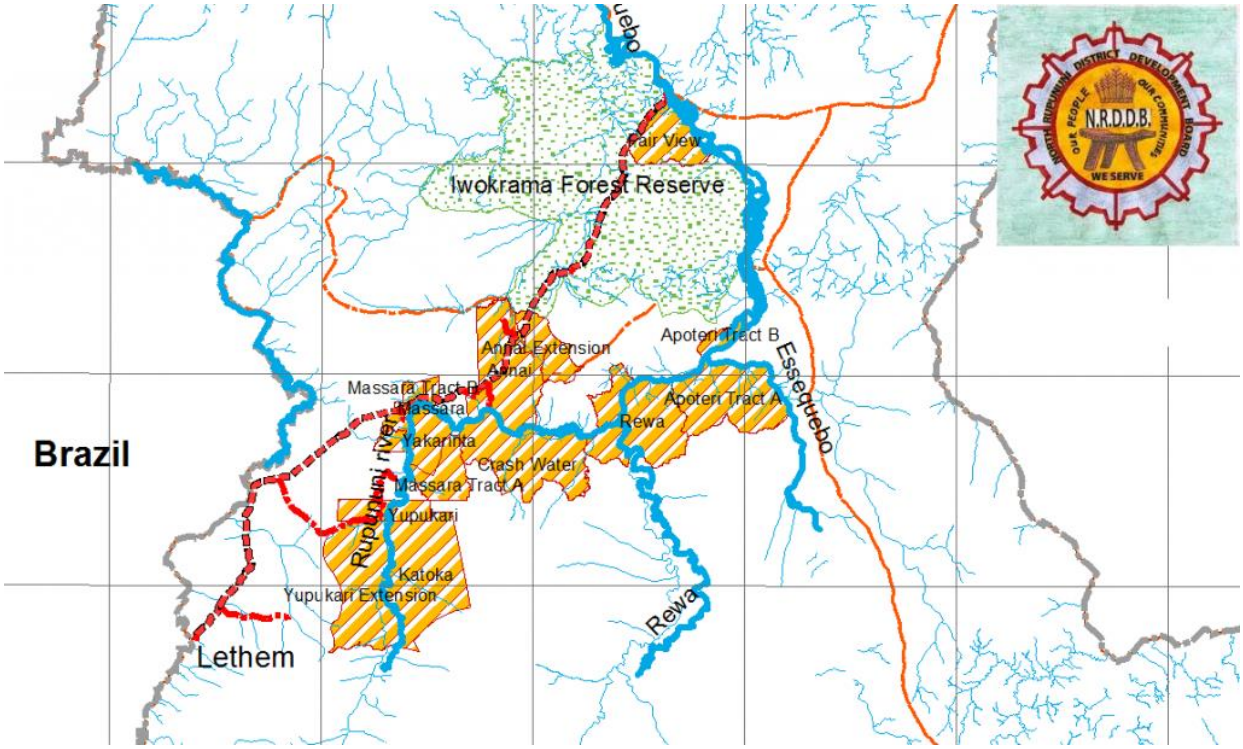


Figure 38: Map showing location of Fair View in relation to the Iwokrama Forest Reserve and the North Rupununi Communities

7.7.2 Fair View Relationship with the Iwokrama Forest

From time immemorial, the Makushi people and their ancestors traditionally used and otherwise occupied the Pîyakîîta (Place of Landings) – the ancestral Makushi lands of Guyana consisting of the area now described as the North Rupununi sub-region (and its Wetlands) and inclusive of the Iwokrama Mountains and Iwokrama Forest.

The above declaration of customary rights is made in the Collaborative Management Agreement (CMA: Preamble Section Clause (iii) which was signed between the North Rupununi District Development Board (NRDDB) and the Iwokrama International Centre for Rain Forest Conservation and Development (Iwokrama). This CMA came into effect on 1 July 2005 and was renewed in 2008, and in 2016. Fair View and Iwokrama also hold a Timber Harvesting Agreement (renewed 2018). There is also a special Agreement between Fair View and Iwokrama which entails Fair View rights to first call on Iwokrama jobs and benefits from Iwokrama timber and tourism benefits.

Petroglyphs in the area of Fair View are evidence of ancient human settlement and trade routes. More recently, in the 1950's the Rupununi Cattle Trail traversed the Iwokrama Forest and stopped in Fair View. The current village was settled in 1925 by the Andries sisters and family and in 1996, the community lands were titled.

Iwokrama and Fair View hold a collaborate management agreement (2009 and renewed 2016) and a timber harvesting agreement (renewed 2018) to address the specific areas of resource use. Before the establishment of the Iwokrama Field Station in 1996, the residents depended mostly on gold mining in the Siparuni River, trading in crabwood oil, farming, fishing, and hunting. Today, villagers are employed at the Iwokrama Mill Site and Lodge.

7.7.3 Language

All of the residents of Fair View currently speak English, (mainly Guyanese creole) but many of them also speak the indigenous languages of Makushi or Wapichan. This can be seen within the graphs in Figure 39.

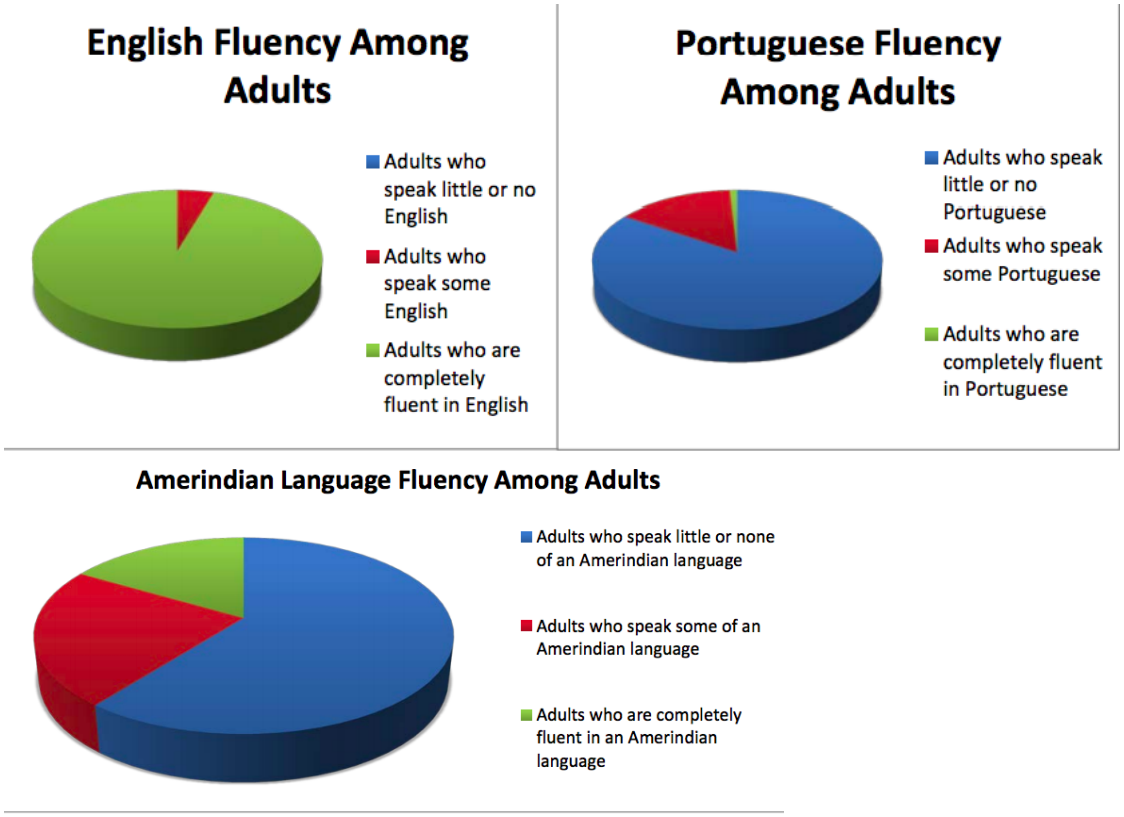


Figure 39: Graphs indicating the languages spoken in Fair View

7.7.4 Economic Activities

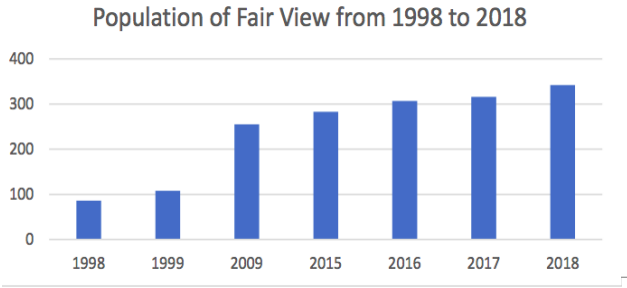
According to the Bureau of Statistics Poverty Map (2007), the community has a high level of poverty, with a household monthly income generally being no more than G$50,000 for a family of five. The main economic activities undertaken by residents are small-scale mining, fishing, and farming. Some residents are also engaged in cash-crop farming, while others have gained employment with Iwokrama's sustainable timber partner, the McVantage Company as loggers, the Iwokrama Field Station as domestics, tour guides, tree spotters and forest rangers, and the Mekdeci Mining Company (MMC) Company as machine operators. These supplementary activities assist in buffering residents' income. Many residents are also hopeful that during the construction/rehabilitation phase, regardless of the option pursued, additional jobs will be created, improving their earning capacity. But this will only result if the contractors acquire available skills from the area.[89]

7.7.5 Growing Population and Growing Community Facilities

The earliest census in the area was in 1998 and showed that Fair View had 86 inhabitants. Since then, the population has grown: the estimated number of inhabitants was 108 in 1999, 255 in 2009, 283 in 2015, climbed to 316 in 2017.

[89] This paragraph has been updated from the 2012 ESIA

Population Update: Fair View is a rapidly growing community and its proximity to the road and prospects of improved livelihoods and development opportunities has attracted other Indigenous Peoples from Regions 8, 9 and 7. The chart in shows this increase from 98 persons in 1998 to approximately 340 persons at the end of 2018 with 54 households. The current Toshao, Martin Carter, is originally from Chenapou Village, near to Kaieteur Falls in Region 8. He joined Iwokrama as a Ranger trainee over a decade ago and then settled in Fair View and is now its leader.



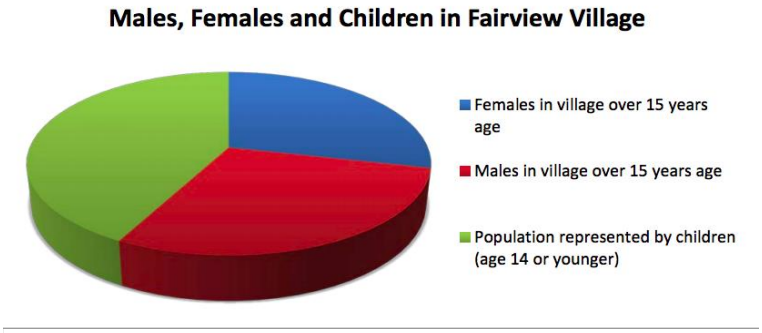


Figure 40: Graphs showing the Fair View population

Source: Fair View Social Monitoring Report 2018

Source: Fauna Project (2013)

7.7.6 Education

The Kurupukari Primary School was constructed in 1998 and a teachers' quarters the next year in 1999.

Levels: Education in the community is arranged at two levels, nursery and primary. It was also reported that illiteracy is high in the community. The community now has a fully trained Headmaster for the Primary School who is bringing a pro-active and enthusiastic outlook to education and development.

Teachers: There are three teachers (one of which is also the head master) employed at the Primary School. Mr. Quado Vancooten took up his post as headmaster in Fair View in January 2018. Until then, Maggie Bernard and Jessica Jonas managed the school alone. Theresa John is a parent volunteer from Fair View who comes in periodically to assist. Lance Caldwell, a U.S. Peace Corps Volunteer also volunteer taught three times a week at the school but left in November when his service contract ended. Of the three teachers, Ms. Jonas is the only teacher who does not have a teaching certificate; Mr. Vancooten and Ms. Bernard are both trained teachers with teaching certificates.

Enrolment at Fair View Primary School by age and sex: At the end of 2018, there are 104 students enrolled at Fair View Primary School, inclusive of 63 males and 41 females. There was a total of 18 pupils in Nursery School (10 males and 8 females), 68 pupils in Grades 1-6 (40 males and 28 females), and 18 pupils in Forms Grades 7-9 (13 males and 5 females); as shown in Table 26. At a glance, it looks like the ratio of students to teachers is 36 children to a teacher. However, this is not the case as each teacher is in charge of different grades and class size differs across grades. Ms. Bernard teaches both years of nursery. Volunteer teacher, Ms. John, teaches grade 1, Ms. Jonas is responsible for grade 2 and HM Mr. Vancooten teaches grades 3 through 9.

Table 26: Enrolment at Fair View Primary School by age and sex

Class	Male	Female	Total
Nursery Year 1	6	4	**10**
Nursery Year 2	4	4	**8**
Total	10	8	**18**

Class	Male	Female	Total
Grade 1	7	1	**8**
Grade 2	6	3	**9**
Grade 3	9	9	**18**
Grade 4	4	9	**13**
Grade 5	6	2	**8**
Grade 6	8	4	**12**
Total	40	28	**68**
Grade 7	6	2	**8**
Grade 8	4	3	**7**
Grade 9	3	0	**3**
Total	13	5	**18**
Total	**63**	**41**	**104**

Junior Wildlife Club: The Fair View Junior Wildlife Club was very active in 2018. Fair View resident, Vibert Ewell and Peace Corps Volunteer, Lance Caldwell met with the club and went on wildlife/bird walks every Saturday morning; Iwokrama rangers participated in some of these events. Lance's service ended in November and Iwokrama Rangers met with the wildlife club every Saturday in the month of December 2018.

7.7.7 Health

A health post was constructed in the community in 2001.

7.7.7.1 Iwokrama Medex and Fair View community health workers

Iwokrama employs two trained Medex who work on a rotational basis; their primary function is to provide health services to Iwokrama and Mill Site employees. The Ministry of Health trained and appointed a community health worker (CHW) in Fair View at the end of the third quarter and health care is now available in the community. Previously health care was provided by the Iwokrama Medex onsite. The CHW is only trained to address general and and common health concerns, maintains pre and post-natal clinic. Villagers may choose to visit the Iwokrama River Lodge (IRL) Medex for a higher level of medical treatment.

A total of 946 visits were made to the Iwokrama Medex over the course of the year; visits from Fair View Village were the highest at 345, Iwokrama staff made 310 visits, "Other" patients made 184 visits, and staff from the Mill Site made 107 visits as shown in Table 27.

Table 27: Enrolment at Fair View Primary School by age and sex

Origin of Visitor	*No. of visits*
Fair View	*345*
Iwokrama staff	*310*
Other	*184*
Mill Site	*107*
	946

"Other" refers to patients anywhere outside of IRL, Fair View and the Mill Site and may include Georgetown, guests to Iwokrama, residents from Kurupukari or anyone else who was seeking medical attention.

Fair View's community health worker (CHW) retired in December 2015, and until September 10, 2018, the village was without a health worker. Until then, the village relied on the Iwokrama Medex for all medical assistance. The Iwokrama Medex continues to provide medical support to Fair View and is providing technical assistance to the CHW with diagnosing, dispensing and as the CHW is not trained in suturing, microscopy and deliveries, the Medex provides assistance here and remains on call in the event of emergencies.

In 2018, Fair View residents made 343 visits to the Iwokrama Medex; 174 women and 169 men. The most common illness was cold and flu, skin infections, internal parasites, injury, fever, hypertension, Diarrhoea, muscle pain, rash and back pain

Accidents

Medex Skeete, the IRL Medex, has defined an accident as "an unfortunate incident that happens unexpectedly and unintentionally". If an employee sustains an injury on the job due to an accident, the Medex stabilizes and treats all accident victims at IRL, and if necessary, patients are then referred to the Annai Health Centre for further treatment. Accidents that occur at the Mill Site are recorded in an accident register and kept on file there; each work-related accident report is filed in the Medex's office and a copy is sent to the Human Resources Officer in Georgetown who then forwards it to the Ministry of Labour.

According to the narrative medical reports, in 2018, the Medex treated thirteen individuals for injuries related to an accident. There were five motor vehicle accidents, three motorcycle accidents and two tractor accidents, all of which occurred on the public road which bisects the Iwokrama Forest. There was one boat accident where Iwokrama staff sustained head injuries. There was one timber related accident where a 40 year old male sustained a broken arm while working, the second record was related to an employee at the Mill Site who was injured off duty. Iwokrama conducts regular health and safety awareness sessions in order to provide information necessary to mitigate accidents on the job. Table 28 shows the details of the thirteen individuals who were treated as a result of an accident in 2018.

Table 28: Record of Accidents treated by Iwokrama Medex for 2018

Date	Age and Gender	Address	Type	Injury
15 January 2018	12 year old male	Fair View	Vehicle	Blunt trauma to left knee
20 March 2018	40 year old male	Mill Site	Felling	Broken arm
18 May 2018	38 year old male	Fair View	Vehicle	Abdominal injury
31 July 2018	3 year old male	Fair View	Motorcycle	Multiple abrasion
9 August 2018	49 year old male	Iwokrama	Boat	Head trauma, laceration
9 August 2018	28 year old male	Iwokrama	Boat	Blunt trauma to head
27 August 2018	32 year old male	Fair View	Vehicle	Laceration to head
18 October 2018	43 year old male	Fair View	Motorcycle	Minor bruising
20 October 2018	49 year old male	Mill Site	Motorcycle	Bruising, referred
19 December 2018	55 year old male	Other	Tractor	Blunt trauma, sutures
19 December 2018	47 year old male	Other	Tractor	Soft tissue injury
28 December 2018	37 year old male	Other	Vehicle	Soft tissue injury
28 December 2018	46 year old male	Other	Vehicle	Soft tissue injury

Malaria and Dengue

The Medex reported in his narrative health reports that IRL and Ranger Stations were fogged at least once in ten months of the year excepting high dry season months of April and October. The Medex treated ten cases of malaria and two cases of dengue in 2018. Out of the ten cases of malaria, eight were P. vivax, two were

P.falciparum. Seven cases of malaria were seen from Fair View, one from Mill Site and one from “other”, all but two cases of malaria treated were in men.

The Iwokrama Medex has the expertise and equipment to test for malaria, and he will prescribe and provide medication if patients test positive. If the patient is from Fair View, the prescription will be filled at the Fair View Health Post.

7.7.8 Waste disposal and recycling:

Garbage from IRL and Mill Site is disposed of daily, and waste is taken to a centralized dump site. Deep pits are dug by an excavator at the site for garbage, and when it is full, it is covered over. The last pit was dug in May 2018 and is still in use.

Guyana has limited recycling opportunities, but Iwokrama has a policy of purchasing beverages in glass bottles when possible. IRL has implemented a local waste reduction program and returns all glass and plastic bottles to Banks DIH, where glass bottles are re-used, and plastic is chipped.

7.7.9 Illegal activities:

Illegal activities are any activity that is not authorized by Iwokrama to be undertaken in the Forest. Rangers discovered and reported four illegal activities in 2018. Table 29 details the activity and the action taken to address it.

Table 29: Illegal activities in Fair View and action taken to address it

Date	Activity	Action Taken
28 February 2018	Mining claim on the bank of the Iwokrama Forest, Essequibo River	Letter writing to GGMC requesting the agency take action. Signs for claims removed.
3 October 2018	Use of water pump to drain creek at Jarvis Culvert for fish	Letter to Fair View Village council written. Activity ceased.
13 November 2018	Evidence of illegal fishing at Stanley Lake, Creek stopped off, dead fish	Report made to Iwokrama management. Fishers not caught. Rangers have been vigilant for ongoing activity and to date, this presence and reporting has been effective, and no other evidence has been found to suggest activities have continued.
30 December 2018	Evidence found of mining or prospecting at Turtle Mountain landing, holes dug every 30m	Rangers have been vigilant for ongoing activities and to date, this presence and reporting has been effective, and no other evidence has been found to suggest activities have continued.

7.7.10 Fish in Fair View - Main Source of Protein and Good Source of Income

Fish is the primary and favourite source of protein for indigenous people in this area, and monitoring the fishers and the source of fish can provide information to help ensure that Iwokrama is not driving a market or methods of fishing that are unsustainable. Over the course of the year, fish was purchased 56 times from nineteen individuals. This amounted to a total of 2876 lbs of fish purchased by Iwokrama.

The pie chart in Figure 41 indicates quite clearly that Fish is the definitive primary source of meat/protein for Fair View. It is also a viable source of income for Fair View residents as can be seen from the figures produced by Iwokrama-Fair View in the social monitoring report for 2018.

The top supplier was from Kurupukari while the rest of the suppliers are residents of Fair View. Fish is purchased at G$300.00 per pound, and community members benefitted from G$862,800.00 in fish sales.

In the first quarter, 15 individuals sold 968 lbs of fish. During the second quarter (rainy season), this dropped to 448 lbs and 3 sellers. In the third quarter, two individuals provided 886 lbs of fish, and finally in the last

quarter 574 lbs were provided by 5 individuals. Different people sold fish, and some only once or twice, but there were a few consistent suppliers. In total, 19 individuals brought fish to sell at IRL. Some family members may consolidate their catch and nominate a representative to sell the fish at IRL.

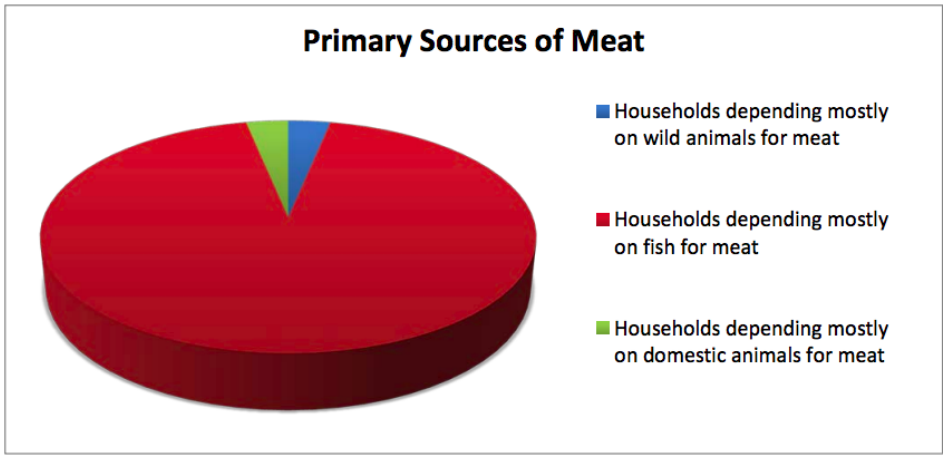


Figure 41: Primary sources of meat in Fair View
Source: Fair View Atlas derived from the Fauna Project led by Dr Jose Fragoso & Team

7.7.11 Tourism in Fair View - A Viable Livelihood

Iwokrama continues to be supportive of Fair View's tourism development and provides technical assistance when requested. Fair View has built relationships with independent tour operators and flights and vehicles arrive in the village with their guests who may not necessarily be visiting the IRL. Some residents are involved in sport-fishing activities and are guides, boat captains and other crew for private operators.

February, May, March and November were the busiest months for tourism in 2018, as can be seen in Figure 42 there were a total of 1269 visitors to the Iwokrama River Lodge in 2018, and this figure is up 236 from the 2017 total of 1033. This figure is not representative of the total amount of visitors to the Iwokrama Forest as some people may visit the Canopy Walkway only. Visitors that overnight at Iwokrama pay a Forest Use Fee, a third of which is paid on to a fund of the North Rupununi District Development Board for the benefit of the communities.

Most visitors arrived overland (736), 435 by air, landing in Fair View, 94 came via Surama or Lethem via flight, and four arrived by helicopter.

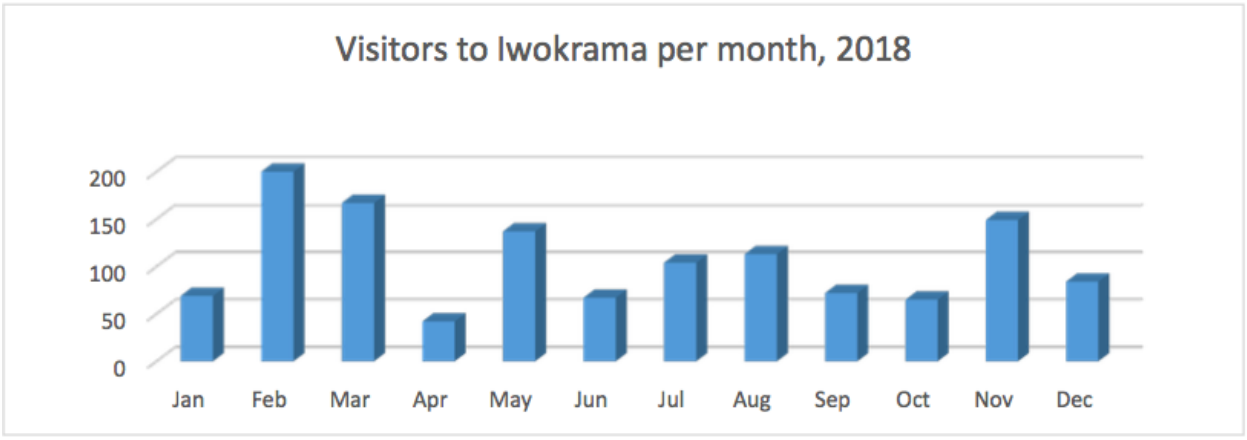


Figure 42: Visitors to Iwokrama per month, 201

Tourism as a Livelihood for Fair View

Fair View's tourism is linked to Iwokrama's. The majority of Boat Captains and Bowmen are employed from Fair View for transporting of tourists on the key Iwokrama narure tours, including to Turtle Mountain and the River Trip. There are also the tours to Fair View itself and to see the rapids and petroglyphs. Rangers, Tour Guides, House-keepers etc. are employed in the business and their local knowledge is highly valued. A percentage of the "forest-user fee" paid to Iwokrama by foreign visitors is given back to Fair View and the other North Rupununi communities which constitute Iwokrama's Indigenous partners. Additionally, a small "landing fee" is charged by Fair View Village for all visitors.

7.7.12 Road Traffic

Road traffic has the potential to have a socio-economic effect on communities as an increase or decrease of people can influence local economic opportunities, and as a result, have social repercussions. This can be both positive and negative and must be accepted as part of overall development. Graphs of road traffic can be found in the biophysical monitoring report.

Currently, there are concerns about the speed that minibuses and other vehicles drive at from the Kurukupari Crossing past Fair View Village especially in the mornings when children are making their way to school.

7.7.13 Air traffic

Iwokrama has a contract with Ministry of Public Infrastructure to maintain the Iwokrama Fair View airstrip through the Aerodrome Department. Iwokrama ensures that the grass around the airstrip is mowed and removes any grass growing on the surface with glyphosate.

Most flights to this airstrip are usually the result of a charter (tourism or Government officials) or due to a medical emergency. There is also an arrangement with Air Services that would provide flights on their regular schedule, once passenger numbers are three or more.

The primary user group for the airstrip are as follows:

- Iwokrama International Centre
- Officials of the Government of Guyana
- Ron Allicock Birding Tours
- Navin Roopnaraine, Adventure Guianas
- Remote Area Medical (RAM), an emergency evacuation service

Airstrip Management

There is a partnership between Fair View and Iwokrama for managing the airstrip. The gate that provides vehicle access to the airstrip gate is kept locked - unless in use for a flight landing. The Fair View Toshao is responsible for opening the gate for all flights called in by Civil Aviation. Both Iwokrama and Fair View Village council have keys for the airstrip gate. Iwokrama's tourism department maintains the statistics of the number of flights landing at this airstrip as it relates to the Centre's tourism.

In the course of the year, 435 visitors to Iwokrama arrived by flight to Fair View.

Data about the total number of flights landing here has been difficult to attain, although the airlines contact the police and village council to advise when flights are landing. **Records of all landings are important to maintain since this also pertains to security. As a result, this figure pertains to Iwokrama guests only, and does not include the number of flights of other operators.**

18.3.14 Fair View Resource Management Plan

Fair View has developed a management plan. To do this, the community zoned its lands and agreed collectively to a community land use policy. This was developed in 2009 and considered a model for other communities in terms of natural resource management. Community mapping was undertaken and policy guidelines adopted.

7.7.14 Carbon Market Potential

The Fauna project referred to earlier undertook the establishment of a number of transects over the period of a number of years to gauge the top species of wildlife hunted by villagers. It also produced a number of related maps, but these can only be made available through the express permission of Fair View Village Council, since they detail the hunting grounds and habitats of these species. Additionally, the project researched and computed carbon stocks.

The map of this is publicly available and is reproduced in Figure 43.

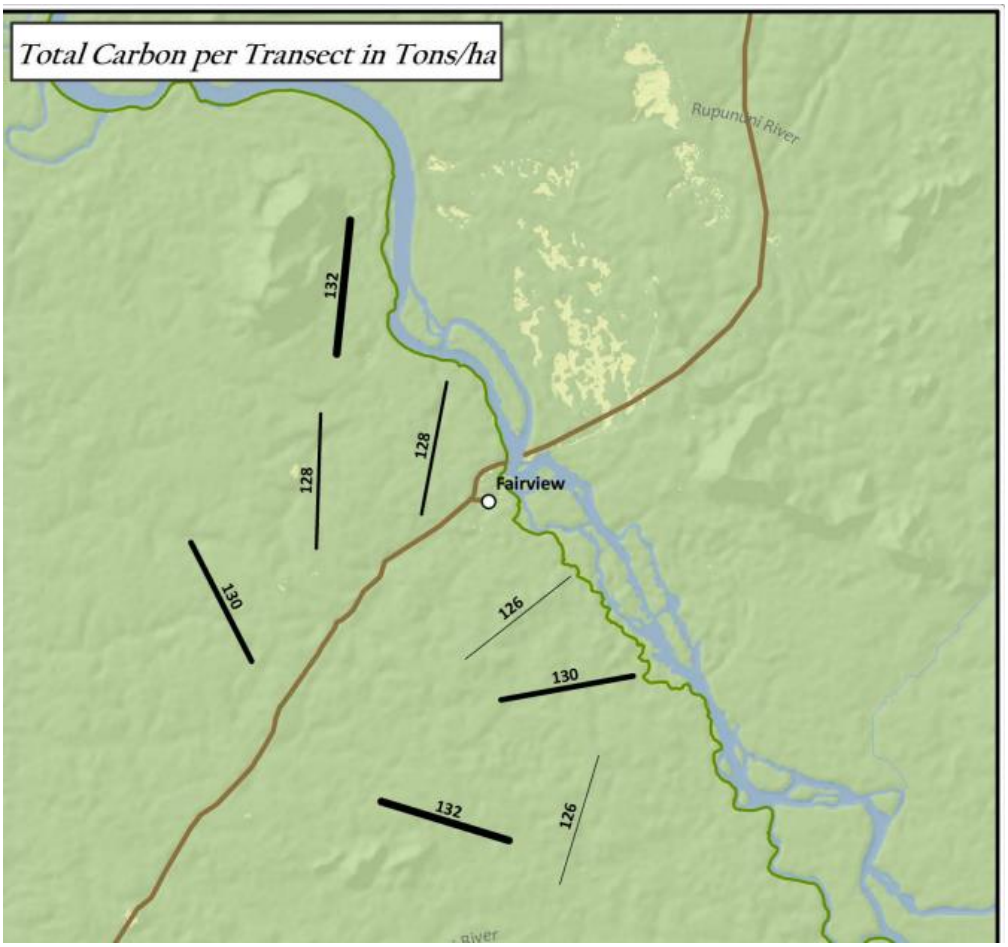


Figure 43: Map of carbon transects – Fair View

The map above shows the total amount of carbon in tons/ha for each transect calculated using land cover distribution and carbon estimates of each land cover type.

This was calculated based on sample measurements from a 4ha area derived from a 10m-wide strip centred along the transect.

Total Moist Carbon was calculated based on soil, litter, shrub, and tree biomass.

Other transect maps on tree species, fruiting trees, fishing grounds are not available for public disclosure, as a safeguard against illegal poaching, felling etc. are recorded in the Fair View Atlas (2013) produced by the Fauna Project which was led by Dr Jose Fragoso and Dr Jeff Luzar, Dr Anthony Cummings, Dr Han Overman and team.

7.7.15 Fair View Village Stakeholder Perspectives on the Road - the Positives and Negatives

Residents view the rehabilitation of the road as a positive step for the development prospects of the community leading to, among other things: (i) quick and cheap access to health care, (ii) increase in economic activities, and (iii) increased markets for products between Lethem and Georgetown. These notwithstanding, many issues were raised. Most representatives support the idea of an all-weather road structure, i.e. paved surface, given that the current road contributes significantly to dust pollution and the concern is that a gravel surface will do likewise. Furthermore, the dust reduces visibility, and compounded by the absence of safety signs, the current road is prone to vehicular accidents. This situation is exacerbated by Brazilians driving on the right-hand side of the road in their country and Guyanese on the left-hand side. Hence, the community advocate that a rehabilitated road must be accompanied by improved, bi-lingual road signage, training, and messages to build awareness on road safety.

While preferring the paved road option, some residents are concerned that this can also lead to exploitation of members of the community. A number of challenges arising from a rehabilitated road, was raised by residents. These include: (i) conflicts due to unclear land boundaries and increased encroachment, which already exists in relation to the fish and wildlife resources, (ii) limited or no control over wildlife hunting in their area thus leading to a sense of powerlessness, (iii) limited security that may not act as a deterrent to nefarious and illegal activities, (iv) the possible increase in and spread of diseases, inclusive of tuberculosis and sexually transmitted diseases (STDs), (v) trafficking in persons for both labour and sexual exploitation, (vi) increased drug use and (vii) the increased occurrence of crime, such as theft, violence, as well as abductions and kidnapping and (viii) the threats posed by careless, speeding vehicles of all types to villagers and, in particular, to school children.

It is felt that the above issues can be mitigated with (i) demarcating of land boundaries, (ii) empowerment of communities, through the provision of control over wildlife hunting, (iii) improved police and supernumerary patrols in the area, (iv) public education programmes controls (v) enforcement of laws and regulations to reduce speeding, peddling of drugs, and unwanted persons and criminals accessing the vulnerable community.

In terms of benefits from employment during the construction phase, it was felt that this might be limited since past experience has shown that contractors import their own labour force. It was therefore a welcome announcement from the MOPI representative during the consultations held in April 2019 in Fair View Village, that a clause in the contractors' contracts would specify that labour must be sourced from the nearby communities situated alongside the roadway.

In terms of the proposed Bridge over the Essequibo River at the Kurupukari Crossing: the main concerns were: (i) no interference whatsoever with the Kurupukari Rapids and the Petroglyphs; (ii) a bridge designed to take into account the aesthetics of the natural environment in which it will be built; (iii) to be conducive to the nature tourism/eco-tourism that constitutes one of the main sustainable businesses and community livelihoods, and to not detract from this but to enhance it by designing a "beautiful" bridge with style and colours and look-out points etc. that might even be incorporated into the tourism packages of both Iwokrama and Fair View.

7.8 Iwokrama Profile

Figure 44: Photograph of the layout of Iwokrama Forest Site at Kurupukari
Source: Iwokrama archives

Location of Iwokrama: The Iwokrama rainforest is located in the geographical heart of Guyana. It comprises 371,000 hectares or one million acres of tropical rain forest (1.6% of Guyana's landmass and 2% of Guyana forests).

Purpose of Iwokrama: The Iwokrama Centre was established in 1996 to manage the forest area. Enshrined in an Act of the Guyana Parliament, the Centre has the task to test the proposition that conservation, environmental balance and sustainable economic activity are mutually reinforcing – that it is possible to use a forest without losing it.

Iwokrama Forest Zones: The Iwokrama Forest is zoned into a wilderness preserve (51%) and a sustainable utilisation area (49%). Over the past two decades, intensive baseline studies of the wilderness preserve and the sustainable use area of the forest has contributed to development of models for sustainable forest management which have been developed in close co-operation with the local communities.

Governance: The Iwokrama International Centre for Rain Forest Conservation and Development (IIC) is an international organisation, governed by the Iwokrama Act of Guyana (1996) and an International Board of Trustees and managed by a team of around seventy permanent staff in Georgetown and at the Iwokrama River Lodge and Research Centre at Kurupukari. The IIC's Patron is HRH The Prince of Wales.

Core Activities: There are four core self-supporting businesses:

3. Sustainable timber harvesting,
4. Eco-tourism,
5. Forest management training and
6. Forest services

Forest Certification: The entire Iwokrama Forest has been certified by the Forest Stewardship Council (FSC) and annual independent audits are undertaken on behalf of the FSC by the UK-based forest certifier - the Soil Association. These Audits are stringent and include community stakeholders' opinions and reports as well as the more technical matters.

Partnerships: Drawing on its earlier work in sustainable forest management, the IIC is now, in close collaboration with the Government of Guyana, the Commonwealth and other international partners including

private sector companies and environmental organisations. Innovative models of business development are being established.

Most importantly, close knit relationships with the local communities, based on equality and mutual trust, help drive the co-management of Iwokrama and its multi-dimensional resources.

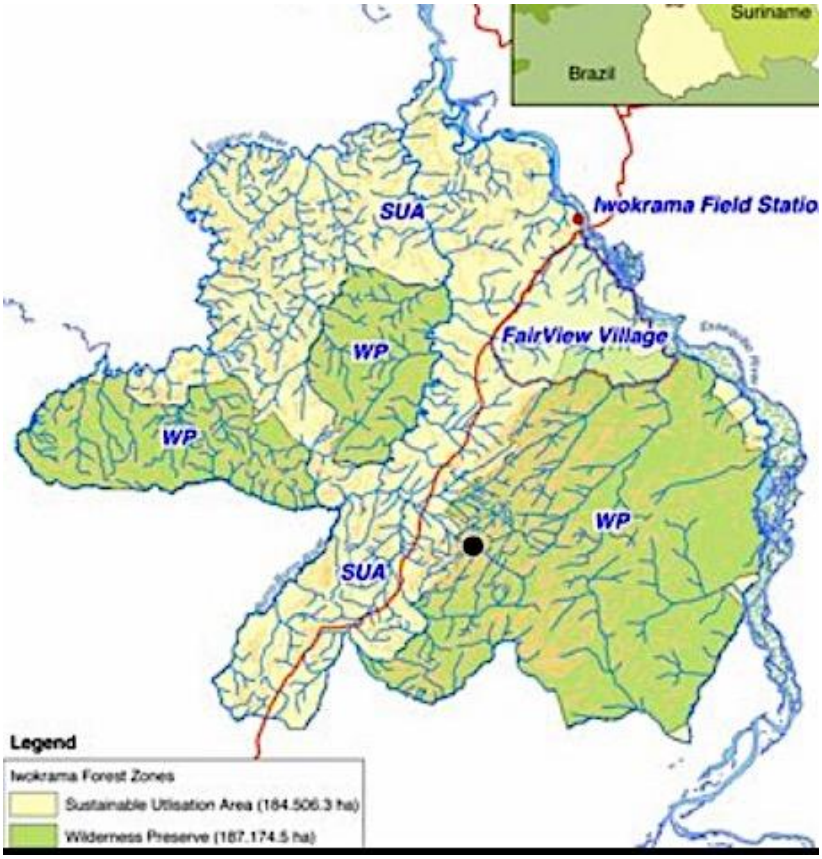


Figure 45: Map of Iwokrama showing its zones[90]

7.9 Summary of Stakeholder Recommendations:

Qualitatively, there was a high level of "savvy" road knowledge displayed, technical expertise, thoughtful social and gender-based issues raised concerning speeding, safety and security, child-friendly advocacy especially for school children road users.

- **Enforcement:** The situation concerning enforcement was a critical one. Technological solutions ranging from rumble strips, speed trap cameras, average speed cameras, drive on weigh-scales that would generate computerised charge tickets were all energetically discussed.
- **Illumination:** Illumination along the entire road using the fluorescent road signs was a key demand.
- **Lighting:** Led lighting/ Solar lighting along the roadside zones where villages and communities were located was a key demand.
- **Widening of the road to allow for off-road lay-bys for trucks:** Truck lay-bys was another key recommendation. Proper drainage was insisted on as a key part of the design.
- **Toll Stations and Road Control Depots:** The idea of toll stations where authorities could all be present with a compound included for impounding of vehicles breaking any of the laws along with a tow truck service along the roadway, as well as specially trained highway patrols were all keenly advocated.
- **Human Trafficking Check Points:** Much concern was also expressed about the crime of Human Trafficking / Trafficking in Persons which can potentially increase with a more accessible roadway. It was felt, therefore, that along with the Police, GRA and other enforcement authorities that trained personnel

[90] WP=Wilderness Preserve and SUA = Sustainable Use the Area.

from the Anti-Trafficking Unit of the Ministry of Social Protection should also be in place at strategic points along the roadway.

- **Special Road Zones where communities are situated:** Special Road Zones was a key recommendation - with good lighting in place - relevant signage indicating school zone and health zone, no honking of horns, slow down signs with road bumps, zebra/pedestrian crossings, even user-controlled traffic lights, plus lower speed limits. (PAHO recommends speeds lower than 50km where there are roadside populations).
- **Road Safety School Programmes:** Very importantly road safety programmes in schools were highly recommended. The EPA said that this is something they do and offered to assist the schools in the stakeholder communities with implementing this.

Digest of Stakeholder Inputs: In order to present all the various stakeholder inputs, concerns and recommendations as a digest, a Matrix / Checklist of these was developed. The expectation is that this Stakeholder Matrix can be taken on board by the design engineers so that they might be guided by it.

The Validation Workshop that is mandated as a key element in the TOR/Scope of Work would serve as the stakeholder mechanism for assessing to what degree their inputs and recommendations have been incorporated into the road and bridge designs.

7.10 Matrix / Checklist of Stakeholder Inputs

A Matrix or Checklist of Stakeholder Inputs has been developed from the various stakeholder engagements / community consultations. This tool serves to ensure that stakeholders' contributions to the road and bridge design project are recorded, combined and prioritised and are officially presented to the Design Team for its consideration and uptake wherever feasible.

This will in turn help to consolidate the value and importance of stakeholder participation, and help to secure their "buy in" to the project and the consultative process.

The Checklist will be developed on a rolling basis - adding in any further themes or issues or inputs, not already included.

When the preliminary and final designs have been presented to stakeholders for their review - the Checklist will be used to gauge the degree to which stakeholders' contributions have been taken up into the design, and if not, explanations will be provided as to their non-feasibility. Either way, the process and the tool enables authentic stakeholder engagement and helps build a sense of "ownership" of the Linden to Mabura Hill Road and Bridge over the Kurupukari crossing; and (hopefully) a degree of satisfaction that the inputs of stakeholders matter. The full matrix, inclusive of designer’s response can be found in Appendix B.

Social Component	Impact • Source of Impact	Impact Type	Significance	Likelihood	Project Phase
Health	Health Emergencies • Life threatening emergencies or injuries occurring on worksite with no immediate medical services nearby	Neg; Loc; Dir	Sig.	Mod-L	Con.
	Communicable and Non-Communicable Diseases • Infection from vector-borne diseases such as dengue and malaria • Sexually Transmitted Infections and TB	Neg; Dir; ST/LT	Sig.	Mod-L	Op; Con
Accidents	Dangerous driving and accidents • Speeding heavy-duty trucks, mini-buses and other vehicles using the roads • Presence of parked machinery and equipment on roadways (especially at night) without proper signs or lighting	Neg; In-D; Loc	Sig.	Likely	Con; P-Con
	Population safety • Absence of proper warming signs along route, particularly in populated areas and where schools are located	Neg; In-D; Loc	Sig.	Mod-L	Con; P-Con
Livelihoods	Vending/Vendors • Potential displacement of vendors who are mostly female, affecting their livelihoods	Neg; Loc; ST	Sig.	Un-L	Con.
	Unemployment • High rates of unemployment in communities along project route	Loc, In-D, LT	Sig.	Likely	Op; Con; P-Con
Culture and Heritage	Preservation of Indigenous Culture • Potential violations against the rights, cultural heritage including sacred	Loc; In-D; LT	Mod.	Un-L	Con.

	sites, and titled lands of Indigenous Peoples				
	Conservation of endangered species (wildlife) • Hunting or purchasing endangered species of wildlife	Loc; In-D; LT	Mod.	Mod-L	Op; Con.
Utility and Habitation	Disruption of water supply • Damage to GWI main during constructions works at Village #58	Neg; Ex; ST	Sig.	Mod-L	Con.
	Contamination of water sources • Potential contamination of water sources (creeks and rivers) during construction	Neg; Ex; ST	Sig.	Mod-L	Con.
	Displacement • Displacement of homes and buildings along project route	Neg; Ex; ST	Sig.	Mod-L	Con.
Social Awareness and Engagement	Trafficking in Persons • Complicity towards activities of trafficking in persons	Neg; Ex; LT	Sig.	Un-L	Op; Con
	Engagement with local communities • Construction camps interacting with local communities	Pos; Loc; ST	Min.	Likely	Op; Con.
	Protests	Neg; Loc; ST	Min.	Mod-L	Op; Con.

KEY – IMPACT RATING PARAMETERS

Pos – Positive	**Loc – Localised**	**Dir – Direct**	**ST – Short Term**
Neg – Negative	**Ex – Extensive**	**Indirect – Indirect**	**LT – Long Term**

8 Environmental Impact Assessment

This section identifies and assesses the potential impacts on the physical and biological environment of the project. The impact assessment describes project impacts that typify the main phases of the project, that is, the construction and operation phases. Impact identification and evaluation was conducted through a rigorous systematic approach and included:

- Characterizing the baseline conditions of the project area to establish and assess the most likely environmental effects of the project (as discussed in Chapter 4);
- Identifying the source of impacts and the impacts themselves that are likely to be generated by the project. This was achieved through professional judgment, desk top analysis and review of relevant literature, the environmental management plans of similar projects, and consultations with project stakeholders;
- Rating impacts to determine impact significance; and
- Recommending appropriate mitigation measures to address significant negative impacts (as discussed in Chapter 7).

The impacts were assessed given the current status of the project and project environment, which is an existing road and crossing in an already disturbed environment. Impacts were also assessed based on the road design maintaining the existing road alignment between Linden and Mabura Hill and the identified option for the Bridge Crossing at Kurupukari being Option 2 – which will be located 75m downstream of the Ferry Landing. The physical and biological impacts were assessed based on an Area of Influence (AOI) of 100m on both sides of the alignments for the road and bridge.

For this EIA, impacts are considered as positive or negative, direct or indirect, short-term or long-term, localized or local, regional and cumulative. Table 30 provides definitions for each type of impact.

Table 30: Definitions of Types of Impacts

Impact Type	Definition
Positive	An impact that results in a positive effect on the receiving environment or resource from activities performed at or by the project.
Negative	An impact that results in a negative effect on the receiving environment or resource from activities performed at or by the project.
Direct	An impact created as a direct result of the project.
Indirect	An impact which may be caused by the project, but will occur in the future or outside the project's AoI.
Short-term	An impact or activity that is expected to dissipate shortly after the cause ceases
Long-term	An impact or activity that is expected to continue for significant time after the cause ceases
Localized	Impact which is limited to the project's AoI.
Extensive	Impact which has extended beyond the vicinity of the project's AoI.

Cumulative impacts are discussed which address issues likely to occur from initiatives facilitated by the presence of the project.

Considering that the project is not complex, employs well understood construction methods and the fact that it is not a new project with the project sites being disturbed areas with existing activities, the impact assessment adopted primarily a qualitative approach.

The importance of an impact was assessed by a combination of the following:

- The **significance** of the impact on the resources should the impact occur; and
- The **likelihood** of that impact occurring.

In determining **the significance level**, consideration is given to the types of impacts from project activity relative to existing baseline conditions. This is described in Table 31.

Table 31: Impact Significance Level Descriptors

Significance Level to Potentially Impacted Physical and Ecological				
Negligible	**Minor**	**Moderate**	**Major**	**Extreme**
Minimal impact in a localized area of little or no consequence.	Low impact in a localized or regional area with a functional recovery within one year.	Medium impact in a localized or regional area with a functional recovery of 1 to 5 years.	High impact in a localized or regional area with a functional recovery within 5 to 10 years.	Very high impact in a broad regional area or area of national significance with functional recovery in greater than 10 years, if at all.

In determining **the likelihood levels,** consideration was given to the probability of an identified physical or ecological or socioeconomic resource to be impacted by the project. The anticipated likelihood of occurrence of an impact was identified to range from Rare to Certain (Table 32).

Table 32: Impact Likelihood Levels

Likelihood of Impact to Physical, Ecological or SocioEconomic Resources				
Rare	**Unlikely**	**Likely**	**Almost Certain**	**Certain**
Highly unlikely to occur but theoretically possible.	May occur within the life of the Project or activity.	Likely to occur more than once during the life of the Project or activity.	Very likely to occur during the life of the Project or activity.	Expected to occur as a result of the Project or activity.

Utilizing the outcomes of both the impact significance ranking and the identified likelihood of impact, the effect of impact causing action on the receiving environment is evaluated. The risk level (or importance) is assessed by combining the significance column and the probability row in the following Risk Assessment Matrix (Table 33).

Table 33: Risk Assessment Matrix

		Significance				
		Negligible	**Minor**	**Moderate**	**Major**	**Extreme**
Likelihood	**Rare**	Low	Low	Low	Medium	Medium
	Unlikely	Low	Low	Medium	Medium	High
	Likely	Low	Medium	Medium	High	High
	Almost certain	Low	Medium	High	High	Critical
	Certain	Low	Medium	High	Critical	Critical

Note: Where the Significance of an impact is indicated to be positive, the corresponding risk will also be positive.

Impacts to be mitigated are those which have a **Negative** rating and pose a **Medium to Critical Risk.** In such cases the approach has been to identify actions to avoid (remove or minimize the source of the impact by modifying project operations) or reduce (lessen the chances of adverse interaction between the project activities and receptions) the potential negative impacts.

Table 34 provides a summary of potential impacts of the LMH Road Upgrade and Construction of a Bridge at Kurupukari, the phases of the project they are likely to occur and whether mitigation actions are needed. These are discussed as part of the impact analysis. Chapter 9 outlines mitigation measures to prevent, minimize and manage the adverse impacts identified.

Table 34: Summary of Potential Impacts on Physical and Biological Resources and Mitigation Measures Proposed

Environmental Component	Impact	Source of Impact	Impact Type	Significance	Likelihood	Project Phase	Mitigation Measures
Physical Resources							
Soils	Erosion	Vegetation clearing to facilitate upgrade of LMH road or construction of bridge at the Kurupukari Crossing	Neg; Dir; Loc; ST;	Moderate	Likely	Construction	• Soil disturbance should be limited to areas only where it is absolutely necessary. • Adequate drainage should be provided at temporary work areas. • Areas of exposed soil should be monitored during periods of heavy rainfall and proper control of stormwater flow over exposed soil surfaces should be practiced. • Weather pattern should be considered before initiating major earthworks. Earthworks should be avoided during periods of heavy rainfall. • Material stockpiles and waste debris should be located at least 10 m away from the drainage system. • Material stockpiles should be kept to a minimum. • Stockpile areas may require berming to collect sediments from runoff during periods of heavy rainfall. Wooden or other material may be used to box off the stockpiled material to prevent erosion. • Excavated materials should be removed from sites as soon as possible and be disposed of at approved sites. Excavated materials should not be onsite for more than two weeks. Where possible excavated materials should be reused. • Side ditches should be installed at road sides and turn-out drains (outlets) should be created at various intervals along the road alignment to help drain water away from the road and into the natural drainage of the area. • After construction, burrow pits should be adequately decommissioned and closed out, including installation of proper drainage.
Soils	Compaction	Movement of heavy equipment	Neg; Dir; Loc; ST;	Minor	Likely	Construction	• Traffic and movement of heavy-duty equipment including low-bed vehicles and heavy trucks over open areas should be restricted and controlled and

Environmental Component	Impact	Source of Impact	Impact Type	Significance	Likelihood	Project Phase	Mitigation Measures
							damage to these areas should be repaired as soon as possible. • Soils that have been compacted by heavy-duty equipment during transport of materials and also during site works should be scarified. • Appropriate heavy-duty equipment should be utilised for all works. • Designated routes for heavy-duty vehicles should be established and used to prevent soil compaction.
Soils	Soil Contamination	Accidental release of waste oils, fuels, lubricants and hazardous wastes. into soils.	Neg; Dir; Loc; ST;	Minor	Likely	Construction	No mitigation required.
Water Resources	Sedimentation	Erosion from improper road drainage and storm water	Neg; Dir; ST; Loc;	Minor	Likely	Construction & Operation	• See previous mitigation measures under Soils addressing erosion during the construction phase. • Weather patterns should be considered during rehabilitation works as heavy rainfall would increase sedimentation rates in bare soil; and • Discharging of storm water runoff directly into nearby water course should be avoided. The location of turnout drains should ensure that storm water is dispersed into the forest and not directly into creeks to prevent sedimentation. The forest acts as a filter, trapping any large solid particles before the water enters the creeks, thus can contribute to reducing the level of sedimentation.
Water Resources	Contamination	Accidental or intentional discharge of waste oils, fuels, lubricants, or hazardous wastes into	Neg; Dir; ST; Loc;	Minor	Likely	Construction	• Waste oil from servicing of machinery and vehicles should be collected and reused/disposed in a safe and acceptable manner in accordance with EPA guidance.

Environmental Component	Impact	Source of Impact	Impact Type	Significance	Likelihood	Project Phase	Mitigation Measures
		water courses and the Essequibo River					• Waste oil drained from vehicles and machinery should be collected by pans and transferred to storage drums located in a designated area. • Used tyres should be stored in a covered area and not be allowed to accumulate water as they can become a breeding ground for mosquitoes. • Used batteries should not be disposed in the environment. These batteries should be collected and returned to the suppliers or provided to approved used batteries dealers. • Fuel storage onsite should be placed at a safe distance from waterways, site offices, accommodation and work areas. Long term storage areas should have secondary containment and impervious base and be covered to keep out rainfall. • Fuel should be transported to the work areas as needed or stored in small quantities. Small quantities of fuel onsite will minimize the possibility of spillages to occur, and also minimize the impacts if spillages do occur. Any fuel storage should be placed higher than ground level to detect any leaks. No fuel should be stored within 100 m of any waterway. • Ensure necessary preventative measures such as adequate signage, fire extinguishers and/or sand buckets are placed in and around the fuel storage areas. The type of fuel stored in tanks should be indicated and the signage should include 'No Smoking' and Highly Flammable'; • Fuel storage containers should be regularly monitored for leaks. • When handling fuel, care should be taken to prevent spillage and leaks, especially during off- loading and refuelling. All nozzles and hoses should be properly secured and stored away to avoid spills and/or accidents;

Environmental Component	Impact	Source of Impact	Impact Type	Significance	Likelihood	Project Phase	Mitigation Measures
							• During the filling/refilling process drip pans should be placed under the equipment/vehicle to prevent any possible contamination and subsequent run off of fuel due to leaks. • Spill kits should be made available in the event of spillages. These kits should be placed in strategic locations that are accessible to key personnel who should be trained in the proper use of these kits through the executions of drills. • Workers, mechanics and other staff should be trained on the proper use of spill kits, as well as in the safe handling of fuel and lubricants.
Water Resources	Contamination	Dumping of general solid wastes/ garbage along the road and into water courses and the Essequibo River	Neg; Dir; LT; Ext;	Minor	Almost Certain	Construction & Operation	• Sewage will be generated from work sites associated with the construction phase of the project. Since the road construction activities will result in the shifting of the operation base as the work progresses it is recommended that portable toilets or pit latrines be utilized. If pit latrines are utilized these should be of the ventilated improved type and be constructed in accordance with the GNBS Guidelines. At the bridge construction site septic tanks should be installed, equipped with filter bed and soak-away. Portable toilets can also be utilized at the construction site. • Waste water from kitchen and bathing areas should be channelled to a soak away. At more permanent sites such as the bridge construction, grease/oil traps should be utilized. • Waste such as paper and cardboard, empty plastic bottles, cans, etc. will be generated by staff working along the construction areas and from the work camps. The waste should be collected via bins placed at strategic points around the construction zones and camps. The bins should be emptied on a regular basis, or once filled. Garbage should not be allowed to accumulate onsite and should be collected and disposed of at an approved area.

Environmental Component	Impact	Source of Impact	Impact Type	Significance	Likelihood	Project Phase	Mitigation Measures
							• All construction waste; such as materials from construction of road, bridges and culverts should be consolidated and reused as much as possible. If it cannot be reused then it should be properly disposed of. Consideration should be given to making the materials available to nearby communities if requested. Waste should not be left in the open to litter the work camps or the road alignment and the bridge construction zone and should be disposed of within 30 days. • No burning of any type of waste should occur. If burial of waste is to be conducted these pits should be located at least 100 m from waterways and be covered regularly.
Water Resources	Cross Drainage	Drainage capacity of culverts are not adequate	Neg; Dir; ST; Loc;	Moderate	Rare	Construction & Operation	No mitigation required.
Air Quality	Dust	Light and heavy vehicles traversing the roads	Neg; Dir; ST; Ext;	Minor	Likely	Construction	• Workers should be equipped with the necessary PPE to combat dust nuisance. Personnel working within dusty environments should be required to use dust masks and respirators if needed; • A speed limit should be imposed for vehicles traversing the work sites and construction zone to reduce the generation of airborne particulate matter; • During dry periods to soak the construction zone and routes where vehicles and equipment traverse. As such, a water tanker should be provided onsite; • Dry materials for road construction such as sand and loam should not be stockpiled in close proximity to communities; and • All vehicles transporting loose materials should be covered to minimize dust emissions.

Environmental Component	Impact	Source of Impact	Impact Type	Significance	Likelihood	Project Phase	Mitigation Measures
Air Quality	Emissions	Exhaust emissions from vehicles and machinery	Neg; Indir; ST; Loc; Un;	Negligible	Likely	Construction & Operation	No mitigation required.
Noise	Noise	Activities during the road upgrade and construction of the bridge at Kurupukari	Neg; Dir; ST; Loc;	Minor	Likely	Construction	• Workers should be equipped with the necessary PPE to mitigate noise pollution. Hearing protection for employees exposed to high noise levels: ear muffs and earplugs for employees who operate heavy-duty machines/equipment should be provided; • Noise levels should be controlled at the source through installation of mufflers on exhaust system; • Noisy activities should not occur close to the communities during the night or on Sundays and Holidays. Any work to be conducted after 18:00hrs and prior to 6:00hrs, or on Sundays and holidays, must be approved by the Supervisory Consultants. The request for approval must be made at least three days prior to the works; • Noisy equipment such as generators should be sited away and downwind from workers accommodation and site offices; • In sensitive areas such as school zones and the Iwokrama Field Station more strict measures such as scheduling of noisy activities, etc., should be considered to prevent undesirable noise nuisance. The contractors should liaise with the IIC management to ensure that noisy activities are conducted at appropriate times in order to mitigate impacts of bird and wildlife migration from the construction area. • The contractors should ensure that machinery and equipment are working efficiently; and • Periodic monitoring of noise levels should be conducted during the construction phase.

Environmental Component	Impact	Source of Impact	Impact Type	Significance	Likelihood	Project Phase	Mitigation Measures
							• Iwokrama to ensure that there is no forest clearance or vegetation removal in the forested area between the road corridor and the Iwokrama Field Station; • Signs indicating no stopping and no use of horns on the road corridor between the Kurupukari bridge and Fairview Village; and • Iwokrama rangers to have an enhanced monitoring presence on the road corridor.
Noise	Noise	Traffic on the road and bridge during operations	Neg; InDir; LT; Loc;	Negligible	Likely	Operation	• Iwokrama to ensure that there is no forest clearance or vegetation removal in the forested area between the road corridor and the Iwokrama Field Station; • Signs indicating no stopping and no use of horns on the road corridor between the Kurupukari bridge and Fairview Village; and • Iwokrama rangers to have an enhanced monitoring presence on the road corridor.
Archaeological Sites	Vibrations	Activities for pier construction of the bridge at the Kurupukari Crossing	Neg; Dir; ST; Loc;	Negligible	Unlkely	Construction	No mitigation required.
Biological Resources							
Flora	Loss of vegetation	Vegetation clearing for the upgrade of the LMH Road	Neg, Dir; ST; Loc;	Minor	Likely	Construction	• Adequate drainage should be maintained/installed especially crossings to prevent flooding/water accumulation within forested areas; • Any clearing of vegetation should be limited to only areas required and should be conducted in a manner to maintain the aesthetics of the natural landscape; • Harvesting of forest species along the LMH Road for use during the construction should not be allowed.
Flora	Loss of vegetation and habitat fragmentation	Vegetation clearing for the bridge at the Kurupukari Crossing	Neg; Dir; ST; Loc;	Moderate	Certain	Construction	
Flora	Loss of	Fire	Neg, Dir;	Minor	Likely	Construction	

Environmental Component	Impact	Source of Impact	Impact Type	Significance	Likelihood	Project Phase	Mitigation Measures
	vegetation		ST; Loc;				• Natural regeneration along areas previously cleared should not be disturbed, unless required; • Soil erosion control measures should be implemented; and • During the construction period measures should be implemented to prevent forest fires such as no open or uncontrolled burning of waste and no disposal of lighted cigarettes by workers. • Fire response equipment should be maintained at work areas. • Once the alignment of the 300m road corridor within Iwokrama is identified and demarcated, the IIC should be requested to undertake a flora and fauna survey. IIC should also be requested to undertake the clearance to ensure this is done in accordance with IIC's requirements and also for IIC to maximise the utilization of trees removed. • If it is contempated that the existing ferry operated by MMC would be decommissioned once the bridge is in place, then the land take from Option 2 could be offset by closing out and re-vegetating, using endemic species, the existing landing area and road. This offers the opportunity of an offset and shoud be explored with IIC and Fairview village.
Terrestrial and aquatic fauna	Habitat loss and fragmentation Displacement and some mortality of terrestrial vertebrate species	Vegetation clearing Noise nuisance Vibrations and dust	Neg, Dir; ST; Loc;	Minor	Likely	Construction & Operation	• Consideration to be given to the establishment of vegetation cover for animal passage particularly at stream crossings, and wildlife underpass crossings at bridges and culverts, particularly species with reduced movement capabilities such as herpetofaunal species, and small mammals; • Stream crossings should be constructed to ensure adequate flow of water during storm events. • Water quality of streams within and around the construction zones should not be affected by construction activities. Recommended measures for

Environmental Component	Impact	Source of Impact	Impact Type	Significance	Likelihood	Project Phase	Mitigation Measures
							the management of waste and hazardous materials and the prevention of sedimentation should be implemented. Receiver water quality should be monitored to ensure ecologically acceptable turbidity, nutrient, oil and grease and sediment levels; • No unnecessary clearing of vegetation should be conducted and any clearing should be staggered to allow wildlife to move, especially slow moving species. This is especially the case with the vegetation clearance in the Iwokrama forest to establish the 300m road corridor; • Measures should be implemented to prevent forest fires; • Grubbed up soil and vegetation materials from construction activities should be land spread and placed at the side of the carriageway or within the adjacent forest areas of the roads to prevent the creation of a longitudinal barrier to animal movement; • Animals with reduced movement capabilities should be allowed to escape if encountered by construction workers; • Worker camps and dwellings routinely sanitized and camp food ration and waste storage and disposal done according to best management practices; • During the operational phase: • Speed limits should be prescribed and enforced; • Drivers should be educated on avoiding road kills of wildlife; and • Warning signs should be installed at strategic areas indicating hunting/capturing of wildlife is prohibited, especially within the road corridor in the Iwokrama forest; • The IIC should ensure that there is no forest clearance or vegetation removal in the forested area

Environmental Component	Impact	Source of Impact	Impact Type	Significance	Likelihood	Project Phase	Mitigation Measures
							between the road corridor and the Iwokrama Field Station; • Signs indicating no stopping and no use of horns on the 300m road corridor In the Iwokrama forest should be installed; • There should be an enhanced monitoring presence by Iwokrama ranger on the 300m road corridor in the Iwokrama forest.
Terrestrial and aquatic fauna	Hunting and gathering of wildlife by workers may occur if not strictly managed.	Hunting and gathering of wildlife by workers not strictly managed.	Neg, Dir; ST; Loc;	Minor	Likely	Construction	All construction workers should be prohibited from hunting, trapping, killing, harming or capturing of any wildlife. Workers should be educated on the importance of wildlife and the impacts they can cause, so as to ensure they are aware of the need to preserve wildlife and to reduce wildlife/roadway conflicts.

KEY – IMPACT RATING PARAMETERS

Pos – Positive	**Loc – Localised**	**Dir – Direct**	**ST – Short Term**
Neg – Negative	**Ex – Extensive**	**Indirect – Indirect**	**LT – Long Term**

8.1 Physical Environment

8.1.1 Soils

Impacts

Accelerated erosion during the construction phase of the LMH is a potential risk to the project as the natural soil base is of low structural integrity and may fail rapidly following vegetation removal. Potential risk of erosion is also present on sections of the alignment which occur on slopes/inclines and on the banks of the Essequibo River at the Kurupukari Crossing, and in areas where burrows pits will be created to provide construction materials.

The use of heavy-duty machinery during the construction phase on the surface of the soil can result in soil compaction beyond the ability of the soil to allow for permeation. Potential risks of compaction are particularly high at construction camps, stockpile yards and vehicle storage/maintenance areas. Consequently, ponding of water can become an issue after heavy rainfall and continuous compaction thereby increasing risks of erosion of the surface.

There is also potential risk of soils being contaminated by the accidental or intentional discharge of fuels, waste oils and lubricants during the construction phase of the project.

Analysis

The existing LMH Road has no drainage system and rainwater runs off the surface of the road. At some sections of the road makeshift turnout drains have been created and some of these drains have significantly eroded. At other sections of the road, pits have been dug on the land at either side into which water drains. At several locations, runoff has led to the formation of gullies which eroded the road edge. It is not anticipated that there will not be significant vegetation clearing for road construction since the upgrade will be done within the existing carriageway. Significant erosion was not observed at the Kurupukari Crossing. Furthermore, compaction of soils along the LMH road were not observed at present.

The LMH Road will be built up so that it is higher than the surrounding ground and the design provides for concrete lined channels on both sides of the roadway. Segments of the roadway on steep slopes will be kerbed and drainage chutes provided to channel water from the road. This will address in a significant way, potential for erosion. Also, the paved surface of the roadway as part of the design, and soil stabilization measures to be applied to steep side slopes will address any potential for erosion on slopes. The erosion and compaction risks along the LMH are not considered to be significant as they can be prevented or minimized during construction of the LMH Road upgrade provided that good engineering practices are employed.

There will be some level of soil disturbance relating to the creation of burrow pits to source construction materials. If these pits are not properly reclaimed/closed out erosion can occur.

Contamination of soils from accidental discharges of fuels, waste oil lubricants or chemicals is not considered significant as this can be prevented if proper fuel and environmental management practices are followed.

Mitigation measures to address soil erosion, sedimentation and compaction are identified in the EMP in Section 9.1.1.

8.1.2 Water Resources

Impacts

Surface water courses crossing the LMH road and the Essequibo River at the Kurupukari Crossing are at risk of the following potential impacts from the road upgrade and bridge construction:

- Pollution of water courses from waste oils, fuel and lubricants and other hazardous or chemical wastes during the construction phase;
- Pollution of water courses due to leaching of contaminants from contaminated soils;
- Pollution of water courses from waste generated by construction camps including solid waste and sewage during the construction phase;
- Sedimentation of the water bodies during the construction and operational phases due to erosion and storm water runoff;
- Inadequacy of cross-drainage structures along the LMH;
- Dumping of general solid wastes into water courses due to increased traffic at the crossings during the operational phase.

Analysis

Pollution of Water Courses During the Construction Phase

Intentional or accidental discharge of waste oils, fuel, lubricants, sewage and other potential contaminants such as cleaning liquids or other chemicals can affect water quality. During the construction phase, water quality can be affected as any pollutants are discharged from temporary camps. These potential risks are most significant at the Kurupukari Crossing where various aquatic fauna including fishes, reptiles and amphibians may be directly affected. However, these risks were not considered significant as they are all preventable if good environmental management measures are implemented during the construction phase of the project. These measures are detailed in Chapter 7.

Sedimentation

Soil erosion from improper road drainage and storm water runoff can increase sedimentation and the turbidity of water courses. Sediments may also be released as a result of any clearing of vegetation required for the road upgrade or bridge construction including for the construction of camp-site or clearance of the right-of-way. Increased sediment loads may have potential negative impacts on aquatic life in the crossings along the LMH.

Cross Drainage

Figure156 -1 identifies major stream crossings along the Linden-Mabura Road. In 2010, the bridges over the crossings at Km 66 (Mile 40) and Km 69 (Mile 41) were damaged because of extreme rainfall which caused flash flooding in the creeks. The bridge at Km 66 (Mile 40) was partially collapsed and was passable with difficulty. However, the culvert at Km 69, which is located in the Mile #47 Village, was completely blown out rendering the crossing impassable and thereby temporarily preventing travelling along this section of the roadway. Prior to this, in 2004, the culvert at Km 69 also washed out. During the stakeholders' consultations, villagers of Mile #47 Village indicated that the culvert in the Village frequently overflows during periods of heavy rainfall resulting in flooding of some sections of the Village. Stakeholder feedback also revealed that there is cross-flow over the road surface which increases erosion risk along the road edge.

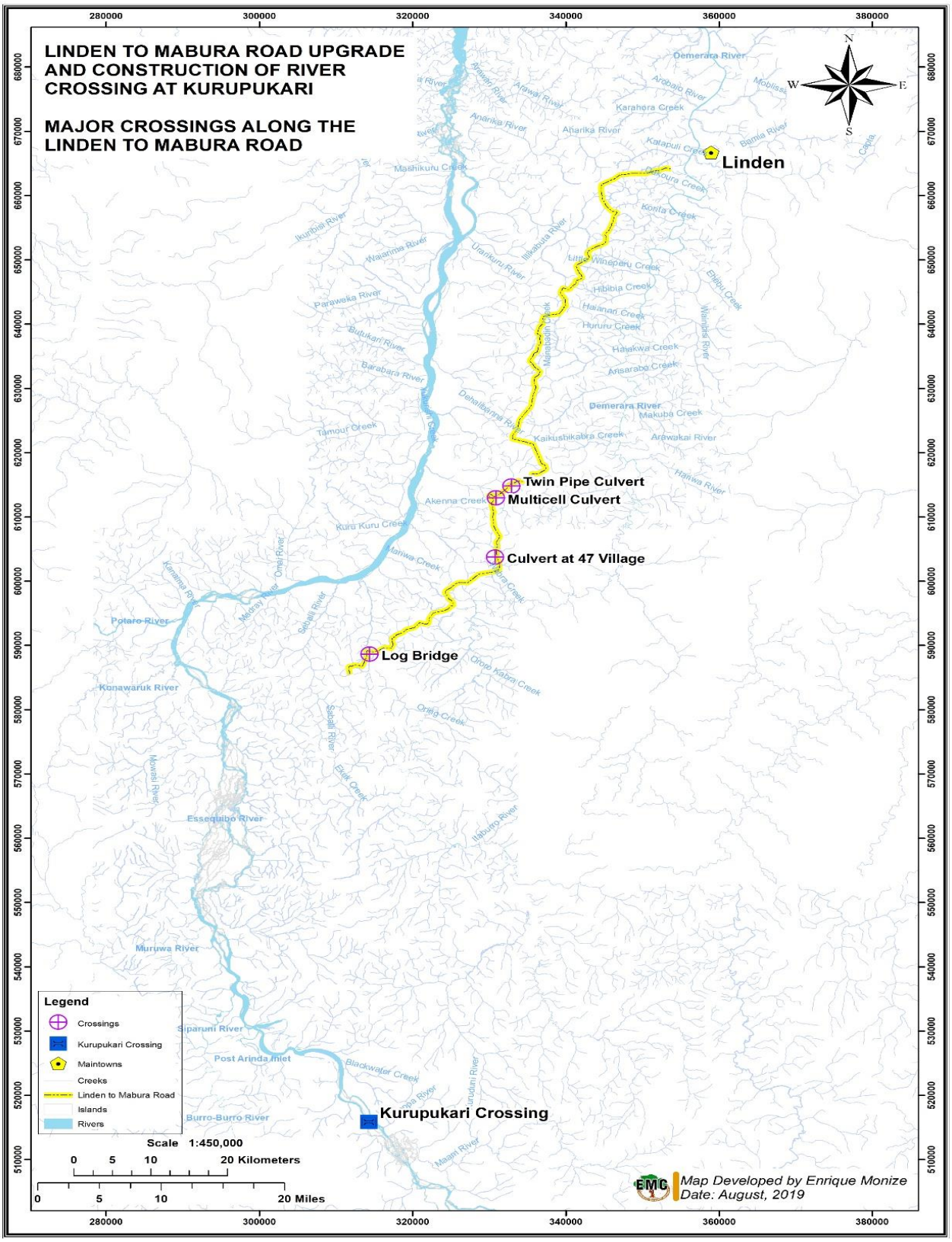
Measures for rehabiliting and expansing the drainage capacity of these drainage structures were recommended as part of the Climate Vulnerability Assessment (CVA) conducted for the project. Based on the findings of CVA and the Hydrological Assessment, the measures to improve cross drainage were also included in the project design. The findings are also dicussed in Section 6.5 Vulnerability Assessment of this EIA report.

Rehabilitating and expanding the drainage capacity of these drainage structures have been considered in the design for the LMH road upgrade and therefore cross drainage impacts are not considered significant.

Dumping of Solid Waste

Increased traffic is expected on the upgrade road and the bridge across the Kurupukari Crossing. In the longer term, when the entirety of the Linden to Lethem road has been completed, even higher volumes of traffic could be expected. The crossings along the LMH and at the Kurupukari Crossing are currently unpolluted and increased passenger traffic may increase intentional dumping of garbage into these waterways. This potential risk can also be mitigated, with recommended measures provided in Chapter 9.1.4.

Figure 46: Stream Crossings along the Linden-Mabura Road



8.1.3 Noise

Impact

Significant noise levels during the construction phase may have potential negative impacts on settlements at the project sites, tourism activities at Iwokrama and on wildlife in the vicinity of the Iwokrama Field Station. These impacts could also extend during the operation phase of the project especially with the LMH Road and bridge at Kurupukari being open to 24 hours a day traffic.

Analysis

Heavy-duty equipment and machinery to be used for the construction are expected to generate high levels of noise. Exposure to high noise levels can cause noise induced hearing loss, fatigue, tiredness, low morale and decreased productivity. Both construction workers and the nearby communities can be affected by noise from project activities. The limit prescribed in the GNBS Noise Standard for construction activities is 90dB during the day and 75dB during the night. However, there are only a few receptors of noise nuisance during the construction phase of the project including:

- Settlements along the LMH Road including Linden, Mile #47 Village, Mile #58 Village and Mabura Hill. These receptors are not expected to be exposed to significant noise nuisance during the construction phase provided that good environmental management measures are employed by the contractor.
- Settlements at Kurupukari including Fairview Village and the residents and businesses on the eastern bank of the Essequibo. Similarly, these receptors are not expected to be exposed to significant noise nuisance during the construction phase provided that good environmental management measures are employed by the contractor.
- The IIC, located along the Essequibo River and which also offers eco-tourism activities including bird watching tours along the Essequibo River and tours to the petroglyphs at the Kurupukari Falls. Based on the selection of Option 2 for the bridge crossing, which will bring the bridge closer to the IIC, noise from construction could scare away birds and other wildlife thereby reducing possible sightings on river tours. In addition, noise may reduce the ambiance of a tour to the petroglyphs at the Kurupukari Falls. In addition, since the LMH Road and Kurupurkari Crossing will operate 24 hours a day, night traffic could generate noise which could affect wildlife and tourists accommodated at the IIC. As such, the IIC may be considered sensitive to noise nuisance during the construction and operation phases of the project.

In the longer term, when the Linden to Lethem road is operational, and based on traffic forecasts as discussed in Section 4.3.5, it is likely that heavy freight trucks originating in Brazil will traverse the Kurupukari Crossing and the LMH road. This may also increase potential risks of noise at the project sites.

Notwithstanding these scenarios, the selection of Option 2 for the bridge crossing, while it brings the bridge and access road closer to the Iwokrama Field Station by 75 m, the bridge crossing and road corridor will still be downwind of the Iwokrama Field Station thereby reducing the possible impact from noise during both construction and operation phases. It is recognized as well that the area where the road corridor will pass is heavily forested with thick vegetation. Trees have been recognized as providing significant noise attenuation and the extent of forests in this area can serve this purpose.

Mitigation measures to address noise are identified in the EMP in Section 9.1.3.

8.1.4 Air Quality

Impact

Significant dust levels may be generated especially during the dry seasons of the construction phase of the project. This has the potential to negatively affect residents of the settlements proximate to the project sites and possibly tourism activities at Iwokrama. In addition, dust emissions have been observed to reduce visibility on the road thereby increasing the risks of vehicular accidents.

Considering the paved nature of the surface for the LMH Road and bridge at Kurupukari, the likelihood of dust nuisance during the operation phase of the project is not expected. However, emissions from vehicles and equipment will occur during the construction and operation phase of the project.

Analysis

During the dry seasons, dust levels are significant when both heavy and light vehicles traverse the LMH and the access roads leading to the ferry at the Kurupukari Crossing. Increased emissions of dust during the construction phase may have significant adverse impacts on residents who reside in proximity to the LMH road and also affect road users in general. Residents are in close proximity to the road at Linden, Mile #47 Village, Mile #58 Village and Mabura Hill. Significant levels of dust emissions may contribute to increased incidence of non-communicable respiratory diseases such as asthma. However, the project itself, once completed, will alleviate the dust nuisance currently faced by residents.

Stockpiled construction materials such as sand can become airborne due to heavy winds occurring in the project areas resulting in an increased level of particulate matter within the local environment and which can affect receptors if in close proximity.

Vehicles and heavy-duty equipment including pavers, asphalt plant etc will generate fumes which may also have some effect to the microclimate of the project area. However, given the scale of the activities to be conducted, this impact is considered negligible.

Section 6.3.5 identifies traffic forecasts as follows:

Without diverted traffic the average annual daily traffic (AADT) increases by approximately 250% from 2020 to 2039 as follows:

- LMH Road – From between 200-320 vehicles in 2020 to between 500-790 vehicles in 2039 (depending on section of road);
- Kurupukari – From 90 vehicles in 2020 to 222 vehicles in 2039.

With diverted traffic the AADT is much higher in 2039;

- LMH Road – Between 1,560 and 1,850 vehicles in 2039 (depending on section of road); and
- Kurupukari – 1,281 vehicles in 2039.

Based on the above, the most optimistic future traffic scenarios are approximately 5.8 times the current scenario for the LMH Road and 14 times for the Kurupukari Crossing. However, the Feasibility Study Report does indicate that short-term traffic counts carried out only in 2010 and 2019 are not a reliable indicator of long-term trends.[91] Estimation of projected emissions from traffic scenarios is also challenged by absence of information such as fuel type, engine size, speed, control technologies etc for each category of vehicles to run models, no baseline scenario for air emissions along the LMH Road and Kurupukari, and the requirement of specialized expertise to be able to carry out modelling. Notwithstanding, the impacts on air quality should be negligible due to the traffic levels still being relatively low – despite the large percentage increase, there being few receptors adjacent to the roadway and little to no idling / queuing traffic. Coupled with the decrease in dust emissions, air quality should not be a negative consideration of this scheme.

Mitigation measures to address air quality are identified in the EMP in Section 9.1.2.

[91] Extracted from Mott MacDonald, November 2019, Feasibility Study Report, Linden to Mabura Hill Road Upgrade and River Crossing at Kurupukari, pg 40– Section 3.3 Updated Traffic Forecasts

8.1.5 Archaeological Sites

Impact

There are no known archaeology sites along the LMH road. However, at Kurupukari there are petroglyphs and man-made soils in the vicinity of the proposed bridge construction site.

Analysis

The identified option for the Bridge Crossing at Kurupukari is Option 2 – which will be 75m downstream of Ferry Landing. The islands are inhabited and the petroglyphs and prehistoric man-made soils are located on the eastern bank of the river[92]. Considering the proposed location of the bridge, there should be no direct interference with the sites and hence no anticipated impacts on the petroglyphs from the construction and operation of the bridge at Kurupukari.

However, in the event that archaeological materials or site are discovered during construction of the LMH Road and bridge at Kurupurkari, a procedure consistent with national requirements should be instituted. This is described in the ESMP in Section 9.1.6.

8.2 Biological Environment

8.2.1 Flora

Impact

The main impact to the flora in the project areas will be due to the clearing of vegetation for the road upgrade and construction of the bridge at the Kurupukari Crossing and will depend on:

- The design specifications as per width of the shoulders, carriageways, area required for drainage structures and the width of the utilities' corridors and/or right-of-way for the road upgrade;
- The location identified for the construction of the bridge at the Kurupukari Crossing;
- Vegetation clearing of borrow pits to facilitate the extraction of construction materials to be used in construction of the roadway, if any proximate sources of materials are identified;
- Fire hazards along the LMH road;
- Harvesting of selected tree species by Contractors to be used for the project;
- Vegetation clearing for construction camps, temporary work areas and stockpiling or storage of construction materials.

Analysis

No significant impact to the vegetation within the project areas is anticipated given that the road upgrade will be done mostly within the existing carriageway. Most of the forested areas proximate to the roadway are secondary forests and the white sand forested areas proximate to Linden are frequently used for agriculture and charcoal production. In addition, as part of routine maintenance of the LMH Road construction camps and temporary work areas have been established along the road and these should be used as much as possible for the construction phase. Also, since MMC operates the ferry service at Kurupukari, work areas have already been established which could be used as temporary work areas.

The identified option for the Bridge Crossing at Kurupukari is Option 2 – which will be 75m downstream of the Ferry Landing. This option will require an approximately 300m length road corridor which extends a through part of the Iwokrama Nature Reserve to link the bridge to the existing road (Kurupukari to Lethem Road). Based on a corridor of 30m width, approximately 9000m^2 of forested area in the Sustainable Use Area (SUA) of Iwokrama would be affected. The extent of land take from the IIC is significant. However, this area is within the SUA component of the IIC and within which sustainable development and species extraction is allowed. It

[92] ERM, 1995. Environmental and Social Impact Assessment – Linden – Lethem Road, Guyana. Section 6.2.3. Water Resources.

is envisaged that impacts to fauna will be minimal due to migration given that the immediate areas are disturbed and there are activities being conducted within proximity with the operations of the Iwokrama Field Station. It is expected that the flora in the area of land take would be representative of the wider area so no major loss of habitat or species value would be incurred. Also, considering that this would be within the IIC SUA, commercial and other timber species could be extracted by IIC prior to construction.

Contractors may tend to harvest selective tree species from nearby forest to support construction activities, such as camp construction, form work, etc. While this impact is expected to be negligible it is not recommended.

Fires are reported to frequently occur in the white sand forest area surrounding Linden. However, source of these fires is likely to be from the anthropogenic burning of biomass[93]. In drought conditions deliberate biomass burning could create the potential risks of fires spreading further south along the road alignment. Anthropogenically set forest fires proximate to the forest areas should be carefully monitored during the construction and operational phases of the project.

Mitigation measures to address flora are identified in the ESMP in Section 9.2.1

8.2.2 Fauna

Impact

Impacts to wildlife due to the upgrade of the LMH road are not expected to be significant since the existing carriageway will be utilized and most sensitive wildlife may have either moved from this area as the road is operational for almost 50 years now, or would have adapted to the presence of humans and the activities occurring. Aquatic fauna can be impacted by any impact to the water quality of the streams along the road alignment and by fishing by workers. Noise may scare away animals and construction workers can also hunt or trap certain species. There is also the possibility of road kills from construction traffic.

During the operational phase of the road there is also the possibility of road kill, especially given that the new road surface might encourage speeding.

The construction of the bridge at the Kurupukari Crossing could have the following potential impacts on fauna:

- Vibrations from construction activities including pile driving for the bridge may have potential impacts on aquatic fauna including fishes, reptiles and amphibians in the vicinity of the Kurupukari Crossing;
- Noise from construction activities may scare away birds at the Kurupukari Crossing as previously discussed;
- Intentional or accidental pollution of surface water with fuel, lubricants, hazardous or chemical wastes could negatively affect aquatic fauna. As previously discussed, this risk could be mitigated; and
- Increased access to the IIC via the bridge at the Kurupukari Crossing increases risks of poaching and illegal hunting within the protected area.

Analysis

As is the case with flora, no significant impact to fauna is anticipated for the upgrade of the LMH Road given that the road upgrade will be done mostly within the existing carriageway. Most of the forested areas proximate to the roadway are secondary forests and the white sand forested areas proximate to Linden are frequently used for agriculture and charcoal production. However, wildlife may be disturbed during construction due to noise, dust, night lights and construction traffic. Any habitats lost due to vegetation clearing may also affect movements of some species specifically the loss of arboreal pathways for canopy dwelling vertebrates such as primates[94]. However, as previously noted, vegetation clearing for construction camps and temporary work may be limited as areas already exist along the LMH Road and at the MMC compound at the Kurupukari Crossing. The use of these should be optimized.

[93] Guyana Forestry Commission, 2018. Guyana REDD+ Plus Monitoring, Reporting and Verification System (MRVS) Year 7 Summary Report.

[94] ERM, 1995. Environmental and Social Impact Assessment – Linden – Lethem Road, Guyana. Section 6.3.3. Impacts on Wildlife

Potential impacts on fauna at the bridge crossing at Kurupukari may have indirect impacts on the species which occur within the boundaries of the IIC. The selection of Option 2 for the bridge, which will be 75m downstream of the Ferry Landing, will require clearance of approximately 9000m^2 of forested area for the road corridor. During this clearance and the construction phase of the project it is expected that fauna will migrate from the immediate area. The Iwokrama Field Station is the base of IIC's ecotourism operations and contains nature trails and areas of natural interests that are closely associated with the site. However, while Option 2 for the bridge crossing brings the bridge and access road closer to the Iwokrama Field Station by 75 m, the bridge crossing and road corridor will still be a significant distance away and downwind of the Iwokrama Field Station thereby reducing the possible impact to IIC ecotourism activities.

During the operational phase, road kills from traffic, especially at nights is a high possibility. Speed limit signs and signs indicating wildlife crossing zones could be helpful to bring increased awareness to motorists to look out for animals. There will be increased access to the Iwokrama forest based on the location of the bridge and the risk of poaching and illegal hunting within the protected area. However, the Iwokrama forest is a legally protected areas in which no hunting or trapping of wildlife is permitted.

Mitigation measures to address fauna are identified in the EMP in Section 9.2.2.

8.3 Health and Safety

8.3.1 Public Health and Safety

Impacts

The safety of the general public could be compromised by the project's activities if guidelines and best practices are not complied with. There is the risk of accidents during both the construction and operation phase.

Analysis

The existing LMH road is a public facility that is used for a variety of reasons including passenger travel to the interior regions and transport of freight and fuel to interior locations including mining operations.

Since heavy-duty equipment and vehicles will be working along and traversing the road during construction, the safety of other road users could be endangered, especially since the roadway will still be used to facilitate the flow of traffic. Accidents can easily occur at the construction sites. After construction the road surface will be improved allowing for easier and faster movement of vehicles. This may encourage speeding by road users, which can increase the risk of accidents. As such, it is necessary to implement the necessary measures by the various authorities to prevent such an occurrence.

At the bridge construction site, the current river crossing utilizing the pontoon will continue throughout the construction phase. Members of the nearby communities also frequent the area. As such, there will be the presence of personnel in proximity to the construction site. If the construction sites are not secured members of the public could get to close to the activities, creating a safety risk. Construction activities will also be done within the Essequibo River which is traversed daily by small boats and the pontoon. This also presents a potential risk of accidents occurring.

8.3.2 Workers Health and Safety

Impacts

Workers' health and safety is always a major concern since workers are usually exposed to conditions that can result in serious or even fatal accidents. Risks to workers' health and safety include accidents from the use of heavy equipment and machinery, excessive exposure to noisy equipment, inhalation of fumes, and improper use of equipment. Accidents can likely occur and may result in serious injuries, or death if established guidelines and practices are not complied with. The following are therefore possible health and safety risks which are likely to occur:

- Sickness caused by the consumption of untreated water;
- Sickness caused by continuous exposure to excessive noise and vibrations from heavy duty equipment;
- Drowning due to accidental fall or being pinned in toppled equipment/vehicle;
- Injuries or death caused by the toppling of heavy duty equipment;
- Injuries or death from vehicular collisions;
- Injuries from slips, trips and falls;
- Ill health caused by insect bites/ stings or from hostile fauna;
- Injuries or death caused by snake bites;
- Injuries or ill health caused by working under extremely hot conditions;
- Injuries or death caused by tree felling activities;
- Injuries such as loss of limbs; and
- Illness caused by malaria or other diseases.

Analysis

The upgrade of the LMH road and construction of the bridge at the Kurupukari Crossing will entail the use of several different types of equipment, heavy duty machinery and vehicles. While training and monitoring seeks to reduce the risk of any serious accidents, accidents can still occur. Risks may include accidents while using heavy duty equipment, improper use of equipment, etc. In such cases, these exposures can result in physical injuries such as cuts, bruises, loss of limbs or can even be fatal. Exposure to high noise levels can result in increased stress levels. Since heavy duty equipment and passenger vehicles will still be traversing the road the safety of other road users can also be endangered.

Other health conditions can also arise. The construction of roads and the presence of miners increase connections between communities and can create situations which may increas potential for the spread of communicable diseases such as HIV/AIDs and tuberculosis as well as the generation of dust and noise. Poorly designed roads lead to waterlogged conditions that increase the risk of mosquito borne diseases such as malaria. In addition, there will be an influx of construction crews to the area which can normally create security fears among local residents.

Health and safety impacts could be exacerbated taking into consideration the access to immediate emergency and proper health care within the area since the nearest hospital is located in Linden.

8.4 Cumulative Impacts

Upgrading of the LMH Road and constructing a bridge at Kurupukari are considered to be the first phase of an all-weather paved highway between Linden and Lethem and by extension the transnational highway between Guyana and Brazil. When the Linden to Lethem highway is completed, there are expected to be increased environmental impacts. Some of these impacts may be positive as it regards potential economic development which may arise from increased access bringing new investments to interior regions in Guyana. On the other hand, the larger road network could result in irreversible and unmitigable impacts to ecosystems and other natural habitats. Some of these impacts could already be taking place or may occur over time as the country continues to develop.

8.4.1 Increased Access to Central and Southern Guyana

Upgrading the LMH Road and constructing a bridge at the Kurupukari Crossing will increase access and reduce costs associated with current travel to central and southern Guyana for:

- Artisanal gold mining operations in the Potaro and Rupununi mining districts which use the LMH Road, and in the case of the latter district the Kurupukari Crossing to access mining concessions and transport freight and fuel;
- Artisanal gold mining operations which occur in the forested areas bordering the LMH Road;

- Previous large-scale gold mining operations by Omai Gold Mines Limited, an area for which a new prospecting license has been issued by GGMC to Canadian-owned company Mahdia Gold Corporation (Guyana) Inc.
- Large- and small-scale commercial forestry operations including small concessions along the Linden to Kurupukari road, forestry operations by DTL, and forestry operations by Iwokrama.
- Passengers travelling to central and southern Guyana for ecotourism and recreation, particularly to the IIC.

It is likely that increasing access may encourage greater economic activities in the extractives sector and other development areas particularly by:

- Increasing the number of artisanal gold mining operators and small-scale loggers expressing interest in exploring concessions located in the forested areas bordering the upgraded LMH Road;
- Resuscitation of large-scale gold mining operations in the vicinity of the previous Omai Gold Mines;
- Resuscitation of large-scale forestry operations in the vicinity of DTL.
- Expansion of tourism activities particularly due to increased interest in accessing the eco-tourism products offered by the IIC by Guyanese and foreign nationals.
- Encouraging the establishing of service centres along the LMH road and at Kurupukari.

The exploitation of the natural resource base could require removal of tress leading to deforestation. Accelerating the rate of growth in extractive industries may exacerbate ecological stressors (identified in Section 6.2) particularly by:

- Increasing potential risks of vegetation clearing and associated habitat loss and species fragmentation due to mining and logging activities in the forested areas bordering the LMH road, particularly since the Guyana Forestry Commission (GFC) and/or the GGMC may have limited capacities to monitor conditions on the ground.
- Pollution of surface water courses connected to surface hydrology in the project areas including by sedimentation of streams from mining activities. Pollution may also result from accidental or intentional discharges of fuels, waste oils and other hazardous or chemical wastes from mining and logging operations.
- Greater pressure on hunting of wildlife along the LMH and within the protected areas of Iwokrama including poaching of IUCN and CITES species. Moreover, this may be encouraged by the 24/7 access to the IIC boundary which will be made possible by bridging the Kurupukari Crossing. It is noted that Iwokrama may not have the capacity to monitor all areas within its boundaries in which poaching or illegal hunting of wildlife occurs.
- Greater demand to access ecotourism in the IIC significant increases solid wastes generated on-site for which disposal creates significant ecological stress.

Section 6.3.1 Land Use identified the various types of land uses adjacent to the LMH Road and crossing at Kurupukari including mining and logging concessions. Guyana operates under a system of multiple land use and in many instances mining and logging concessions overlap and utilise the same infrastructure.

Legislation regulating the mining and logging sectors currently exist and which empowers mines officers and forestry rangers from the GGMC and GFC to conduct monitoring and enforcement activities in these concessions. For large scale logging operations, GFC maintains a permanent presence of forest rangers while mines officers conduct regular monitoring exercises across mining districts. In addition, along the road corridor from Georgetown to Kurupukari there are several checkpoints which are operated by the Guyana Police Force (Soesdyke Highway, Linden, Mabura Hill), GFC (Soesdyke Junction, Linden) and Iwokrama (Kurupukari) and which monitor the movement of road users including persons involved in logging and mining. While GGMC and GFC are empowerd by legislation which is specific to the agency and sector e.g the Forests Act and Guyana Forestry Commission Act, there is collaboration and sharing of information among the agencies which is facilitated by an MoU. This collaboration also extends to other agencies such as the EPA, Wildlife Commission, and the Guyana Police Force. Iwokrama personnel are also empowered under the Iwokrama

Act to conduct monitoring exercises in the Iwokrama forest and road corridor within. This is also being done in collaboration with regulatory agencies (Police, GFC, GGMC, EPA etc).

With the projected traffic increase, there would be the need for enhanced monitoring perhaps through the setting up of additional checkpoints. In addition, there would be the need for increased monitoring and enforcement by regulatory agencies working in close collaboration with local communities and institutions which have a presence on the ground, including the IIC.

8.4.2 Transnational Transportation between Guyana and Brazil

This project alone may not attract the expected transit traffic from Brazil unless the entire corridor is an all-weather paved road and Guyana's transhipment facilities were developed. These factors would need to be considered as an integral part of the wider Linden to Lethem Road upgrade.[95]

8.5 Vulnerability Assessment[96]

The project could be vulnerable to natural and man-made hazard events during the construction and operation phases. The Contractors are required to prepare an Emergency Response Plan (ERP) as part of their CESMPs which should outline protocols for responding to environmental emergencies that may occur as a result of unforeseeable circumstances, such as a spill of fuel and hazardous materials, accidents to workers, traffic accidents, fire, or medical emergencies. This is elaborated in Section 9.3.3.

As it regards the operational phase of the project, it is recognized that Guyana's transport sector is particularly vulnerable to climate and weather-related hazards. Hinterland roads are at risk from flooding, wash-aways and land instability associated with heavy rainfall events. Climate projections suggest that the proportion of precipitation occurring in heavy events may increase thereby exacerbating risks to climate-related hazards in the future.

Given the existing conditions within the AoI of the project, these projected changes are anticipated to bring about multiple climate change risks to which the project will be vulnerable. Specifically:

- Increased frequency of heavy precipitation events are likely to have the following climate-related risks:
  - Flash flooding of creeks resulting in damage or destruction of structures at crossings on the roadway.
  - Increased erosion and instability at bridge foundations and support structures
  - Increased erosion leading to widespread formation of gullies and ravines along the roadway.
  - Surface runoff contributes to flooding of Mile #47 Village.
  - Surface flooding of the roadway resulting in ponding of water on the surface and wash-boarding thereby weakening the substructure of the road.
  - Slope instability leading to damage of the roadway.
  - Increased risk in the development of potholes, existing potholes will worsen.
  - Increased risks of skid as friction is lowered on wet roads thereby reducing safety.
  - Increased flooding and erosion of the banks of the Kurupukari.
- Increased annual average temperatures and increased frequency of hot days and nights are likely to have the following climate-related risks:
  - Heat damage (softening of asphalt, embrittlement and cracking) or melting of paved surfaces.
  - Heat damage of HDPE pipes used in culverts.

[95] ERM, 1995. Environmental and Social Impact Assessment – Linden – Lethem Road, Guyana. Section 7.9 Effects of Transboundary Linkage.

[96] Extracted from Mott MacDonald, November 2019, Climate Vulnerability Assessment Report, Linden to Mabura Hill Road Upgrade and River Crossing at Kurupukari, pg 37– Section 7 Vulnerability Risk and Adaptation Assessment

  - Heat Stress.
  - Thermal stress of bridge joints.
- In combination, increased average annual temperatures, increased frequency of hot days and nights, decreased average annual precipitation and increased frequency of drought-like conditions are likely to have the following climate-related risks:
  - Increased dust emissions resulting in negative health outcomes.
  - Increased dust emissions resulting in reduced visibility on the roadway.
  - Wildfire.

The Climate Vulnerability Assessment Report has examined and identified the magnitude of climate related risks occurring at the project sites. This is detailed in Section 9 of the Report. In the Climate Vulnerability Assessment, the magnitude of climate-related risks was assessed against a risk-assessment matrix to determine the likelihood and consequences of climate change. Details on this methodology is presented in Section 2 of the Climate Vulnerability Assessment Report.

All climate-related risks associated with precipitation were determined to be either serious or high and are therefore of significant concern to the project area. In the recent past, episodes of heavy rainfall have washed away bridges and culverts rendering sections of the LMH Road impassable. However, the LMH Road follows the watershed between the Demerara and Essequibo catchments which means that very few watercourses cross the road and it does not cross any major rivers or areas of marsh or swamp. This reduces the risk of widespread flooding along the road alignment.

Nonetheless, roads that are impassable or passable with difficulty significant impact Mile #47 and Mile #58 villages which are small, low-income communities located along the existing alignment. Some buildings in both the Mile #47 and Mile #58 communities are located lower than the level of the existing road. Mile #47 village is reported to be prone to flooding. At the Kurupukari Crossing, during the wet season, the water levels rise significantly above the levels otherwise observed and inundate occupied lands, particularly on its western banks.

Risks associated with increased annual average temperature and increased frequency of hot days were determined to be moderate to high. Currently, during the dry seasons, a significant quantity of dust is produced when vehicles traverse the road, adversely impacting all road users. Heat stress to community members, road users and workers during the construction phases of the project. Solar heat gains to the road surface, in combination with an increase of traffic that may be expected as a result of an upgraded road, may stimulate a ‘heat-island’ effect in the Mile #47 and Mile #58 villages. No documented instances involving melting of paved (tarmac) surfaces have been previously reported in Guyana. In general, paved surfaces are not expected to soften or melt until their temperatures exceed 50°C.

Forest fires are frequently observed in the white sand forest area surrounding Linden. It has not been determined whether these fires are only anthropogenically driven as part of agricultural activities. During extreme drought conditions, wildfires have been reported to frequently occur in savannah forests (GFC, 2016) but there are no savanah forests with the AOI. Decreases in average annual precipitation, increases in average annual temperatures, increased frequency of hot days, and drought conditions may, in combination, increase the risks of wildfire in the project area. This risk may be amplified by existing agricultural practices which involve biomass burning in forests close to the roadway.

Additional details and discussion on the risk-magnitude ratings for each climate-related risk and adaptation measures are presented in Section 7 of the Climate Vulnerability Assessment Report and summarised in Table 35, Table 36 and Table 37 presented in the following pages.

Specific adaptation measures to build resilience of the LMH Road and Bridge Crossing at Kurupukari are identified for the climate-related risks which were considered to be ‘serious’, namely:

- Flash flooding of creeks resulting in damage or destruction of structures at crossings on the roadway,
- Increased flooding of the banks of the Kurupukari,
- Increased heat stress to the work force of the project and the users of the roadway and bridge.

In addition, several risks were considered to be ‘high’ due to surface runoff and adaptation measures for these risks were also identified.

The outputs and recommendations from the Climate Vulnerability Assessment Report along with the Hydrology Report were considered as part of the Feasibility Study and Preliminary Design for the project. These are reflected in the proposed design of drainage structures and features to reduce erosion.

Table 35: Risk magnitude rating for the key climate-related risks

Projected climate change impacts	Risk description	Current risk	Likelihood (2060s)	Consequence	Magnitude of risk
Precipitation (decreases in average annual precipitation and increased frequency of heavy precipitation events)	Flash flooding of creeks resulting in damage or destruction of structures at crossings on the roadway.	Yes	Likely	Catastrophic Impact	Serious
	Increased erosion and instability at bridge foundations and support structures.	Yes	Likely	Major Impact	High
	Increased erosion leading to widespread formation of gullies and ravines along the roadway.	Yes	Likely	Moderate Impact	High
	Surface runoff contributes to flooding of Mile #47 Village.	Yes	Likely	Major Impact	High
	Surface flooding of the roadway resulting in ponding of water on the surface and wash-boarding thereby weakening the substructure of the road.	Yes	Likely	Moderate Impact	High
	Slope instability leading to damage of the roadway.	No	Moderate	Major Impact	High
	Increased risk in the development of potholes, existing potholes will worsen.	Yes	Likely	Moderate Impact	High
	Increased risks of skid as friction is lowered on wet roads thereby reducing safety.	Yes	Likely	Moderate Impact	High
	Increased flooding of the banks of the Kurupukari.	Yes	Almost Certain	Major Impact	Serious
	Increased erosion on the banks of the Kurupukari.	Yes	Likely	Major Impact	High
Temperatures (increased average annual temperatures and increased frequency of hot days and nights)	Heat damage (softening of asphalt, embrittlement and cracking) or melting of paved surfaces.	No	Unlikely	Major Impact	High
	Heat damage of HDPE pipes used in culverts.	No	Unlikely	Major Impact	High
	Heat Stress.	Yes	Almost Certain	Major Impact	Serious
	Thermal stress of bridge joints.	No	Likely	Major Impact	High
Temperature and Precipitation (increased average annual temperatures, increased frequency of hot days and nights, decreased average annual precipitation and increased frequency of drought conditions).	Increased dust emissions resulting in negative health outcomes.	Yes	Likely	Major Impact	High
	Increased dust emissions resulting in reduced visibility on the roadway.	Yes	Likely	Major Impact	High
	Wildfire	No	Moderate	Major Impact	High

Source: EMC (2019)

Table 36: Climate Risks, Hotspots and Adaptation Options

Projected climate change impacts	Climate-related risks	Magnitude of risk	Hotspots	Proposed adaptation measures
Precipitation (decreased average annual precipitation and increased frequency of precipitation events)	Fluvial flooding of creeks resulting in damage or destruction of structures at crossings on the roadway.	Serious	The nine crossings along the road: 1. Km 72+750 (Mile 40) 2. Km 75+550 (Mile 41) 3. Km 85+720 (Cassandra Crossing) 4. Km 87+080 (Mile 47) 5. Km 98+900 6. Km 99+610 7. Km 99+960 8. Km 100+170 9. Km 115+240 (a log bridge)	The design of the Linden to Mabura Hill road and bridge crossing at the Kurupukari should consider: • Establishing a system for drainage of the roadway. This system should also include options for roadside drainage of surface runoff including turnout drains. • Establishing drainage system (underdrains or other subsurface drainage structures) to prevent erosion of white sand base of some sections of the road. • Improving capacity of cross drainage structures (culverts and bridges) and increasing their elevation above current water levels. • Including of headwalls and wingwalls on all culverts. • Establishing embankments can be constructed at the crossings. • Increase size and/or number of structures for the drainage of surface runoff in the Mile #47 village. This is especially important if the elevation of the redesign is greater than the current roadway. • For additional/replacement drainage features consider increase of hydraulic capacity to allow for higher flows • Establishing options for drainage surface runoff (turnout drains, ditches, etc.). • Foundation of new road should also accommodate increased surface runoff. • Reducing the gradient of slopes, where possible. • Establishing methods to reduce erosion of gullies and ravines (gabions, retaining walls, etc) • Including flood protection measures for the roadway and the banks of the Kurupukari river. • Constructing embankments on the banks of the Kurupukari River. • Locating the starting point for the access road/entryway for the bridge at the Kurupukari crossing higher than the highest water level mark which currently obtains during the wet seasons. This should apply to both the eastern and western banks of the river.
	Increased erosion and instability of bridge foundations and support structures.	High		
	Increased erosion leading to widespread formation of gullies and ravines along the roadway.	High	Gullies were observed at 15 locations along the current (km 14.5; 17; 19; 22;25.5; 28.9; 34; 39, 49.5; 57; 62; 64; 74; 99 and 103). Ravines had formed at four of these locations. Increased risk is also present at sections of the road constructed on white sand.	
	Surface runoff contributes to flooding of Mile #47 Village.	High	Mile #47 village particularly residences proximate to the culvert located in the village.	
	Surface flooding of the roadway resulting in ponding of water on the surface and washboarding thereby weakening the substructure of the road	High	In the absence of an established drainage system for the roadway, the entirety of the road is at risk. No specifically identifiable Hotspots.	
	Increased risk in the development of potholes,	High		

Projected climate change impacts	Climate-related risks	Magnitude of risk	Hotspots	Proposed adaptation measures
	existing potholes will worsen			The following options should be considered during the operational phase of the Linden to Mabura Hill road and the bridge at the Kurupukari Crossing: • Establishing a fixed schedule for periodic maintenance of the entire roadway. The maintenance schedule should take cognizance of seasonal schedules. • Conducting periodic visual checks of road, bridges and drainage structures should be conducted before, during and after the wet seasons. • Including the cleaning and/or clearing of culverts and drains in maintenance works. Areas at greatest risk of flooding and erosion should be prioritised. • Conducting condition surveys of the roadway and Kurupukari bridge crossing every five years. • Establishing a warning system (radio, social media, etc) to inform users of road of diversions / areas of flooding or dangerous driving conditions. • Establishing an occupational safety and health protocol for construction and maintenance crews working during periods of heavy precipitation. • Building awareness in the settlements along the LMH of climate change, its impacts and resilience measures which were included in the design of the road.
	Slope instability leading to damage of the roadway.	High	Existing slopes along the roadway.	
	Increased risks of skid as friction is lowered on wet roads thereby reducing safety.	High	Entire roadway. No specifically identifiable hotspots.	
	Increased flooding of the banks of the Kurupukari.	Serious	The eastern and western banks of the Kurupukari.	
	Increased erosion on the banks of the Kurupukari	High	The eastern and western banks of the Kurupukari.	
Temperatures (increased average annual temperatures and increased frequency of hot days and nights)	Heat damage (softening of asphalt, embrittlement and cracking) or melting of paved surfaces.	High	All project areas, no identifiable hotspot	The following should be considered during the design phase: • Incorporating the use of heat-resistant materials with which have high resilience to hot and dry conditions. • Factoring durability for high temperatures in design of pavement and foundation. During the operational phases, there should be regular inspections on of the quality of any asphalted surfaces on the Linden to Mabura Hill road or the bridge at the Kurupukari crossing.
	Heat damage of HDPE pipes used in culverts.	High	Culverts at km 66 and 69.	During the design phase, consideration should be given to replacing the HDPE pipes with concrete structures such as the culvert located at km 80 (within the Mile #47 village).

Projected climate change impacts	Climate-related risks	Magnitude of risk	Hotspots	Proposed adaptation measures
				If HDPE pipes are maintained in the design, during operational phases there should be regular inspections on the conditions of the HDPE pipes.
	Thermal expansion of bridge joints leading to their failure.	High	Bridge at km 107. New bridge at the Kurupukari crossing.	During the design phase, consideration should be given to selecting heat resistant and robust materials for bridge construction including bridge expansion joints.
	Heat Stress	Serious	Residents of Mile #47 and #58 Villages. Road-users, particularly pedestrians Road construction and maintenance crews.	During the design phase, the following should be considered: • Maintaining vegetative buffer on the sides of the roadway, where possible. • Creating shaded portions on the pedestrian pavement using natural vegetation. During operational phases, the following should be considered: • Establishing shading/ shelter or trees for areas utilised by construction and/or maintenance crews. • Creating an occupational safety and health protocol for work force in high temperatures included access to emergency health care should a heat stroke occur.
Temperature and Precipitation (increased average annual temperatures, increased frequency of hot days and nights, decreased average annual precipitation and more frequent drought conditions).	Increased dust emissions resulting in negative health outcomes.	High	Settlements along the roadway and at the eastern bank of the Kurupukari crossing.	During the design phase, options should be explored to change the surface of the roadway from laterite to asphalt. In addition, the access road for the bridge at the Kurupukari Crossing should also be asphalt.
	Increased dust emissions resulting in reduced visibility on the roadway.	High	Entire roadway. No specifically identifiable hotspots.	
	Wildfire	High	White sand forest area surrounding Linden and adjacent to the road.	During the design phase, there should be engagement with the Guyana Forestry Commission to determine the areas close to Linden where fires occur most frequently. During operational phases, vegetation in any areas where fires usually occur that are proximate to the roadway should be carefully managed. Consultations with persons engaged in farming in the white sand forest surrounding Linden should be benefit from awareness building on the importance of keeping fires under control given the proximity of the road.

Source: EMC (2019)

Table 37: Priority adaptation measures to be included in project design

Climate-related risks	Priority adaptation measures
Flash flooding of creeks resulting in damage or destruction of structures at crossings on the roadway.	Adaptation measures to be included in the design include: Improving capacity of cross drainage structures (culverts and bridges) considering the return-periods for heavy rainfall events (as detailed in the Hydrology Report). Including concrete headwalls and wingwalls on all culverts. All cross-drainage structures should be constructed of concrete.
Increased flooding of the banks of the Essequibo at the Kurupukari Crossing.	Adaptation measures to be included in the design include: Constructing embankments or other flood protection measures on the banks Essequibo River at the Kurupukari crossing. Locating the starting point for the access road/entryway for the bridge at the Kurupukari crossing higher than the highest water level mark which currently obtains during the wet seasons. This should apply to both the eastern and western banks of the river.
Increased heat stress to project workforce and future users of road and bridge.	During the design phase, the following should be considered: Maintaining vegetative buffer on the sides of the roadway, where possible. Creating shaded portions on the pedestrian pavement using natural vegetation. During construction phases, the following should be considered: Establishing shading I shelter or trees for areas utilised by construction and/or maintenance crews. Creating an occupational safety and health protocol for work force in high temperatures included access to emergency health care should a heat stroke occur. Building awareness of the work force of the signs and symptoms of heat stress and measures to bring relief
Surface runoff from heavy precipitation events contributing to: Flooding of Mile #47 Village, Surface flooding of the roadway resulting in ponding of water on the surface and wash-boarding thereby weakening the substructure of the road, Increased risk in the development of potholes, existing potholes will worsen. Increased erosion.	Establishing a system for drainage of the roadway including: Roadside drainage for surface runoff including turnout drains at frequent intervals, Underdrains or other subsurface drainage structures to prevent erosion of white sand base. Increase size and/or number of structures for the drainage of surface runoff in the Mile #47 village. This is especially important if the elevation of the design of the upgrade is greater than the current roadway. Establishing methods to reduce erosion of gullies and ravines (gabions, retaining walls, etc).

Source: EMC (2019)

Table 38: Summary of Potential Impacts of the LMH Road Upgrade and Construction of a Bridge at the Kurupukari Crossing

Environmental Component	Impact	Source of Impact	Impact Rating
Physical Resources			
Soils	Erosion	▪ Vegetation clearing to facilitate upgrade of LMH road or construction of bridge at the Kurupukari Crossing ▪ Erosion of roads on inclines or slopes ▪ Absence of formal drainage system accelerating erosion on road edges	Insig; Loc; ST; Av; M
	Compaction	▪ Movement of heavy equipment	Insig; Loc; ST; Av; M
	Soil Contamination	▪ Accidental release of fuels, waste oils and lubricants into soils.	Sig; Loc; ST; Av; M
Water Resources	Sedimentation	▪ Erosion	Insig; ST; Loc; M
	Contamination	▪ Accidental or intentional discharge of waste oils, fuels, lubricants, chemical or hazardous wastes into water courses and the Essequibo River	Sig; ST; Loc; Av; M
		▪ Dumping of general solid wastes/ garbage into water courses and the Essequibo River	Sig; LT; Ext; Av; M
	Cross Drainage	▪ Drainage capacity of culverts are not adequate	Sig; ST; Loc; Av; M
Air Quality	Dust	▪ Light and heavy vehicles traversing the roads during the dry seasons and construction material stockpiles	Sig; ST; Ext; Av; M
	Emissions	▪ Exhaust emissions from vehicles and machinery	InSig; ST; Loc; Un; M
Noise	Noise	▪ Activities during the construction phase of the road upgrade	Insig; ST; Loc; M
		▪ Activities during the construction phase of the bridge at the Kurupukari Crossing	Sig; ST; Loc; M
Archaeological Sites	Vibrations	▪ Activities for pier construction during the construction phase of the bridge at the Kurupukari Crossing	Insig; ST; Loc; M

Environmental Component	Impact	Source of Impact	Impact Rating
Biological Resources			
Flora	Loss of vegetation	▪ Vegetation clearing for the upgrade of the LMH Road	Insig; ST; Un; Loc
	Loss of vegetation and habitat fragmentation	▪ Vegetation clearing for the construction of a bridge at the Kurupukari Crossing	Sig; ST; Un; Loc
	Loss of vegetation	▪ Fire	Insig; ST; Loc; M
Terrestrial and aquatic fauna	▪ Habitat loss and fragmentation ▪ Displacement and some mortality of terrestrial vertebrate species	▪ Vegetation clearing ▪ Noise nuisance during the construction phase ▪ Vibrations and dust during the construction phase	Sig; ST; Loc; M
	▪ Hunting and gathering of wildlife by workers may occur if not strictly managed.	▪ Hunting and gathering of wildlife by workers not strictly managed.	Sig; ST; Loc; M

KEY – IMPACT RATING PARAMETERS

Loc – Localised **Ex – Extensive** **ST – Short Term** **LT – Long Term** **Av. – Avoidable**

Un – Unavoidable **Sig. – Significant** **InSig. – Insignificant** **M. – Mitigable** **UM – Unmitigable**

9 Environmental Social Management Plan

The activities to be conducted for the implementation of this project, especially during the construction phase, must be carried out in a manner which is in compliance with the legislation and guidelines outlined in Chapter 3, and in particular, with the conditions of the Environmental Authorisation to be granted by the EPA, and the requirements of the Ministry of Public Infrastructure. In this regard, this ESMP has been prepared to guide the project's activities by setting out measures and strategies to address the environmental issues related to the upgrade of the road and construction of the bridge at Kurupukari. The ESMP recommends activities to be undertaken in an effort to mitigate the principal adverse effects of the project and describes the way in which the main potential environmental and safety impacts of the project can be managed, and recommends appropriate mitigation measures that should be adopted by the contractors during the construction phase of the project, as well as measures to be applied during the operation phase.

A framework to ensure that the ESMP is effectively implemented is outlined in Chapter 0, including the roles and responsibilities of the various parties, plans to be developed by the Contractors, monitoring to ensure compliance, a mechanism to address grievances, etc. The Contractors will be required to prepare Construction Environmental and Social Management Plans using the guidance provided in this ESMP to outline how they intend to manage the impacts identified and implement the mitigation measures recommended.

Mitigation measures identified to prevent, minimize and manage the adverse impacts discussed in Chapter 8 are outlined.

9.1 Physical Environment

9.1.1 Erosion, Sedimentation and Compaction

During the construction phase of the project, there will be some activities which will affect the soil as was discussed in Chapter 6, though in a minor way. The activities can contribute mainly to soil erosion, compaction and sedimentation, which can be prevented or minimised.

The design for the LMH Road has included measures such as stabilization of steep side slopes, impermeable verges, and the installation of lined channels on both sides of the roadway. These will help to address issues of erosion. However, the following measures should be implemented to reduce the potential impact of erosion, compaction and sedimentation activities:

Erosion

- Soil disturbance should be limited to areas only where it is absolutely necessary;
- Adequate drainage should be provided at temporary work areas;
- Areas of exposed soil should be monitored during periods of heavy rainfall and proper control of stormwater flow over exposed soil surfaces should be practiced;
- Weather pattern should be considered before initiating major earthworks. Earthworks should be avoided during periods of heavy rainfall;
- Material stockpiles and waste debris should be located at least 10 m away from the drainage system;
- Material stockpiles should be kept to a minimum. Stockpile areas may require berming to collect sediments from runoff during periods of heavy rainfall. Wooden or other material may be used to box off the stockpiled material to prevent erosion;
- Excavated materials should be removed from site as soon as possible and be disposed of at approved sites. Excavated materials should not be onsite for more than two weeks. Where possible excavated materials should be reused;
- Side ditches should be installed at road sides and turn-out drains (outlets) should be created at various intervals along the road alignment to help drain water away from the road and into the natural drainage of the area; and

- After construction, burrow pits should be adequately decommissioned and closed out, including installation of proper drainage.

Compaction

- Traffic and movement of heavy-duty equipment including low-bed vehicles and heavy trucks over open areas should be restricted and controlled and damage to these areas should be repaired as soon as possible;
- Soils that have been compacted by heavy-duty equipment during transport of materials and also during site works should be scarified;
- Appropriate heavy-duty equipment should be utilised for all works; and
- Designated routes for heavy-duty vehicles should be established and used to prevent soil compaction.

Sedimentation

- Weather patterns should be considered during rehabilitation works as heavy rainfall would increase sedimentation rates in bare soil; and
- Discharging of storm water runoff directly into nearby water course should be avoided. The location of turnout drains should ensure that storm water is dispersed into the forest and not directly into creeks to prevent sedimentation. The forest acts as a filter, trapping any large solid particles before the water enters the creeks, thus can contribute to reducing the level of sedimentation.

9.1.2 Air Quality

Whilst upon the completion of the project the current dust nuisance along the road alignment will be alleviated, dust pollution can be an impact from the construction activities as permanent communities and small businesses are located along the road alignment. The associated impacts, even though localized, should be mitigated to reduce the effect on the environment. Thus, the following measures should be implemented to reduce the impacts of dust on the environment:

- Workers should be equipped with the necessary PPE to combat dust nuisance. Personnel working within dusty environments should be required to use dust masks and respirators if needed;
- A speed limit should be imposed for vehicles traversing the work sites and construction zone to reduce the generation of airborne particulate matter;
- During dry periods to soak the construction zone and routes where vehicles and equipment traverse. As such, a water tanker should be provided onsite;
- Dry materials for road construction such as sand and loam should not be stockpiled in close proximity to communities; and
- All vehicles transporting loose materials should be covered to minimize dust emissions.

9.1.3 Noise

Noise is not expected to be a significant environmental impact during the construction phase especially since construction will be carried out in areas mostly inhabited, or where there are already other activities occurring. However, there is still the need to implement measures to prevent and minimize noise, especially as it relates to impacts to workers and communities located along the road alignment and at the Kurupukari crossing. The limits prescribed in the GNBS Standard for construction projects are 90dB during the day and 75dB during the night. Compliance with these limits is necessary to ensure the impacts on the environment and human health, particularly for workers, are reduced. Therefore, the following measures should be implemented to reduce the impacts of noise during construction:

- Workers should be equipped with the necessary PPE to mitigate noise pollution. Hearing protection for employees exposed to high noise levels: earmuffs and earplugs for employees who operate heavy-duty machines/equipment should be provided;
- Noise levels should be controlled at the source through installation of mufflers on exhaust system;
- Noisy activities should not occur close to the communities during the night or on Sundays and Holidays. Any work to be conducted after 18:00hrs and prior to 6:00hrs, or on Sundays and holidays, must be approved by the Supervisory Consultants. The request for approval must be made at least three days prior to the works;
- Noisy equipment such as generators should be sited away and downwind from workers accommodation and site offices;

- In sensitive areas such as school zones and the Iwokrama Field Station more strict measures such as scheduling of noisy activities, etc., should be considered to prevent undesirable noise nuisance. The contractors should liaise with the IIC management to ensure that noisy activities are conducted at appropriate times in order to mitigate impacts of bird and wildlife migration from the construction area.
- The contractors should ensure that machinery and equipment are working efficiently; and
- Periodic monitoring of noise levels should be conducted during the construction phase.

During the project's operation phase, the LMH Road and bridge at Kurupukari will operate 24 hours a day. Recognising the Iwokrama Field Station as a receptor to noise from traffic on the road corridor, the following are recommended:

- Iwokrama to ensure that there is no forest clearance or vegetation removal in the forested area between the road corridor and the Iwokrama Field Station;
- Signs indicating no stopping and no use of horns on the road corridor between the Kurupukari bridge and Fairview Village; and
- Iwokrama rangers to have an enhanced monitoring presence on the road corridor.

9.1.4 Waste Management

The project will generate waste which, if not managed properly, can result in soil and water contamination and contribute to ill health and affecting the aesthetics of the area. Waste piles often present an eye sore and can affect the aesthetic of any environment. The improper disposal of waste can result in mal-odour and attraction of vermin. In addition, improper storage and disposal of waste can also lead to water and soil contamination. Waste to be generated include domestic garbage and construction waste. Liquid waste will also be generated including sewage waste and waste water from sanitary facilities and work camps. Hazardous waste to be generated includes used batteries, waste oil, filters, oil containers and contaminated soils.

The contractors should include a plan to manage waste in the CESMP and should take into consideration the guidance provided below.

For each category of waste, the handling, storage and disposal measures varies. The disposal frequency or each waste type will also vary, depending on generation. It is recommended that no significant amount of waste be allowed to accumulate onsite. Outlined below are various measures that should be implemented to properly dispose of waste associated with the project:

Liquid Waste

- Sewage will be generated from work sites associated with the construction phase of the project. Since the road construction activities will result in the shifting of the operation base as the work progresses it is recommended that portable toilets or pit latrines be utilized. If pit latrines are utilized these should be of the ventilated improved type and be constructed in accordance with the GNBS Guidelines. At the bridge construction site septic tanks should be installed, equipped with filter bed and soak-away. Portable toilets can also be utilized at the construction site.
- Waste water from kitchen and bathing areas should be channelled to a soak away. At more permanent sites such as the bridge construction, grease/oil traps should be utilized.

Solid Waste

- Waste such as paper and cardboard, empty plastic bottles, cans, etc. will be generated by staff working along the construction areas and from the work camps. The waste should be collected via bins placed at strategic points around the construction zones and camps. The bins should be emptied on a regular basis, or once filled. Garbage should not be allowed to accumulate onsite and should be collected and disposed of at an approved area.
- All construction waste; such as materials from construction of road, bridges and culverts should be consolidated and reused as much as possible. If it cannot be reused then it should be properly disposed of. Consideration should be given to making the materials available to nearby communities if requested. Waste should not be left in the open to litter the work camps or the road alignment and the bridge construction zone and should be disposed of within 30 days.

- No burning of any type of waste should occur. If burial of waste is to be conducted these pits should be located at least 100 m from waterways and be covered regularly.

Hazardous Waste

- Waste oil from servicing of machinery and vehicles should be collected and reused/disposed in a safe and acceptable manner in accordance with EPA guidance. Waste oil drained from vehicles and machinery should be collected by pans and transferred to storage drums located in a designated area.
- Used tyres should be stored in a covered area and not be allowed to accumulate water as they can become a breeding ground for mosquitoes.
- Used batteries should not be disposed in the environment. These batteries should be collected and returned to the suppliers or provided to approved used batteries dealers.

The hazardous waste listed above should not be stored at construction sites. As such, timely removal is recommended.

9.1.5 Fuel, Lubricants and other Hazardous Materials

During the construction phase of the project, special consideration for the transportation, handling and storage of fuel, lubricants and chemicals must be given as these are classified as hazardous substances. To reduce the risks on the environment and human health, preventative actions should be taken and/or mitigation measures implemented. It is necessary to implement the following measures to prevent and or reduce the impacts on the environment, in particular, contamination of soil and water from leaks and spills:

- Fuel storage onsite should be placed at a safe distance from waterways, site offices, accommodation and work areas. Long term storage areas should have secondary containment and impervious base and be covered to keep out rainfall.
- For the road upgrade, fuel should be transported to the work areas as needed or in small quantities. Small quantities of fuel onsite will minimize the possibility of spillages to occur, and also minimise the impacts if spillages do occur, especially since the construction activities would be temporary and it would not be feasible to construct proper facility for fuel storage. Any fuel storage at these areas should be placed higher than ground level to detect any leaks. No fuel should be stored within 100m of any waterway.
- Ensure necessary preventative measures such as adequate signage, fire extinguishers and/or sand buckets are placed in and around the fuel storage areas. The type of fuel stored in tanks should be indicated and the signage should include ‘No Smoking’ and Highly Flammable’;
- Fuel storage containers should be regularly monitored for leaks;
- When handling fuel, care should be taken to prevent spillage and leaks, especially during off- loading and refuelling. All nozzles and hoses should be properly secured and stored away to avoid spills and/or accidents;
- During the filling/refilling process drip pans should be placed under the equipment/vehicle to prevent any possible contamination and subsequent run off of fuel due to leaks;
- Regular maintenance should be conducted to ensure the proper functioning of machines, equipment and vehicles to avoid unnecessary leaks;
- Spill kits should be made available in the event of spillages. The kits should be placed in strategic locations that are accessible to key personnel who should be trained in the proper use of these kits through the executions of drills. Spill kits should contain sorbents with high absorbing capacity (up to 300 litres). The absorbent material should be in the form of booms, pillows and pads and the kits should include a pair of PVC gloves, a disposal bag and operating instructions; and
- Workers, mechanics and other staff should be trained on the proper use of spill kits, as well as in the safe handling of fuel and lubricants. A mock spill exercise should be conducted prior to construction activities.

9.1.6 Archaeological Find

There are no known archaeology sites along the Linden to Mabura road. However, at Kurupukari there are petroglyphs in the vicinity of the proposed bridge construction site. The following procedure should be followed in the event that archaeological materials or site are discovered during construction:

- All activities in the immediate vicinity of the remains should cease immediately;
- The find location should be recorded, and all remains left in place;
- The contractors should inform the Supervisory Consultants, who should then inform the Ministry of Public Infrastructure;
- The Ministry of Public Infrastructure should inform the National Trust of Guyana of the find;
- The National Trust of Guyana should coordinate with the relevant personnel to determine the significance of the findings and assess appropriate mitigative options;
- If the significance of the remains is judged to be sufficient enough to warrant further actions which cannot be avoided, the Ministry, in collaboration with the National Trust of Guyana, will determine the appropriate course of such action;
- Relocation of the artefacts for preservation and security reasons may be determined as an appropriate action;
- In the case of human remains, the appropriate authority should be contacted. In addition, a coroner and/or physical anthropologist may be involved if the remains are classified as an artefact. Options for removal and burial should be considered if the location must be disturbed; and
- The National Trust of Guyana should inform the MOPI of when work may recommence in the specific area.

9.2 Biological Environment

9.2.1 Flora

No significant impact to the vegetation within the project areas is anticipated given that the road upgrade will be done mostly within the existing carriageway, while the identified option for the Bridge Crossing at Kurupukari is Option 2 – which will be 75m downstream of the Ferry Landing.

Nevertheless, the following measures should be implemented to avoid or minimise impacts to vegetation within the project areas:

- Adequate drainage should be maintained/installed especially crossings to prevent flooding/water accumulation within forested areas;
- Any clearing of vegetation should be limited to only areas required and should be conducted in a manner to maintain the aesthetics of the natural landscape;
- Harvesting of forest species for use during the construction should be authorised by the Guyana Forestry Commission;
- Natural regeneration along areas previously cleared should not be disturbed, unless required;
- Soil erosion control measures should be implemented; and
- During the construction period measures should be implemented to prevent forest fires such as no open or uncontrolled burning of waste and no disposal of lighted cigarettes by workers. Fire response equipment should be maintained at work areas.

9.2.2 Fauna

Since the project activities will occur along the existing road alignment and already disturbed areas no significant impacts to wildlife is anticipated. However, the following should be implemented to prevent and reduce any such impacts on wildlife:

- Consideration will be given to the establishment of vegetation cover for animal passage particularly at stream crossings, and wildlife underpass crossings at bridges and culverts, particularly species with reduced movement capabilities such as herpetofaunal species, and small mammals;
- Stream crossings should be constructed to ensure adequate flow of water during storm events.
- Water quality of streams within and around the construction zones should not be affected by construction activities. Recommended measures for the management of waste and hazardous materials and the

prevention of sedimentation should be implemented. Receiver water quality should be monitored to ensure ecologically acceptable turbidity, nutrient, oil and grease and sediment levels;

- No unnecessary clearing of vegetation should be conducted and any clearing should be staggered to allow wildlife to move, especially slow moving species;
- Measures should be implemented to prevent forest fires;
- Grubbed up soil and vegetation materials from construction activities should be land spread and placed at the side of the carriageway or within the adjacent forest areas of the roads to prevent the creation of a longitudinal barrier to animal movement;
- Animals with reduced movement capabilities should be allowed to escape if encountered by workers;
- All construction workers should be prohibited from hunting, trapping, killing, harming or capturing of any wildlife. Workers should be educated on the importance of wildlife and the impacts they can cause, so as to ensure they are aware of the need to preserve wildlife and to reduce wildlife/roadway conflicts.
- Worker camps and dwellings are routinely sanitized and camp food ration and waste storage and disposal is done according to best management practices; and
- During the operational phase:
  - Speed limits should be prescribed and enforced;
  - Drivers should be educated on avoiding road kills of wildlife; and
  - Warning signs should be installed at strategic areas indicating hunting/capturing of wildlife is prohibited.

9.3 Health and Safety

9.3.1 Workers Health and Safety

The health and safety of workers involved in the activities during the construction phase can be compromised. As such, it is necessary to implement measures to prevent these situations from occurring. The Contractors should, as part of their Construction Environmental and Social Management Plan outline measures to ensure that the health and safety of workers is preserved. The following measures should be implemented to reduce the impacts on workers:

- The requirements of the Occupation Safety and Health Act should be complied with;
- The Contractors should designate someone with the responsibility of ensuring occupational safety and health;
- Workers should be properly oriented to the safety and health rules and guidelines;
- Adequate training should be provided to workers in the execution of their tasks;
- Machinery/equipment should be operated by competent, licensed and authorized personnel only, and in a manner that does not endanger other employees or the Contractors equipment;
- An Emergency Response Plan should be prepared and made available to all relevant personnel and the necessary training and resources required should be provided;
- Well-equipped first aid kits should be provided at all work sites;
- At least one personnel trained in first aid should be present at each construction site;
- Potable water for employees should be provided;
- Protective gear and clothes should be provided to employees and should be worn at all times during operation. Gear to be provided should include safety vests, hard hats, dust mask, ear plugs, gloves and safety boots where necessary. Rain coats should also be provided;
- Employees should be required to wear safety equipment and protective clothing provided by the Contractors in all working areas. Monitoring should be done to ensure workers utilise the gears provided;
- Safety rules and guidelines should be posted at strategic locations; and

- Adequate signage should be erected, especially in hazardous areas.

9.3.2 Traffic Management and Public and Road Safety

It is anticipated that during construction works the public can be exposed to certain activities which can present a risk to their safety both at the Kurupukari bridge construction site and along the Linden to Mabura road corridor. The contractors should, as part of their CESMPs, outline measures to ensure that the safety of the public is not compromised. Traffic management should also be addressed. Specific areas that should be considered and incorporated in the Plan and implemented include:

- Disruption to commercial activities along the road alignment and at the Kurupukari crossing should be minimised;
- Adequate communication to road users on traffic disruption should be provided in advance;
- The flow of traffic throughout the construction zones should be maintained and allow for diversion bridges where necessary;
- Traffic controls/signage should be installed as appropriate, particularly in advance of construction work on the road, temporary route changes or deviations;
- Operators of heavy-duty machinery should be well trained and licensed to operate construction machinery to ensure safety to road users and members of the public;
- The construction zones should be properly demarcated, with well-spaced and visible signage during both the day and night, allowing for the sites to be adequately illuminated;
- Traffic around the construction site along to road should be controlled by flag persons;
- Access to entrances of public, private and commercial facilities should be maintained at all times;
- Reduced speed limits and measures to prevent speeding through construction zones should be implemented;
- The construction sites at the crossing should be secured to keep out the public; and
- Construction activities within the River should be clearly demarcated and lighting provided at nights.

During the operational phase measures will also need to be implemented to ensure road safety is maintained. Measures recommended for this phase include:

- Prescribe speed limits and allow for strict enforcement along the roadway. Lower limits should be set for where the road passes through communities;
- Install speed limits and warning signs such as dangerous bends, steep slopes, school zones, pedestrian crossings, etc.;
- Install pedestrian crossings where the road passes through communities. Provision of sidewalks should also be considered; and
- Increased road patrols by the Police.

9.3.3 Emergency Response

The Contractors will be required to prepare an Emergency Response Plan (ERP) as part of their Construction Environmental and Social Management Plan. The Plan should outline protocols for responding to environmental emergencies that may occur as a result of unforeseeable circumstances, such as a spill of hazardous materials, accidents or medical emergencies. The ERP should describe the general types of emergency and actions to be followed, should an emergency occur during the mobilization and operational phases of the project and should include:

- Emergency Contact Details;
- Emergency Procedures;
- Authority of Control;

- Emergency Response Equipment;
- Scenario Description and Response; and
- Incident Reporting.

All personnel should be aware of potential risks and take steps to cope with hazards in their work area. In addition, all personnel are expected to alert the correct personnel if they discover an accident, medical emergency, fire or spill. As such, the Plan should also outline the role of the various personnel in emergency response. The types of emergencies to be covered by the ERP should include fuel and other hazardous material spills, accidents to workers, traffic accidents, fire, etc.

9.4 Social Environment

The purpose of the social component in the ESMP is to ensure that the local communities – Linden Town and Ward of Wismar, #47 Community, #58/Great Falls Village, Mabura Hill Community, Mekdeci Mining Company, Small Businesses Cluster at Kurupukari, Iwokrama and Fair View Village – are informed and engaged at an early stage and throughout the implementation of the Project. As part of its community engagement process, the project will implement a Grievance Mechanism to ensure that all stakeholder comments, suggestions and objections are recorded, analysed and adequate feedback provided, or that the issue(s) is/are addressed. Open and ongoing communication channels allow affected communities and workers avenues to express their concerns and any complaints directly to the implementors of the project.

The ESMP also takes into consideration gender and diversity as well as cross-cutting components of its implementation. Specifically, efforts will be made to ensure that both men and women are consulted on all matters requiring community engagement. This will entail making sure arrangements put in place are based on decisions informed by direct feedback from stakeholders on the most suitable times and location for equal participation. Where there are employment opportunities, the project will ensure – where practical and the required skills are available – that women and youth are given equal consideration. The Contractor will prioritise hiring of both skilled and unskilled labour from within communities alongside the planned road project, by widely publicising information inviting both male and female applicants.

9.4.1 Stakeholder Communications

The three areas that inform the basis for communicating among stakeholders are: 1) Consultation, planning, coordination and implementation of activities; 2) Ongoing dissemination of information, including notices; and 3) Resolution of grievances.

Consistent and timely communications with stakeholders in the project is critical for maintaining healthy relations with communities, and ensuring their support and buy-in to the project. It is essential for stakeholders to have access to information in a manner that is timely and that allows them to be fully aware of the progress of the project. Also, to be able to provide feedback or information in a meaningful way.

Communication channels will include (but not be limited to):

- Community meetings/consultations – Community meetings will be convened to provide a platform for sharing information on the process and progress of the project, and to provide communities with an interpersonal space to voice their concerns, raise their questions and receive feedback directly from those responsible for and are implementing the project.
- Site visits – Site visits will be made to stakeholders as a primary means of engagement and addressing grievances.
- Public Awareness Campaigns – Public awareness campaigns will be initiated prior to the start-up of the project as part of the induction and preparation phase of the project. Throughout the life of the project, this medium will be used to address various areas of risk. A major aspect that needs to be tackled early are behaviours that put road users at risk; so public awareness campaigns will be used starting from

construction phase to target behaviours (such as speeding, driving under the influence, etc.) that endangers life and limb.

- Media Blasts (Localized) – Mixed media will be used to send out notices to stakeholders within the project areas. Text message notifications (targeting specific zones where service is available) will be sent out with information pertaining to planned works, especially when/where this may affect those along the project route. WhatsApp messages can also be used to update Key Stakeholders (Community Leaders, Businesses, etc.) of planned activities. Local radio stations will also be used as a means of disseminating information to project stakeholders.
- Televised Programming – Local television spots will also be used to raise awareness of the ongoing works of the project, and to give important notices/advisory to residents in the Linden and Wismar areas.
- Multi-Media Platforms – The project will also utilize media platforms such as Instagram, Facebook, mailto: email, WhatsApp Groups, etc. to maintain ongoing and real-time communication with project stakeholders.

9.4.2 Health

The main health risk associated with road projects is the spread of HIV/AIDS epidemic. However, the increased exposure to water borne disease vectors due to increased breeding sites at water pools at construction sites due to poor or lack of drainage structures is likely to occur. The stagnant waters could stimulate growth of mosquitoes, which can lead to malaria and dengue. Therefore, the following should be limited to ensure the wellbeing of locals and workers alike:

- Since construction camps will attract job seekers and traders from various areas, the contractor is required to enforce code of conduct at the camp to encourage respect for the local community and, to maintain cleanliness and order at the camp at all the time. It is important that the camp is located far from the villages, trading centres and markets so as to reduce chances of interaction with the locals.
- Environment, health and safety induction course should be conducted to all workers.
- In order to create awareness on prevention of HIV/AIDS infection, information education and communication component (IEC) should be undertaken during the implementation phase. This shall include involving the local NGOs and government agencies active in these sectors and the project area in awareness creation and educating the local communities on HIV/AIDS and STIs prevention as well as how to protect against mosquito borne diseases.
- Subcontract with a Service Provider to provide an HIV Awareness Program to the Contractor's Personnel and the Local Community.
- Workers will be given awareness training relating to vector born disease and posters will be located around work sites warning workers of the potential health risks.
- Medicines for the treatment of vector borne diseases will be provided at the camp medical facility.

9.4.3 Job Creation/Opportunities for Locals

The implementation of the project will bring several people from different cultural backgrounds together. Such interactions may bring about social changes in the communities along the road. Also, local people will acquire skills from the road workers during constructions and after implementation. The skills and acquired knowledge shall be implemented locally thus lead to the development of the project area. During the construction phase, jobs will be created. Local job seekers should be given a degree of preference for construction jobs.

Thus, it is of utmost importance that:

- The Contractor will ensure that no persons under the age of 18 are employed on the Project.
- The Contractor will employ local labour to benefit local communities and to promote the overall acceptance of the project.

9.4.4 Risk of social conflict

Conflicts may arise between the local community and the construction workers, which may be related to religious, cultural or ethnic differences, or based on competition for local resources. Therefore:

- The Contractor is responsible for his workers' behaviour.
- Company guideline to deal with this should be prepared and made aware to workers. Workers must adhere to these guidelines.

9.4.5 Grievance Mechanism

As far as possible, the project will endeavour to prevent or mitigate the risk of grievances by taking proactive measures to: A) Provide timely and adequate information on the project to local communities and all key stakeholders; B) Conduct meaningful public consultations in a timely manner; and C) Consistently build capacity of project staff to increase their awareness of the social issues analysed, and how to properly manage any potential situations that may arise.

The Grievance Mechanism will be set out in the following steps:

1. Design and launch platform and system for grievance reporting, analysis and resolution;
2. Widely disseminate information related to the Grievance Redress Mechanism to stakeholder communities and all other involved parties;
3. Receive and register grievance complaints;
4. Investigate and verify nature of complaints and record (by photo and written reports) all details of grievance complaints;
5. Consult with all relevant parties (Contractor, Site Managers, Partner Agencies (e.g. GWI), MoPW, Engineers, etc.) to identify the most appropriate approach/solution and response to the complaint;
6. Issue notice to contractor for implementation of the selected approach/solution, specifying the allotted period of time for implementation based on the severity of the complaint;
7. Monitor and assess impact of the results;
8. Analyze and share lessons learned with relevant parties, and make recommendations for improvements within project.

The grievance redress process will flow as depicted in the figure below:

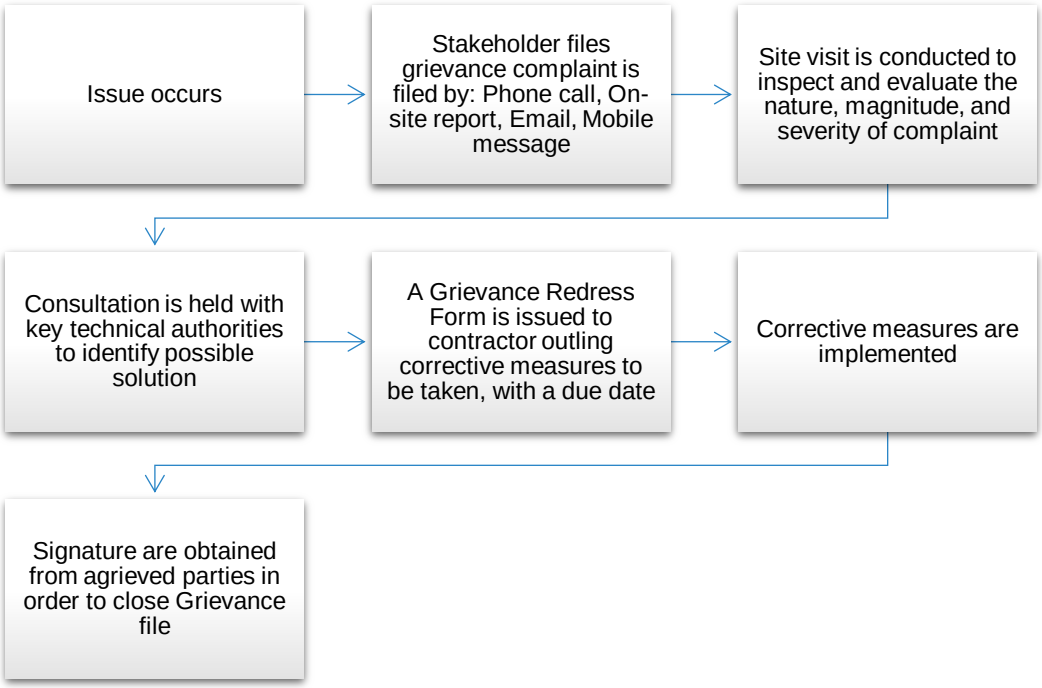


Figure 47: Figure outlining the grievance redress process.

Contact details and information on the process, including grievance redress form, will be distributed to the local communities and other key stakeholders. In general, it is envisioned that grievances will be responded to within no more than 14 days (2 weeks) after an official complaint has been filed.

Data on grievances will be filed and analysed on a bi-weekly and monthly basis; this information will be used to contribute to the overall assessment of the project. As evaluation will be based on contractual agreements, which are aligned to national and international standards and best practices.

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10 ESMP Implementation Framework

This chapter provides the management framework for the implementation of the Environmental Management Plan (EMP). The activities to be conducted for the implementation of the project, especially during the construction phase, should be carried out in a manner which is in compliance with the legislation and guidelines outlined in Chapter 3, and in particular, with the requirements of the EPA as set out in the Environmental Permit.

10.1 Roles and Responsibilities

To ensure the environmental and social management measures are implemented the MoPI as well as the Contractors will have major roles to play. The roles and responsibilities are outlined below:

Ministry of Public Infrastructure

The project will be executed by the MoPI which will have overall responsibility for ensuring that the environmental and social requirements of the project are met. Prior to the commencement of construction MoPI will need to ensure that environmental authorization is obtained for the project, a process which MoPI has already commenced with the EPA.

During the construction phase, it is envisaged that MoPI is likely to employ a Supervisory Consultant to oversee the project's implementation on the Ministry's behalf. As part of its role the Supervisory Consultant is expected to also have responsibility for overseeing the environmental and social management aspect of the project prior to and during the construction phase. In the operational phase of the project, MoPI is expected to take on the responsibility of ensuring that the social and environmental measures are complied with and to undertake monitoring and reporting activities in keeping with the requirements of the EPA Environmental Permit.

Supervisory Consultant

The Supervising Consultant is expected to be contracted by MoPI to oversee the implementation of the project. As part of its team, it is recommended that the Supervisory Consultant include an Environmental, Social and Health and Safety Personnel. This person will have the responsibility of ensuring compliance with the environmental, social, health and safety requirements.

It is recommended that each site, the LMH road and bridge at Kururpukari, has its own Environmental, Social, Health and Safety Personnel with the responsibility of ensuring day to day compliance.

The Supervisory Consultant's Environmental, Social, Health and Safety Personnel are expected to:

- Review the Contractors' CESMP to ensure it is compliant with the EPA's Environmental Permit for the project and the provisions of the Environmental and Social Impact Assessment Study;
- Approve the Contractor's CESMP;
- Conduct routine inspection of construction activities and sites for compliance with the CESMP along with environmental monitoring of key parameters;
- Prepare Monthly Inspection Reports on environmental compliance by the Contractors and which should include suggestions for corrective actions;
- Continuously engage with the contractor to ensure corrective actions are implemented;
- Participate in stakeholder engagements and outreach to stakeholders;
- Ensure the views of stakeholders are reported and any grievances received from stakeholders are addressed in a timely manner;

- Provide regular reporting to MoPI environmental personnel; and
- Participate in project progress meetings to discuss and report on environmental compliance.

Contractors

Contractors will be responsible for ensuring environmental compliance and maintaining environmental quality at and around the construction sites and equipment/materials storage areas. It is recommended that Contractors be required to prepare a CESMP and each Contractor employ environmental personnel to assist with the implementation of environmental management measures. These persons should be suitably qualified and experienced for such a portfolio. The responsibilities of the contractor environmental personnel are outlined below:

- Prepare the Contractors' CESMP and oversee its implementation once approved. The CESMP should be guided by the EPA's Environmental Permit for the project and the provisions of the Environmental and Social Impact Assessment Study;
- Conduct training for all Contractor staff on the health, safety, environmental and social requirements;
- Monitor all construction activities onsite and prepare and submit monthly environmental and social reports to the Supervisory Consultant;
- Supervise the Contractors' workers to ensure full compliance with the requirements;
- Provide oversight of the implementation of all necessary mitigation measures to ensure compliance with the requirements;
- Identify any non-compliance and take corrective actions as appropriate;
- Liaise routinely with the Supervising Consultant's Project Manager, Environmental and Social Personnel, and if necessary, with the MoPI Environmental Personnel;
- Assist in arranging and participate in meetings and engagements with stakeholders;
- Address grievances from stakeholders and maintain liaison;
- Attend meetings to report on environmental compliance; and
- Ensure all of the Contractors' worksites are adequately decommissioned upon the completion of works.

The main responsibilities of the project's environmental management team are summarised in Table 39.

Table 39: Summary of Environmental related Responsibilities

Pre-Construction Phase	
MoPI	Securing Environmental Authorisation for the project from the EPA
	Preparation of Contractors' bidding documents to include environmental requirements
	Ensure Supervisory Consultant's team includes Environmental, Social, Health and Safety Personnel
Contractors	Employment of Environmental Personnel
	Prepare Construction Environmental and Social Management Plan
	Conduct Site Induction and Training of Employees
Supervisory Consultants	Employment of Environmental, Social, Health and Safety Personnel and designating environmental responsibility for each site
	Ensure that the Contractors' CESMPs are prepared and approved and training conducted by the Contractors.
Construction Phase	
MoPI	General oversight of the Contractors' environmental performance
Contractors	Implementation of the CESMP, mitigation and environmental management measures and corrective actions
	Participating in the progress meetings
	Preparation of the monthly environmental and social compliance reports

	Monitor for non-compliances and effectiveness of mitigation measures
	Engaging with stakeholder and address any grievances which might arise
	Conduct regular refresher training for workers on health, safety, environmental and social requirements
Supervisory Consultants	Monitoring of project activities to ensure health, safety, environmental and social compliance as well as environmental monitoring
	Identify non-conformances and recommend corrective actions
	Participating in stakeholder engagements and taking the lead in addressing/responding to stakeholder grievances
	Convene Monthly Meetings and discuss status of Contractor's compliance
Post Construction Phase	
MoPI	Post construction/operation monitoring and reporting in accordance with the EPA Environmental Permit.

10.2 Contractors ESMP

The Contractors should be required to prepare a CESMP to mitigate issues pertinent to the construction phase of the project and relevant to their assigned tasks. This CESMP should be submitted to the Supervisory Consultant for approval prior to the commencement of works. Once approved, the CESMP is expected to be implemented during the construction period and be updated/revised periodically in a timely manner to ensure that it contains measures appropriate to the works being undertaken.

Preparation of the CESMP should be guided by this EMP, the requirements outlined in the EPA's Environmental Permit, relevant national standards and guidelines including those of the GNBS, and the MoPI. The following should be addressed/included in the CESMP:

- Contractors' Work Programme – A brief overview of the Contractor's proposed Work Programme should be provided, including information on expected duration of the works, number of workers to be onsite, type and quantity of heavy equipment to be onsite, whether workers will be housed onsite or travel daily, siting of camps, details on burrow pits and reclamation plans, medication facilities to be installed, etc. This information will be essential in the review process of the CESMP.
- HSSE Policy – If the Contractor has a Health Safety, Social and Environmental Policy this should be included in the Plan. The policy should also address alcohol and drug use, hunting and the prevention of harm to wildlife, and interactions with local communities and stakeholders.
- Management Structure – The CESMP should describe the Contractor's management structure for the project, clearly highlighting the responsibilities for health, safety, and the environment.
- Waste Management – Measures to manage the various waste types to be generated should be included, including solid waste, liquid waste/wastewater, hazardous waste and construction waste.
- Erosion and Sedimentation Control – The CESMP should describe measures to be implemented by the Contractors to prevent erosion onsite, and sedimentation of nearby drains.
- Hazardous Materials Management – The Plan should outline how hazardous materials will be managed onsite, including fuel and lubricants.
- Dust Control – The Contractors must include in the CESMP measures to prevent dust nuisance from occurring.
- Noise Prevention – measures to reduce noise levels and prevent noise nuisances should be detailed.
- Workers Health and Safety – A Health and Safety Plan for workers should form a component of the CESMP.
- Community Safety – Measures should be implemented to ensure that the safety of the nearby communities is not compromised and these measures should be documented in the CESMP.
- Traffic Management – The CESMP should detail how the Contractors intend to allow for the smooth flow of traffic during the construction period.

- Contingency and Emergency Response Plan – A Contingency and Emergency Response Plan must be included in the CESMP to address emergencies relevant to the project. The possible emergencies are:
  - Accidents/Medical Emergencies
  - Fires
  - Fuel/Chemical Spills
  - Flooding

  The Contingency and Emergency Response Plan should also address training of employees, assembly point in case of emergency, emergency contacts, communications, responsible personnel, response procedures and incident reporting.
- Chance Find Procedure – This should be included to cater for if during project activities archaeological pieces are found. The procedures to be followed should be outlined.
- Training - Training to be conducted should be described in the CESMP.
- Site Closure, Decommissioning and Restoration - At the conclusion of works the sites will need to be cleaned up, all waste removed and all temporary structures belonging to the Contractors dismantled and removed. The measures to be employed by the Contractors during this process should be described in the CESMP.
- Grievances – A Grievance Mechanism is included in this ESIA (Section 10.7). However, since the Contractor will be responsible for addressing grievances, including implementation of corrective actions, measures to be employed by the Contractor in dealing with grievance should be outlined in the CESMP.
- Monitoring and Reporting – The CESMP should outlined how monitoring will be done by the Contractor's Environmental Personnel, including frequency, areas to be monitored, etc. A checklist to be utilized should be included.

10.3 Environmental Monitoring

Monitoring of project activities should be conducted to ensure that the recommended mitigation measures and management practices identified in this EMP are implemented and effective. This should take place for both the construction and operation phases of the project.

The Supervising Consultant's Environmental, Social Health and Safety Personnel should conduct periodic monitoring of all construction sites. Further, the Consultant's personnel based at each site should monitor for day to day compliance by the Contractors.

The Contractors' Environmental Personnel should conduct frequent visits (at least twice per week) to the construction sites and prepare a monthly environmental compliance report to be submitted to the Supervising Consultants.

Monitoring during the construction period should be done by the Supervising Consultants. The table below highlights the various parameters recommended to be monitored as well as the frequency and location of monitoring activities.

Table 40: Environmental Monitoring

Parameters	Frequency	Locations
Air Quality ▪ Evidence of dust accumulation and suspended particles through visible observation ▪ Ease of visibility ▪ Possible measurement of Particulate Matter ($PM_{2.5}$ & PM_{10})	Continuous	All active constructions sites

Parameters	Frequency	Locations
Water Quality ▪ Temperature ▪ pH ▪ Turbidity ▪ Oils/Grease ▪ Dissolved Oxygen ▪ Coliform	Monthly	Streams in vicinity of active construction sites, both upstream and downstream of project activities
Noise ▪ Decibel	Monthly	Worksites in close proximity to communities.
Waste Management ▪ Compliance with CESMP and waste management practices ▪ Littering and waste accumulation	Weekly	Waste receptacles, disposal sites and all active construction sites.
Wildlife ▪ Hunting and Trapping by workers	On Observance	Active construction areas
Health and Safety ▪ Use of protective gear by workers ▪ Adequate and appropriate signage ▪ Location of Emergency Procedures ▪ Tool box talks, Induction Training, etc. ▪ Health conditions of staff. ▪ Stocked First Aid Kit ▪ Demarcation of construction sites ▪ Speed limits by Construction vehicles	Weekly	All active construction sites.

It is expected that environmental monitoring would also be conducted by the EPA to determine compliance with the conditions of the Environmental Permit. Such monitoring would cover both the construction and operation phases of the project.

In the operational phase, it is recommended that MoPI develop and implement monitoring systems which will assist with the monitoring and reporting requirements of the EPA and as outlined in the Environmental Permit. Such monitoring systems could be integrated with existing approaches for monitoring status and effectiveness of road facilities and installations and compliance by road users such as ensuring prescribed weight limits are complied with.

10.4 Reporting

In order to ensure environmental compliance, it is essential that there are regular meetings of the project management team (Contractors, the Supervisory Consultant and the Ministry) and the preparation and submission of formal reports.

It is recommended that the Supervisory Consultants convene progress meetings at least monthly at which the Contractor's environmental personnel will attend as well as the Ministry's Personnel. Further, the agenda of each meeting should include environmental, health, safety and social compliance and where a report should be presented on the Contractor's environmental and social performance. This report should then allow for discussion on areas for improvements, review the progress of implementation of corrective actions and to plan ahead to prevent non-compliances from occurring. These meetings should be convened on a statutory basis throughout the duration of the project and should be documented.

The Contractor's environmental personnel should prepare a Monthly Environmental Compliance Report which should indicate areas of non-compliances, reasons for the non-compliances and corrective actions to be implemented. The report should also indicate environmental incidents occurring during the month, complaints or grievances received and follow-up actions. This report should be submitted to the Supervisory Consultants prior to the convening of the monthly meetings and should include but not be limited to the following:

- Environmental incidents or non-compliances observed and corrective actions taken with regards to contract requirements, including waste management, contamination, noise and dust control, traffic management, etc.;
- Health and safety incidents, accidents, injuries and all fatalities that require treatment and actions taken to improve conditions. Information on number of workers, work hours, personal protective equipment (PPE) provided and usage, and worker violations and follow-up actions taken (if any);
- CESMP implementation progress, including implementation of the management and mitigation measures outlined in the plan, effectiveness of the measures being implemented, any emerging Environmental, Social, Health and Safety issue and any adjustments required (if any); and
- Grievances by workers and community, including grievances received, how resolved, those unresolved and plan for resolving these.

Prior to construction, the Contractors should prepare and submit a reporting format to the Supervisory Consultants for approval.

In addition to the monthly report, the Contractors should also provide immediate notification to the Supervisory Consultants of incidents in the following categories. Full details of such incidents should be provided within the timeframe agreed with the Supervisory Consultant.

- Confirmed or likely violation of any Environmental Permit Conditions or any relevant legislation;
- Any fatality or serious (lost time) injury;
- Significant adverse effects or damage to private property, e.g. vehicle accident;
- Damage to public utilities; or
- Any allegation of sexual harassment or sexual misbehaviour, child abuse, defilement, or other violations involving children.

10.5 Orientation and Training

During the construction phase of the project, it is essential that Contractors conduct orientation and training of workers prior and during construction activities. Training should include both theory and practical exercises and to cover a range of topics on health, safety and the environment including an overview of the CESMPs and the roles and responsibilities of Contractors' personnel.

Training should be done as part of site induction and should include, but not be limited to the following:

- Environmental requirements and environmental management and health and safety measures as outlined in the CESMPs;
- Workers' role and responsibilities in environmental management and health and safety;
- First aid, occupational safety and health measures and the use of PPE;
- Emergency response measures;
- Methods for waste and hazardous materials management and disposal; and
- Social responsibilities of all personnel working under the project and rules of engagement with stakeholders, in particular local communities.

Any new employee should undergo an orientation programme to ensure they fully understand the job requirements and employment conditions and is motivated to improve their skills.

The Contractor should establish a schedule for training which should take place at least every 6 months and with the participation of the Supervisory Consultant Environmental, Social, Health and Safety Personnel. On a day-to-day basis, there should be Took Kit Orientation by the Contractor's Managers and Supervisors to emphasise key issues on health, safety and the environment.

10.6 Traffic Education and Public Awareness

The construction period of the project is likely to cause disruptions to the current flow of vehicular traffic along the LMH road as well as the pontoon crossing at Kurupukari. Also, the upgrade of the LMH road and construction of the bridge at Kurupukari could result in an increase in traffic and changes in traffic behaviour. More vehicles are likely to be passing through communities and at a faster rate given the improved new road surface.

The MoPI should undertake traffic education and public awareness initiatives to reach out to road users and communities during the construction phase of the project as well as the operational phase. The objectives of such initiatives should be:

Construction Phase

- To provide information and details on the project, Contractors, Supervising Consultant, schedule of activities, likely disruptions and mitigation arrangements to be in place.

Operation Phase

- To provide information about new or modified regulations, such as speed limits, weight restrictions, etc.
- To improve knowledge and/or awareness of new requirements of behaviour, for example location of pedestrian crossings, school zones, etc.
- To modify problem behaviours or maintain safety conscious behaviour such as drinking and driving.
- To decrease the frequency and severity of accidents.

It is recommended that MoPI consider the preparation and implementation of a Traffic Education and Public Awareness Programme for the project.

10.7 Grievance Mechanism

During the course of the project grievances are likely to arise whether due to conflicts or other issues such as nuisances. All stakeholders who believe aspects of the project (planning, construction, operation) are likely to have a detrimental impact on their organisation, community, day to day activities, the environment, or on their quality of life should be able to communicate their grievances. These grievances should be documented, analysed and responded to efficiently. Stakeholders should also be able to submit comments and suggestions that they feel will increase the benefits of the project and reduce or mitigate any adverse impacts.

It is envisaged that any grievances arising from the construction activities will be localized. As such, to ensure that the process is effective, a site level mechanism to address such grievances is recommended.

The grievance mechanism should be coordinated by the Supervisory Consultant's Environmental, Social, Health and Safety Personnel who should act as a point of contact to receive complaints and work to address all grievances in a timely, effective and satisfactory manner, and to foster positive engagement when issues arise. Information on the grievance mechanism, including contact person and contact information should be shared with stakeholders, in particular the communities through notices. These can be posted at the site and at public places within communities.

The following is an outline of actions that should be taken once grievances resulting from the execution of works is received:

- The Supervisory Consultant Environmental, Social, Health and Safety Personnel, along with the Contractor's Project Manager/Environmental Personnel, should investigate reported grievances to determine the validity of a complaint and cause for the grievance.
- It should then be determined whether the grievance can be resolved by the Project Team or whether authorities with regulatory or other responsibilities and relevant skills are to be consulted or engaged.
- Or it should be determined if corrective actions are to be taken by the Contractor and what those actions are.
- The Supervisory Consultant Environmental, Social, Health and Safety Personnel should prepare a grievance report, including supporting materials such as photographs. If necessary, a clear list of tasks and outcomes expected should be developed.
- If a grievance is the fault of the Contractor then the Contractor should implement corrective action immediately.
- The Supervisory Consultant Environmental, Social, Health and Safety Personnel, along with the Contractor's Project Manager/Environmental Personnel should conduct follow-up inspection to monitor the situation and determine whether the issue is likely to recur and to put measures in place to prevent recurrence.

A register of grievances received should be maintained by the Supervisory Consultants and should include information such as date of complaint, by whom, nature of grievance, date investigated and by whom, validity and corrective action required, timeline for implementation of corrective action, and if the grievance was satisfactorily addressed or not. A monthly review on the status of grievances received/addressed should be conducted by the Supervisory Consultants.

Considering that the Contractors will be responsible for addressing grievances including implementation of corrective actions, measures to be employed by the contractor in dealing with grievances should be outlined in their CESMPs.

10.8 Mitigation and Monitoring Budget

An indicative budget is presented in Table 41 outlining estimated costs for mitigation and monitoring activities during the construction phase of the project. However, most of the significant costs associated with the actual road and bridge construction mitigation actions are not included here since these are built into the designs and are addressed in those costs. These would include measures such as installing of lighting, roads signs, installing pedestrian walkways and crossings, etc.

Table 41: Budget for Mitigation and Monitoring

Environmental Component/ Impacts	Action	Equipment/ Personnel/ Activities	Annual Cost US$
Environmental Personnel	Hiring of Supervisory Consultants Environmental Personnel		50,000
	Hiring of Contractors Environmental Personnel		50,000
Waste Management	Collection and disposal of garbage and construction waste	Bins and garbage receptacles Disposal of waste	5,000
	Managing of liquid waste	Provision of Portable Toilets/Latrines/Toilets with Septic Tanks	50,000

Environmental Component/ Impacts	Action	Equipment/ Personnel/ Activities	Annual Cost US$
Water Quality	Water quality tests such as pH, Turbidity, Oils/Grease, Dissolved Oxygen, Coliform, etc.	Samples collected and outsourced to Lab for analysis	10,000
Noise	Monitoring	Noise level testing	500
Health and Safety	First Aid Kits	Procure kits	5,000
	Protective gear for workers e.g. safety vests, helmets, gloves, dust masks, safety boots and ear piece.	Procure gears	25,000
	Warning signs at work sites.	Prepare and erect signs	25,000
Emergency Response	Fire Extinguishers and Spill Kits.	Procure equipment	10,000
	Communication Equipment	Procure equipment	25,000
Training	Training of personnel e.g. in Environmental Responsibilities, First Aid, Health and Safety, Emergency Response, etc.	Conduct training once per year	15,000
Incidentals and Emergencies	Response needed in event of accidents and emergencies.	Materials and personnel (depends on type/scale of incident or emergency)	20,000
TOTAL			**290,500**

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11 Conclusion

This EIA has been prepared at a time when there is no Government decision regarding upgrade of other sections of the Linden to Lethem Road Corridor considering the following:

- Information reviewed as part of this EIA;
- The road design maintaining the existing road alignment between Linden and Mabura Hill;
- The identified option for the Bridge Crossing at Kurupukari bring Option 2 – 75m Downstream of Ferry Landing; and
- The Linden to Lethem Road is already in existence and operational

The proposed upgrade of the LMH road and construction of a bridge across the Essequibo River at Kurupukari is envisaged to have relatively few potential significant adverse impacts on the physical and ecological environment. Those which could likely occur have been identified within the EIA and could be addressed by putting in place recommended mitigation and management measures during the construction and operation phases of the project.

There will be serious social and gender impacts deriving from a fully upgraded, paved Linden to Mabura Hill roadway, as expressed by stakeholders and captured in this Assessment Report.

Along the way, the report offers solutions generated by stakeholders themselves, by systems and mechanisms being put in place by the MOPI, Police, National Road Safety Council, Minibus Union, Ministry of Social Protection, etc. There is need for an on-going, living Inter-Agency / Multi-Stakeholder Group to keep in place for the design and tender process, especially for the construction phase and thereafter for the necessary maintenance of the roadway.

The key to it all is that a high standard of law and order enforcement must be rigorously implemented - if we are to have a safe and secure road - and one that stands the test of time. We have all been living with bad roads that are death traps and that are abused by lawless road users of every kind and roads that abuse us with their disgraceful condition. The current condition of the road is an abomination.[97]

This particular road link is the only transportation route there is from Lethem and from Mahdia. It has to be better maintained and rehabilitated - even before the paved road is constructed three years down the line. As one of the Mabura stakeholders said:

> *"The Government spends $90M dollars to "grade" the road - just smooth it over - without any gravel or other material to bolster it - so it just takes one big rain come - and whoosh! The entire $90M washed away!"*

The road must be designed in such a way that it takes into account stakeholder perspectives and employs design solutions to mitigate as many of the existing technical and structural problems. The Government authorities to develop strong policies and the Enforcement Agencies to do their job and enforce the laws and regulations. The communities to do their part - establish their community monitoring committees; and community policing groups; social support committees etc. It is telling that none of the stakeholder communities had active women's group or youth groups!

The Linden to Mabura Hill Road is poised to bring many needed opportunities and benefits. That is a fact. However, it can also be the proverbial double-edged sword. Many solutions have been suggested and many mechanisms put in place.

[97] I can testify first-hand to this - having just travelled on it myself to Mabura Hill on Saturday, June 17 tfor the Mabura stakeholder consultation there. It took some 12 excruciating hours from Linden to Mabura round trip. We left Mabura at aproximately 5.45 PM and never got to Linden until just after midnight!

As the Hon. Sydney Allicock[98] famously said years ago; and as quoted in the 2012 IPP:

"Let us prepare to use the road well and wisely - so that the road does not use us!"

[98] Sydney Allicock - Vice President and Minister of Indigenous Peoples Affairs - was Toshao of Annai and Chair of the NRDDB, and lived the reality of the Linden-Lethem Road.

References

1. Academy of Natural Sciences of Philadelphia, 1998. Faunal Surveys of Iwokrama.

2. Conservation International, 2014. Biodiversity and Ecosystem Services Assessment Final Report.

3. Conservation International, 2014. Biodiversity and Ecosystem Services Final Report. Appendix IV: Species of Conservation Concern in Guyana.

4. Environmental Resources Management (ERM), 1995. Environmental and Social Impact Assessment – Linden – Lethem Road, Guyana.

5. Government of Guyana, 2000. National Development Strategy 2001-2010 – Eradicating Poverty and Unifying Guyana.

6. Government of Guyana, 2012. Government of Guyana, 2012. Second National Communication to the United Nations Framework Convention to Climate Change.

7. Government of Guyana, 2013. Guyana National Land Use Plan.

8. Guyana Forestry Commission, 2018. Monitoring, Reporting and Verification System Interim Measures Report Year 7.

9. Ministry of Finance, 2000. Study for the Upgrading and Completion of the Guyana – Brazil Road: Technical Appendices III Description of the Existing Route.

10. Ministry of the Presidency, 2019. Green State Development Strategy, Vision 2040 Volume 1 – Policy Recommendations, Financial Mechanism & Implementation.

11. Mott MacDonald, May 2019, Inception Report, Linden to Mabura Hill Road Upgrade and River Crossing at Kurupukari.

12. Mott MacDonald. 2019. Climate Vulnerability Assessment Report, Linden to Mabura Hill Road Upgrade and River Crossing at Kurupukari.

13. SCN-Lavalin International Inc, 2011. Environmental and Social Impact Assessment (ESIA) Final Report.

14. Watkins et al. (2004). The Fish Fauna of the Iwokrama Forest.

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Appendices

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A. Species of fishes, birds, amphibians, reptiles and mammals found in the project site

A.1 Species of Conservation Concern in Guyana

Scientific Name	Common Name	IUCN Status	CITES Listing	Guyana Endemic
Fishes				
Acanthocharax microlepis				Yes
Aequidens potaroensis	Guyana Aequidens			Yes
Ancistrus leucostictus	Mana Ancistrus			Yes
Ancistrus lithurgicus				Yes
Aphyocharax erythrurus	Flametail Tetra			Yes
Aphyodite grammica				
Astyanax guianensis	Guyana Tetra			Yes
Astyanax potaroensis				Yes
Auchenipterus brevio				Yes
Brachyglanis frenata				Yes
Brachyglanis melas				Yes
Bryconamericus hyphesson				Yes
Bunocephalus chamaizelus				Yes
Characidium pteroides				Yes
Corydoras potaroensis				Yes
Crenicichla wallacii	Slender Pike Cichlid			Yes
Hemigrammus cylindricus				Yes
Hemigrammus iota				Yes
Hyphessobrycon eos	Dawn Tetra			Yes
Hyphessobrycon minimus	Mini Tetra			Yes
Hyphessobrycon minor	White Minor			Yes
Hypostomus hemiurus				Yes
Jupiaba essequibensis				Yes
Jupiaba mucronata				Yes
Jupiaba potaroensis				Yes
Leporinus megalepis	Large-scaled Leporinus			Yes
Lithoxus lithoides	Rock Suckermouth			Yes
Loricariichthys brunneus				Yes
Loricariichthys microdon				Yes
Myleus pacu	Brown Giant Pacu			Yes
Myoglanis potaroensis				Yes
Ochmacanthus flabelliferus				Yes
Parapristella aubynei				Yes
Peckoltia braueri				Yes

Scientific Name	Common Name	IUCN Status	CITES Listing	Guyana Endemic
Phenacogaster megalostictus	Large-spot Glass Tetra			Yes
Poecilocharax bovalii				Yes
Pseudancistrus nigrescens				Yes
Rivulus waimacui	Waimacui Rivulus			Yes
Sturisoma monopelte				Yes
Vandellia beccarii				Yes
Birds				
Accipiter poliogaster	Gray-bellied Hawk	Near Threatened	II	
Accipiter striatus			II	
Accipiter superciliosus			II	
Agamia agami	Agami Heron	Vulnerable		
Amazilia bervirostris	White-chested emerald		II	
Amazilia fimbriata	Glittering-throated emerald		II	
Amazilia leucogaster	Plain-bellied emerald		II	
Amazilia versicolor			II	
Amazilia viridigaster			II	
Amazona amazonica			II	
Amazona farinosa	Mealy Parrot		II	
Amazona festiva	Festive Parrot	Vulnerable	II	
Amazona ochrocephala			II	
Anthracothorax nigricollis	Black-throated mango		II	
Anthracothorax viridigula			II	
Ara ararauna			II	
Ara chloropterus			II	
Ara macao	Scarlet macaw		I	
Aratinga pertinax			II	
Aratinga solstitialis	Sun Parakeet	Endangered	II	
Asturina nitida			II	
Athene cunicularia	Burrowing owl		II	
Brotogeris chrysoptera			II	
Bubo virginianus			II	
Burhinus bistriatus			III	
Busarellus nigricollis			II	
Buteo albicaudatus			II	
Buteo albonotatus			II	
Buteo brachyurus			II	
Buteo magnirostris			II	
Buteogallus meridionalis			II	
Buteogallus urubitinga			II	
Cairina moschata			III	
Calliphlox amethystina			II	
Campylopterus largipennis	Gray-brested saberwing		II	
Caracara cheriway			II	
Carduelis cucullata	Red Siskin	Endangered	I	
Cathartes aura	Turkey vulture			

Scientific Name	Common Name	IUCN Status	CITES Listing	Guyana Endemic
Cathartes burrovianus	Savanna vulture			
Cathartes melambrotus	Forest vulture			
Chlorostilbon mellisugus	Blue-tailed emerald		II	
Chondrohierax uncinatus			II	
Chrysolampis mosquitus			II	
Ciccaba huhula			II	
Circus buffoni			II	
Colibri delphinae	Brown-eared violet		II	
Bicoloured Conebill	Olive-sided Flycatcher	Near Threatened		
Coragyps atratus	Black vulture			
Crax alector	Black Curassow	Vulnerable		
Daptrius ater			II	
Deconychura longicauda	Long-tailed Woodcreeper	Near Threatened		
Dendrocygna autumnalis			III	
Deroptyus accipitrinus			II	
Diopsittaca nobilis			II	
Discosura longicaudus	Raquet-tailed coquette		II	
Elanoides forficatus			II	
Elanus leucurus			II	
Eudocimus ruber	Curry curry		II	
Falco deiroleucus	Orange-breasted Falcon	Near Threatened	II	
Falco femoralis			II	
Falco rufigularis	Bat falcon		II	
Falco sparverius			II	
Florisuga mellivora	White-necked jacobin		II	
Forpus modestus			II	
Forpus passerinus			II	
Gampsonyx swainsonii			II	
Geranospiza caerulescens			II	
Glaucidium brasilianum	Ferruginous pygmy owl		II	
Glaucidium hardyi			II	
Glaucis hirsutus	Rufous-breasted hermit		II	
Harpagus bidentatus			II	
Harpagus diodon			II	
Harpia harpyja	Harpy Eagle	Near Threatened	I	
Heliomaster longirostris	Long-billed starthroat		II	
Heliothryx auritus	Black-eared fairy		II	
Herpetotheres cachinnans	Laughing falcon		II	
Hylocharis cyanus	White-chinned sapphire		II	
Hylocharis sapphirina	Rufous-throated sapphire		II	
Hypocnemis cantator	Guianan Warbling-antbird	Near Threatened		
Ibycter americanus			II	
Ictinia plumbea			II	
Jabiru mycteria	Jabiru stork		I	
Leptodon cayanensis			II	

Scientific Name	Common Name	IUCN Status	CITES Listing	Guyana Endemic
Leucopternis albicollis			II	
Leucopternis melanops			II	
Lophornis ornatus	Tufted coquette		II	
Lophostrix cristata	Crested owl		II	
Micrastur gilvicollis	Lined forest falcon		II	
Micrastur mirandollei	Slaty-backed forest falcon		II	
Micrastur ruficollis	Barred forest falcon		II	
Micrastur semitorquatus	Collared forest falcon		II	
Milvago chimachima			II	
Mitu tomentosum	Crestless Curassow	Near Threatened		
Monasa astra	Black nun bird			
Morphnus guianensis	Crested Eagle	Near Threatened	II	
Myrmornis torquata	Wing-banded Antbird	Near Threatened		
Myrmotherula gutturalis	Brown-bellied Antwren	Near Threatened		
Myrmotherula surinamensis	Guianan Streaked Antwren	Vulnerable		
Nannopsittaca panychlora			II	
Odontophorus gujanensis	Marbled Wood-quail	Near Threatened		
Orthopsittaca manilata			II	
Oryzoborus angolensis	Tower tower			
Otus choliba	Tropical screech owl		II	
Otus watsonii	Tawny-bellied screech owl		II	
Pandion haliaetus			II	
Patagioenas subvinacea	Ruddy Pigeon	Vulnerable		
Periporphyrus erythromelas	Red-and-black Grosbeak	Near Threatened		
Phaethornis augusti			II	
Phaethornis bourcieri	Straight-billed hermit		II	
Phaethornis ruber	Reddish hermit		II	
Phaethornis rupurumii			II	
Phaethornis superciliosus	Long-tailed hermit		II	
Picumnus spilogaster	White-bellied Piculet	Vulnerable		
Pionites melanocephalus			II	
Pionopsitta caica			II	
Pionus fuscus			II	
Pionus menstruus			II	
Pipile cumanensis	Blue-throated Piping-guan	Vulnerable		
Polystictus pectoralis	Bearded Tachuri	Near Threatened		
Polytmus guainumbi	White-tailed golden throat		II	
Polytmus theresiae	Green-tailed golden throat		II	
Pteroglossus aracari			II	
Pteroglossus viridis			II	
Pulsatrix perspicillata			II	
Pyrilia caica	Caica Parrot	Near Threatened		
Pyrrhura picta			II	
Ramphastos toco	Toco Toucan		II	

Scientific Name	Common Name	IUCN Status	CITES Listing	Guyana Endemic
Ramphastos tucanus			II	
Ramphastos vitellinus			II	
Rostrhamus sociabilis			II	
Rupicola rupicola	Cock of the Rock		II	
Sarcoramphus papa	King vulture		III	
Spizaetus ornatus	Ornate Hawk-eagle	Near Threatened	II	
Spizaetus tyrannus	Black hawk eagle		II	
Thalurania furcata	Fork-tailed wood nymph		II	
Tinamus major	Great Tinamou	Near Threatened		
Topaza pella	Crimson topaz		II	
Touit batavicus			II	
Touit purpuratus			II	
Zebrilus undulatus	Zigzag Heron	Near Threatened		
Amphibians				
Atelopus spumarius		Vulnerable		
Rhinatrema shiv	Shiv's Caecilian			Yes
Stefania evansi	Groete Creek Tree Frog			Yes
Reptiles				
Boa constrictor			II	
Crotalus durissus			III	
Melanosuchus niger	Black Caiman	Lower Risk/conservation dependent	I/II	
Podocnemis unifilis	Yellow-spotted River Turtle	Vulnerable	II	
Mammals				
Ateles paniscus	Black Spider Monkey	Vulnerable	II	
Cebus apella			II	
Cebus olivaceus			II	
Cerdocyon thous			II	
Cuniculus paca	Labba	Least Concern	III	
Dasyprocta punctata			III	
Diclidurus ingens	Greater ghost bat			
Eira barbara			III	
Eumops maurus	Guianan bonneted bat			
Leopardus pardalis	Ocelot	Least Concern	I	
Leopardus wiedii	Margay	Near Threatened	I	
Myrmecophaga tridactyla	Giant Anteater	Vulnerable	II	
Panthera onca	Jaguar	Near Threatened	I	
Pithecia pithecia	Golden faced saki	Least Concern	II	
Priodontes maximus	Giant Armadillo	Vulnerable	I	
Pteronura brasiliensis	Giant Otter	Endangered	I	
Saguinus midas			II	
Saimiri sciureus			II	
Speothos venaticus	Bush Dog	Near Threatened	I	
Tamandua tetradactyla	Tamandua	Least Concern		
Tapirus terrestris	Brazilian Tapir	Vulnerable	II	
Tayassu pecari	White-lipped Peccary	Vulnerable	II	
Vampyressa brocki	Brock's yellow-eared bat	Least Concern		

A.2 Critical Species in the Project Area

Scientific Name	Common Name	Location Relative to the Project Sites
Birds		
Amazona dufresniana	Blue Cheeked Amazon	Kurupukari Crossing, Iwokrama
Crax alector	Black Curassow/ Powis	All project sites
Oryzoborus angolensis	Tower tower	Kurupukari Crossing, Iwokrama
Rupicola rupicola	Guianan Cock of the Rock	All project sites
Tinamus major	Great Tinamau	Kurupukari Crossing, Iwokrama
Fishes		
Arapaima gigas	Arapaima	Downstream of Kurupukari Crossing
Mammals		
Cuniculus paca	Labba	All project sites
Leopardus pardalis	Ocelot	All project sites
Mazama americana	Red Brocket Deer	All project sites
Mazama nemorivaga	Brown Brocket Deer	All project sites
Odocoileus virginianus	White Tail/Savanna deer	All project sites
Panthera onca	Jaguar	All project sites
Pteronura brasiliensis	Giant Otter	All project sites
Puma concolor	Deer tiger/Puma	All project sites
Tamandua tetradactyla	Tamandua	All project sites
Tapirus terrestris	Brazilian Tapir	All project sites
Tayassu pecari	White-lipped Peccary	All project sites
Amphibians		
Dendrobates leucomelas	Yellow-headed Poison Frog	Mabura Hill to Kurupukari

A.3 Fish Fauna in the Essequibo and Siparuni Rivers bordering the IIC

Scientific Name	Common Name	Essequibo River	Siparuni River	IUCN Status	CITES list
Acanthocharax microlepis		X	X		
Acanthodoras cataphractus		X	X		
Acanthodoras spinosissimus		X			
Acaronia nassa		X			
Acestrorhynchus falcatus		X	X		
Acestrorhynchus falcirostris		X	X		
Acestrorhynchus heterolepis		X			
Acestrorhynchus microlepis		X	X		
Acestrorhynchus nasutus		X			
Acestrorhynchus sp			X		
Aequidens tetramerus		X	X		
Ageneiosus inermis		X			
Ageneiosus pardalis		X			
Ageneiosus piperatus		X			
Agoniates halecinus		X			
Amblydoras affinis		X	X		
Ammocryptocharax lateralis			X		
Amnocryptocharax vintonae		X	X		
Anchoviella guianensis		X			

Scientific Name	Common Name	Essequibo River	Siparuni River	IUCN Status	CITES list
Anchoviella jamesi		X			
Anchoviella sp.		X	X		
Ancistrus hoplogenys			X		
Ancistrus lithurgicus		X			
Ancistrus sp			X		
Anostomus anostomus			X		
Anostomus plicatus		X			
Anostomus ternetzi		X			
*Aphyocharax erythrurus**	Flametail Tetra	X			
Aphyocharax sp		X			
Aphyodite grammica		X			
Aphyodite sp		X			
Apistogramma ortmanni		X	X		
Apistogramma steindachneri		X	X		
Apteronotus albifrons			X		
Apteronotus leptorhynchus		X			
*Arapaima gigas**		X	X		II
Argonectes longiceps		X			
*Astyanax guianensis**	Guyana Tetra	X	X		
Auchenipterus demerarae			X		
Auchenipterus nuchalis		X			
Batrachoglanis raninus		X	X		
Biotodoma cupido		X			
Bivibranchia bimaculate		X			
Bivibranchia fowleri		X			
Boulengerela cuvieri		X	X		
Brachychalcinus orbicularis			X		
Brachyglanis frenata		X			
Brachyhypopomus beebei		X	X		
Brachyhypopomus sp		X			
Brachyplatystoma filamentosum		X			
Brachyplatystoma vaillantii		X	X		
Brycon falcatus		X	X		
Brycon pesu		X	X		
Bryconamericus hyphesson		X			
Bryconops affinis		X	X		
Bryconops alburnoides		X			
Bryconops caudomaculatus		X	X		
Bryconops melanurus		X	X		
Bryconops sp 1		X			
Bryconops sp 2			X		
Bunocechalus coracoideus		X	X		
Bunocephalus amaurus		X			
Bunocephalus verrucosus		X	X		

Scientific Name	Common Name	Essequibo River	Siparuni River	IUCN Status	CITES list
Caenotropus labyrinthicus		X			
Caenotropus maculosus		X			
Callichthys callichthys		X			
Carnegiella strigata		X	X		
Catoprion mento		X			
Centromochlus heckelii		X			
Centromochlus schultzi		X			
Centromochlus sp		X			
Chaetobranchus flavescens		X			
Chalceus macrolepidotus		X	X		
Characidium gr. fasciatum			X		
Characidium pteroides		X			
Characidium steindachneri		X			
Charax gibbosus		X	X		
Charax hemigrammus		X			
Chasmocranus brevior		X			
Chasmocranus longior		X	X		
Chasmocranus sp			X		
Chilodus punctatus		X			
Cichla ocellaris		X			
Colomesus asellus		X	X		
Corydoras gr. simulatus		X	X		
Corydoras melanistius		X	X		
Corydoras punctatus		X			
Corydoras sp		X			
Creagrutus sp		X			
Crenicichla alta		X	X		
Crenicichla gr. wallaceii			X		
Crenicichla johanna		X	X		
Crenicichla lugubris		X	X		
Crenicichla sp		X	X		
Crenicichla wallaceii		X			
Crenuchus spilurus		X	X		
Cteniloricaria platystoma		X	X		
Cteniloricaria sp		X			
Ctenobrycon spilurus		X	X		
Curimata cyprinoides		X			
Curimata roseni		X			
Curimata vittata		X			
Curimatella immaculate		X			
Curimatopsis crypticus		X			
Cynodon gibbus			X		
Cynopotamus essequibensis		X			
Cyphocharax festivus		X	X		
Cyphocharax microcephalus		X			

Scientific Name	Common Name	Essequibo River	Siparuni River	IUCN Status	CITES list
Cyphocharax sp 1		X			
Cyphocharax sp 2		X			
Cyphocharax spilurus		X	X		
Dasyloricaria sp			X		
Distocyclus conirostris		X			
Doras carinatus		X	X		
Doras micropoeus		X			
Eigenmannia limbata			X		
Eigenmannia macrops		X			
Eigenmannia virescens		X	X		
Electrophorus electricus		X	X		
Erythrinus erythrinus		X	X		
Farlowella amazona		X			
Farlowella rugosa			X		
Farlowella sp 1		X			
Farlowella sp 2		X			
Farlowella sp 3		X			
Geophagus brachybranchus		X			
Geophagus surinamensis		X	X		
Gnathocharax steindachneri		X			
Goeldiella eques		X			
Guianacara geayi		X			
Guianacara owroewefi		X	X		
Gymnorhamphichthys rondoni		X			
Gymnorhamphichthys sp		X			
Gymnotus anguillaris		X	X		
Gymnotus carapo		X	X		
Gymnotus sp		X			
Haemomaster sp		X	X		
Hassar orestis		X			
Helogenes marmoratus		X	X		
Hemigrammus analis		X			
Hemigrammus belottii		X	X		
Hemigrammus cylindricus		X			
Hemigrammus gracilis		X			
Hemigrammus iota		X			
Hemigrammus levis		X			
Hemigrammus ocellifer		X	X		
Hemigrammus ocellifer-gr		X			
Hemigrammus orthus		X			
Hemigrammus schmardae		X			
Hemigrammus sp		X			

Scientific Name	Common Name	Essequibo River	Siparuni River	IUCN Status	CITES list
Hemiodontichthys acipenserinus		X			
Hemiodopsis sp 1		X			
Hemiodopsis sp 2		X			
Hemiodus argenteus		X			
Hemiodus gr. gracilis		X			
Hemiodus gracilis		X			
Hemiodus microlepis		X			
Hemiodus quadrimaculatus		X	X		
Hemiodus unimaculatus		X			
Hemisorubim platyrhynchos		X	X		
Henonemus punctatus		X			
Heptapterus sp 2		X	X		
Heptapterus sp 3		X			
Heros efasciatus		X			
Heros severus		X			
Heterocharax macrolepis		X			
Homodiaetus sp 1		X			
Homodiaetus sp 2		X			
Hoplerythrinus unitaeniatus		X	X		
Hoplias macrophthalmus		X	X		
Hoplias malabaricus		X	X		
Hoplias sp		X	X		
Hydrolycus armatus		X			
Hydrolycus tatauaia		X	X		
Hyphessobrycon bentosi		X			
Hyphessobrycon bentosi-rosaceus		X	X		
*Hyphessobrycon eos**	Dawn Tetra	X	X		
Hyphessobrycon gr. agulha		X			
Hyphessobrycon gr. Bentosi			X		
*Hyphessobrycon minimus**	Mini Tetra	X			
*Hyphessobrycon minor**	White Minor	X			
Hyphessobrycon rosaceus		X			
Hyphessobrycon sp		X			
Hypoclinemus mentalis		X			
Hypopomus artedi			X		
Hypopomus sp 2		X			
Hypopomus sp 3		X			
Hypopomus sp 4		X			
Hypoptopoma guianense		X			
Hypoptopoma sp		X			
Hypopygus lepturus		X	X		
Hypopygus sp 2		X			

Scientific Name	Common Name	Essequibo River	Siparuni River	IUCN Status	CITES list
Hypopygus sp 1		X			
Hypostomus hemiurus		X			
Hypostomus plecostomus		X			
Hypostomus watwata		X	X		
Iguanodectes spilurus		X			
*Ituglanis gracilior**		X			
Jupiaba abramoides		X	X		
Jupiaba essequibensis		X	X		
Jupiaba pinnata			X		
Jupiaba polylepis		X	X		
Jurengraulis sp.		X	X		
Knodus heteresthes		X			
Knodus sp		X	X		
Laemolyta proxima		X			
Leiarius marmoratus		X	X		
Leporinus alternus		X			
Leporinus arcus		X	X		
Leporinus fasciatus		X			
Leporinus friderici		X	X		
Leporinus maculatus			X		
Leporinus nigrotaeniatus		X	X		
Leporinus pellegrini		X	X		
Leptocharacidium sp			X		
Leptodoras hasemani		X			
Leptodoras linnelli		X			
Limatulichthys griseus		X			
Limatulichthys sp		X	X		
*Lithoxus lithoides**	Rock Suckermouth	X	X		
Loricaria cataphracta		X			
Loricaria sp 1		X			
Loricaria sp 2		X			
Loricariichthys brunnea		X			
Loricariichthys sp		X			
*Mazarunia mazarunii**	Mazaruni Cichlid				
Megalechis thoracata		X	X		
Megalonema platycephalum		X			
Melanocharacidium blennioides		X	X		
Melanocharacidium dispilomma			X		
Mesonauta cf. insignis		X			
Mesonauta festivus		X			
Metynnis argenteus		X			

Scientific Name	Common Name	Essequibo River	Siparuni River	IUCN Status	CITES list
Metynnis hypsauchen		X			
Metynnis luna		X			
Microcharacidium eleotrioides			X		
Microcharacidium sp		X	X		
Microglanis poecilus			X		
Microschemobrycon casiquiare		X			
Microschemobrycon geisleri			X		
Microschemobrycon sp		X			
Microsternarchus sp 1		X	X		
Microsternarchus sp 2		X			
Moenkhausia chrysargyrea		X	X		
Moenkhausia collettii		X	X		
Moenkhausia copei		X	X		
Moenkhausia cotinho		X			
Moenkhausia dichroura		X			
Moenkhausia georgiae			X		
Moenkhausia gr. chrysargyrea		X			
Moenkhausia grandisquamis		X			
Moenkhausia lepidura		X	X		
Moenkhausia megalops		X			
Moenkhausia oligolepis		X	X		
Moenkhausia shideleri			X		
Moenkhausia sp 1		X			
Moenkhausia sp 2		X			
Moenkhausia sp 3		X			
Moenkhausia sp 4		X			
Moenkhausia surinamensis			X		
Myleus rhomboidalis		X	X		
Myleus rubripinnis		X			
Myleus sp		X	X		
Myleus torquatus		X			
Nannostomus eques		X	X		
Nannostomus marginatus		X	X		
*Nannostomus minimus**	Least Pencilfish	X	X		
Nannostomus trifasciatus		X			
Nannostomus unifasciatus		X			
Nemadoras leporhinus		X			
Osteoglossum bicirrhosum		X	X		
Oxybrycon sp		X			
Oxydoras niger		X	X		
Oxyropsis carinata		X			
Pachypops sp		X			
Pachypops trifilis		X			

Scientific Name	Common Name	Essequibo River	Siparuni River	IUCN Status	CITES list
Pachyurus sp		X			
Parapristella aubynei		X			
Parodon guyanensis			X		
Parotocinclus britskii		X	X		
Parotocinclus collinsae		X	X		
Petilipinnis grunniens		X	X		
*Phenacogaster megalostictus**	Large-spot Glass Tetra	X			
Phenacogaster microstictus		X			
Phenacogaster sp		X			
Phractocephalus hemiliopterus		X			
Physopyxis lyra		X	X		
Piaractus brachypomus		X			
Pimelodella cristata		X	X		
Pimelodella macturki		X			
Pimelodella megalops		X			
Pimelodella sp			X		
Pimelodus albofasciatus		X			
Pimelodus blochii- gr. A		X	X		
Pimelodus blochii- gr. B		X	X		
Pimelodus ornatus			X		
Pirinampus pirinampu			X		
Plagioscion squamosissimus		X	X		
Platydoras cf. costatus			X		
Platyurosternarchus macrostomus		X			
Poecilia reticulata		X			
Poptella compressa		X			
Porotergus gimbeli		X			
Porotergus gymnotus		X			
Potamorrhaphis guianensis		X	X		
Potamotrygon orbignyi		X			
Potamotrygon sp		X			
Pristella maxillaries		X			
Pristobrycon sp		X			
Pristobrycon striolatus		X	X		
Prochilodus rubrotaeniatus		X	X		
Psectrogaster ciliata		X			
Psectrogaster essequibensis		X	X		
Pseudancistrus barbatus		X	X		
Pseudancistrus nigrescens		X			
Pseudancistrus sp 1		X	X		
Pseudanos irinae		X			

Scientific Name	Common Name	Essequibo River	Siparuni River	IUCN Status	CITES list
Pseudanos trimaculatus			X		
Pseudauchenipterus nodosus		X			
Pseudauchenipterus sp		X			
Pseudocetopsis minuta		X			
Pseudopimelodus sp			X		
Pseudoplatystoma fasciatum		X	X		
Pseudoplatystoma tigrinum		X	X		
Pseudotylosurus microps		X			
Psuedacanthicus leopardus		X			
Pterophyllum scalare		X			
Pygocentrus nattereri		X			
Pygopristis denticulate		X			
Pyrrhulina filamentosa		X	X		
Pyrrhulina sp		X			
Pyrrhulina stoli		X			
Rhabdolichops sp		X			
Rhamdia laukidi			X		
Rhamdia quelen		X	X		
Rhamdia sp		X			
Rineloricaria fallax		X			
Rineloricaria platyura		X	X		
Rineloricaria sp 1		X			
Rineloricaria sp 2		X			
Rineloricaria stewarti			X		
Rivulus sp		X	X		
*Rivulus waimacui**	Waimacui Rivulus	X			
Roeboides thurni		X	X		
Roestes molossus		X	X		
Roestes ogilviei		X	X		
Satanoperca jurupari		X			
Satanoperca leucosticta		X	X		
Schizodon fasciatus		X			
Serrasalmus rhombeus		X			
Serrasalmus serrulatus		X	X		
Serrasalmus sp		X	X		
Soleonasus finis		X			
Sorubim lima			X		
Steatogenys elegans		X			
Stegophilus sp		X			
Steindachnerina bimaculata		X			
Steindachnerina planiventris		X			

Scientific Name	Common Name	Essequibo River	Siparuni River	IUCN Status	CITES list
Sternarchorhynchus oxyrhynchus		X			
Sternopygus macrurus		X	X		
Synbranchus marmoratus		X	X		
Tatia aulopygia		X			
Tatia creutzbergi			X		
Tatia sp 1		X			
Tatia sp 2		X	X		
Tetragonopterus argenteus		X			
Tetragonopterus chalceus		X			
Thrissobrycon sp		X			
Trachycorystes sp		X			
Trachycorystes trachycorystes		X			
Trachydoras cf. brevis		X			
Trachydoras microstomus		X			
Trachyelopterus galeatus		X			
Triportheus angulatus		X			
Triportheus rotundatus		X	X		
Vandellia beccarii		X			
Vandellia cirrhosa	Candiru	X			
Vandellia sp		X			
Zungaro zungaro	Gilded catfish	X			

* Also recorded in Table 7: Species of Conservation Concern in Guyana

A.4 Herpetofauna at the Kurupukari Base Camp and Three Miles Camp

Scientific Name	Common Name	Base Camp (Kurupukari)	Mile 3	IUCN	CITES List
Ameiva ameiva		X	X		
Amphisbaena fuliginosa		X			
Anilius sp		X	X		
Anolis fuscoauratus			X		
Atractus flammigerus			X		
Bachia flavescens			X		
Bothrops atrox	Labaria		X		
Bufo guttatus			X		
Bufo marinus	Cane toad	X	X		
Bufo species		X	X		
Chironius scurrulus		X			
Coleodactylus septentrionalis			X		
Corallus hortulanus			X		
Dipsas catesbyi			X		

Scientific Name	Common Name	Base Camp (Kurupukari)	Mile 3	IUCN	CITES List
Dipsas pavonina		X			
Drymoluber dichrous			X		
*Eunectes murinus**		X			II
Gonatodes humeralis			X		
Helicops angulatus			X		
Hyla boans			X		
Hyla crepitans			X		
Hyla geographica			X		
Hyla granosa			X		
Hyla leucophyllata			X		
Hyla minuscula			X		
Hyla minuta			X		
Kentropyx calcarata			X		
Leposoma percarinatum			X		
Leptodactylus bolivianus			X		
Leptodactylus knudseni		X	X		
Leptodactylus mystaceus			X		
Leptodactylus rhodomystax			X		
Liophis reginae			X		
Mabuya bistriata			X		
Osteocephalus taurinus			X		
Oxybelis aeneus	Brown vine snake		X		
Phyllomedusa bicolor	Giant monkey frog		X		
Phyllomedusa vaillanti			X		
Physalaemus species			X		
Pipa pipa			X		
Plica umbra			X		
Pseustes sulphureus			X		
Scinax boesemani			X		
Scinax sp. cf. egleri			X		
Thecadactylus rapicaudus			X		
*Tupinambis teguixin**			X		II
Typhlops reticulatus			X		
Uranoscodon superciliosus			X		

* Also recorded in Table 7: Species of Conservation Concern in Guyana

A.5 Birds of Ecotourism Value in the Iwokrama Forest

Scientific Name	Common Name	IUCN	CITES
Amazona dufresniana	Blue-cheeked Amazon	Near Threatened	II
Atticora melanoleuca	Black-collared Swallow		
Crax alector	Black Curassow	Vulnerable	
Cyanicterus cyanicterus	Blue-backed Tanager		
Deroptyus accipitrinus	Red-fan Parrot		
Discosura longicauda	Racket-tailed Coquette		
eriporphyrus erythromelas	Red-and-black Grosbeak	Near Threatened	
Frederickena viridis	Black-throated Antshrike		
Haematoderus militaris	Crimson Fruitcrow		
Hylexetastes perrottii	Red-billed Woodcreeper		
Iodopleura fusca	Dusky Purpletuft		
Leucopternis melanops	Black-faced Hawk		
Mitu tomentosa	Crestless Curassow	Near Threatened	
Myrmornis torquata	Wing-banded Antbird		
Neomorphus rufipennis	Rufous-winged Ground-Cuckoo		
Nyctibius leucopterus	White-winged Potoo		
Perissocephalus tricolor	Capuchinbird		
Phoenicircus carnifex	Guianan Red-Cotinga		
Phylloscartes virescens	Olive-green Tyrannulet		
Polioptila guianensis	Guianan Gnatcatcher		
Psophia crepitans	Gray-winged Trumpeter	Near Threatened	
elenidera culik	Guianan Toucanet		
Topaza pella	Crimson Topaz		

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B. Matrix / Checklist of Stakeholder Inputs

Ref.	Stakeholder Issues / Concerns	Recommendation / Responses Provided at Engagement Events	Design Organisation Response
1	**Road Alignment, Road Reserve and Compensation for Removal of Structures**		
1.1	**Alignment of Road** Alignment of Linden to Mabura Hill Road - would it pass through the villages?	**Response from SRKN:** Expected be more or less same as it is now. It is not expected to change its alignment in terms of location of villages.	As per the response from the SRKN. The proposed highway alignment deviates slightly from the existing alignment in places, however this mainly occurs in the locations of tight bends and not at villages.
1.2	**Road Reserve / Right of Way** What exactly is the official measurement of the Road Reserve? The Road Reserve / Right of Way needs to be established by Government and Enforced	**Response from MOPI:** The standard reserve is 200 ft on either side of the middle of the road.	As per the response from the MOPI. The Right of Way is 200ft either side of the existing centreline. It is understood this is already enforced in places e.g. Mile #58 Village and should continue to be enforced along the entire route once constructed.
1.3	**Removal of Structures on Reserve** What would happen if there were houses in the way of the road design? Would peoples' dwellings and business structures be broken down / removed?	**Response from MOPI:** No structures are allowed anywhere on the Reserve. This is the Law. We don't anticipate the alignment changing and so don't think anyone has to move. But if that is the case there would be a relocation project and the person(s) would be compensated.	As per the response from the MOPI.
1.4	**Relocation and Compensation** Would there be relocation, and to where? Will there be compensation if structures are removed from Reserve?	**Response from MOPI:** First step of design will be to avoid relocation, as far as possible. *Relocation Plan*: If relocation is necessary: The Ministry (MOPI) will try to relocate those who are in need and would create a relocation plan. *Compensation*: Yes: Any structure that has to be removed from the Reserve will be built back to the same type and value or, usually, better with improved materials used to reconstruct / compensate for any such structures removed.	As per the response from the MOPI.

Ref.	Stakeholder Issues / Concerns	Recommendation / Responses Provided at Engagement Events	Design Organisation Response
1.5	**Dimensions / Width of Road** What is the width of the Road? Will it have multiple lanes?	**Response at event:** We do not yet know dimensions of road.	The road width consists of two 3.6m lanes (one in each direction) plus a 3.0m paved hard shoulder either side of the carriageway. We are currently looking into the safety and economic benefits of a 2.4m hard shoulder as it will cost less, whilst reducing undertaking and still allowing trucks to pull mostly off the road if required. A climbing lane is also being considered in lieu of a hard shoulder on steep sections of the road to allow safe overtaking of slow moving vehicles.
2	**Safety**		
2.1	**Roadway and Bridge Lighting** No lights exist along the Linden to Mabura Hill stretch causing road accidents and impacting safety / security for villagers and women in particular. No road lights exist at #47, #58, Area behind MMC, at MMC Crossing or at Kurupukari / Fair View. Solar or LED-lights and must be theft-proof, as far as possible, given previous experience. The Kurupukari Bridge needs to be very well lit; including the "landings" on either side of the crossing.	**Agreed at event:** Lights would be included as a road safety feature in the design. Lights / Lighting will be included in the zones near to and within villages / communities - this can be considered as part of the design to maximise village safety and help with security. Illuminators/ "cat eyes" lighting to be considered for full length of roadway. Bridge to be well lit as well as access on both sides. Type of Lighting on Bridge yet to be determined.	Lighting is to be provided in the villages of Mile #47, Mile #58, Mabura Hill and on the approach to Linden. Lighting is not to be provided along the full length of the route, but thermoplastic markings with reflective beads and cats eyes will be considered in the detailed design to increase the reflectivity of carriageway markings at night. The type and full extents of the lighting will be determined at the detailed design phase. It is agreed that lighting within the villages themselves would be beneficial, however this is outside the current scope of this project which is just focussing on the road. Lighting at the Kurupukari Bridge will be considered at the detailed design phase, however further analysis is required before a final decision is made due to the environmental sensitivity of this area.
2.2	**Roadway Markings** A type of yellow paint being used is not luminous - cannot be clearly seen at night.	**Recommendation:** Need to stock and use a better quality luminous paint that is visible - so road users can clearly see road markings.	

Ref.	Stakeholder Issues / Concerns	Recommendation / Responses Provided at Engagement Events	Design Organisation Response
			Thermoplastic markings with reflective beads and cats' eyes will be considered in the detailed design to increase the reflectivity of carriageway markings at night.
2.3	**Speeding** There is unregulated / unchecked speeding along the roadway. Speeding has become the norm and many accidents and loss of life thus caused.	**Recommendation:** Have structural and technological solutions incorporated into road design so as to reduce speeding, increase safety of pedestrians & road users, generally and remove human corruption. Modern "Speed Calming" measures to be incorporated / supported by MOPI. Average Speed Trap Camera Surveillance trial now in place (on West Demerara) with average speed camera; once the driver enters the zone and exits, the distance between cameras is measured tracking the speed. Ideally this feed could go to several agencies for audit and generate a speeding ticket (All computerised). This is a question of budgeting, but the project will lobby for this.	Speed limits will be reduced to 50kph through villages of Mile #47 and Mile #58 and on approaches to Linden and Mabura Hill. Warming signs will be provided on approach to villages / schools. Consideration will be given to rumble strips, speed bumps and narrowing of the road to encourage lower speeds through villages. The above measures will be specified as part of the detailed design.
2.4	**Road Safety Measures for Pedestrians** What safety measures can be used for pedestrians?	**Recommendation:** Speed suppressors, rumble strips, pedestrian crossings, overhead walkways. The shoulders should be as wide as possible so there can be provision for a parking space nearby so trucks could pull in if need be.	The measures above will be provided to encourage vehicles to slow down through villages. Pedestrian crossings will be provided at villages. The exact form will be specified at the detailed design phase, but it is likely to be a raised to ensure it is visible and ensure vehicles slow down on approach. An overhead walkway is deemed to be excessive in this locality. A hard shoulder of 2.4 to 3.0m will be provided which should provide a gap between pedestrians and vehicles driving along the road. A walkway will be provided over bridges which will be separated from the carriageway by a concrete barrier.
2.5	**Road Safety Education for Schools** There is no proper road safety education for school children. Children from villages regularly have to cross the road to get to school. Teachers tell them to look right and left etc. before crossing but that is all. There is no proper signage indicating schools or a School Zone. (Just small sign-posts with name of schools).	**Recommendation:** Official Road Safety Education Program for Schools to be established. Large, official School Signs to be erected. School Zone signage also to be erected. Pedestrian Crossings / Traffic Lights / Overhead Walkways to be established as school children's road safety measures.	Appropriate signs and other measures will be provided which clearly indicate the location of a school and encourage reduced speeds. A road safety education programme would be encouraged but is outside the scope of the current scheme.

Ref.	Stakeholder Issues / Concerns	Recommendation / Responses Provided at Engagement Events	Design Organisation Response
3	**Health Facilities**		
3.1	**Upgraded Health Facilities to handle Road Accidents and Emergencies** Currently there are Health Posts at #47 and #58 with the nearest hospital in Linden over two plus hours away. The current #47 Health Post has only one community health worker (CHW) and an assistant. It would be welcomed if there was an upgrade. In order to provide care for accidents a medical nurse and an ambulance would be needed.	**Response:** Upgraded Health Facilities are indeed necessary but are not part of the Road Design remit. However, we will pass on this recommendation to the relevant health authorities.	As per the response at the event – outside the scope of this scheme.
4	**Security**		
4.1	**Access by unwanted persons to our communities.** People pass through the community and nobody knows them. Currently, the police are located in Mabura and by time the police get to the villages after a report is made – the persons have already done their mischief and are gone. There might be a bandit coming in, and some may come and kidnap the children. We are very unsafe and the paved road will open up a lot of unwanted persons coming in. We are worried that there will be: • More crime. • Increased smuggling. • Increased Trafficking in • Persons - especially young women (for sex work in mining camps) and young men (for cheap labour). • More illegal immigrants, • More illegal hunting, • Poaching and trapping.	**Recommendations / Responses:** A Police Outpost is needed at #58. Multi-Agency Control Stations - Vehicle Interception Facilities located at Mabura Police station and the Iwokrama Ranger Station. These would include: • GRA • Customs • Police • Rangers • Drive-on Weigh Scales • TIP & Wildlife Agency presence etc. A Specially Trained Highway Patrol is required to monitor the road Checkpoint at Bridge Crossing operating 24/7 on Northern side (MMC) Increased security at the bridge crossing 24/7 and monitoring of illegal immigrants.	These are very valid concerns but are not specifically a design issue. The recommendations will be taken into consideration. and passed on by MOPI to the relevant authorities. This should also be brought to the attention of the Multi-Stakeholder Group/ Inter-Agency Group set up for the Road / Bridge consultations. Space can be allocated within the designs for checkpoints etc. if required.
5	**Overweight / Overladen Trucks**		
5.1	**Overloading** The Axle Load Survey shows that nearly all trucks are in breach of the law/legal limit of 7 or 8 tonnes per axle. This situation will break up the new road if not checked and outlawed**.**	**Recommendations / Responses:** Policy / law for maximum axle weight must be reviewed and set. Public education campaign needed. Enforcement must be done.	As per the responses at the event – a weight control programme will be crucial to ensure the design life of the road is realised. This is a matter of education and enforcement rather than a design issue.

Ref.	Stakeholder Issues / Concerns	Recommendation / Responses Provided at Engagement Events	Design Organisation Response
		Double / triple / quadruple axles recommended according to weights carried by trucks and incentives given to truck owners to reconfigure their trucks/axles. This weight limit must be across the board for ALL trucks / containers. The Ministry of Public Infrastructure should begin enforcing weight restrictions prior to construction.	
5.2	**Logging Trucks** The logging trucks are the most damaging, what are some measures that can be done to reduce axle load?	**Recommendations / Responses:** Enforce weight restrictions Have weigh station at multiple locations along the route GFC and GGMC need to be part of the enforcement	As per the response to item 5.1. Portable weigh scales could also be considered to allow police to stop and weigh trucks which look overloaded/
6	**Rainfall and Flooding**		
6.1	**Rainfall and Flooding at 40 and 42 miles** Consistent road flooding and pooling of water from rainfall at 40 and 42 miles mentioned by several stakeholders which causes transportation issues in the community. The existing culverts are not working in this location.	**Response:** This situation needs to be fixed.	A hydrological model has been developed for the road to inform the design of the cross drainage structures: • The culvert at mile 40 will be replaced with a 4.2m x 2.1m concrete box culvert. • The culvert at mile 42 will be replaced with a 20m span bridge. These have been designed to withstand a 1 in 50 year design flow to massively reduce the risk of flooding.
7	**Utilities Corridor**		
7.1	**Utilities Corridor** Lack of Electricity, Telecommunications, Internet, Water for Communities alongside the road.	**Response:** A Utilities Corridor is needed all along the length the road from Linden to Lethem. This allows for future planning and development.	The preliminary design includes a 2.5m wide utilities corridor along the entire length of the road corridor and utilities ducting in the structures. This is to be on the right hand side of the road when driving from Linden to Mabura Hill so that, in general, it is at the top of slope rather than the bottom of an embankment. The utilities corridor will be offset from the road so that the paved road does not have to be ripped up to access it.
8	**Wildlife and Eco-Tourism**		
8.1	**Impacts of Road on Wildlife / Eco-Tourism** A question for the EPA in regard to tourism and the eco-tourism that we promote and develop for our livelihood business.	**EPA Response / Recommendation:** What is recommended is to have an underpass for the animals especially for the mating season because the	It is possible to provide crossings for wildlife along the road, however the design team need to be guided by the EPA on this aspect of the design.

Ref.	Stakeholder Issues / Concerns	Recommendation / Responses Provided at Engagement Events	Design Organisation Response
	We are concerned about the impacts of the road, the increased noise and traffic etc. (especially during construction and thereafter). We have species of birds that attract international bird watchers and with the increased traffic in place with the increased noise, the birds and animals tend to go further inward as a result.	noise would affect these animals. It is recommended to have an alternative for wildlife to safely cross the road. All recommendations and options will be put forward to the design engineers for the road. And to the EPA for Environmental permitting. They will then assess what is the most feasible / practical and possible structural design options for protecting wildlife along the road.	It will be important to understand what is required sooner rather than later to ensure the costs can be accounted for within the cost estimates and economic analysis.
8.2	**Impacts on fish** Take into consideration that the Essequibo river is a main traverse to the Rupununi river, especially in spawning season. Need to be careful not to negatively impact this important resource. There is need to study fish movement at different times of the year. It is just the Arapaima has really been tracked. There hasn't been a lot of work on tracking fresh water fish mostly counts but not patterns.	No direct response.	The design team will be guided by the environment team / EMC on this item.
9	**Harmonisation of Road Plan with Community Development Plan**		
9.1	**Community Development Plans** It was within our Community Development Plan to have nature trails within our eco-tourism business projections. So the Road will be a major impact on our wildlife In the process of development as a community. We have our community development plan and the road plan comes in and if it doesn't coincide with our community's plan. What then?	**SRKN Response:** We would like to have a copy of the Community Development Plan - this is something we need to have in hand, so as to try to ensure that the road design/road plan is in harmony, as far as possible, with the Community Development Plan.	The design organisation will respond once they have received a copy of the Community Development Plans.
10	**River Traffic**		
10.1	**River Traffic** It is mostly small community boats or small tourism / tour guide boats that traverse the river, but there is a possibility of larger vessels traversing the river where it is navigable.	**Response:** The bridge should not impact on small boat traffic or local transportation. The bridge should also enhance tourism enterprises.	A minimum span between piers of 45m is currently being proposed which should allow free movement of all river traffic at that locality.

Ref.	Stakeholder Issues / Concerns	Recommendation / Responses Provided at Engagement Events	Design Organisation Response
	Boats can go upstream - to the South as far as Rewa and Apoteri. One stakeholder is thinking of building a double decker boat for tourism. Whitewater Adventures company 6 cylinder Jet boats came up to Kurupukari at one time.		The height between the river level and base of the bridge will vary throughout the year depending on the river level. However there should be sufficient room, even for a double decker boat, to pass beneath the bridge throughout the year as the deck has been designed to withstand a 1 in 100 year design flow.
11	**Bridge traffic and control of Iwokrama Corridor**		
11.1	**Bridge traffic and control of Iwokrama Corridor** Will the new bridge be operational at night - on a 24/7 basis? We are looking at the bridge as part of the country's development and for tourism. Control of the Iwokrama corridor is critical and to keep Iwokrama as a protected area. Guyana has a 'Green Development Strategy' and this should be kept in mind. Currently, the Iwokrama Road Corridor is closed to traffic at night, and the pontoon is also closed at night. This is a control measure for the protected area.	**Response:** Opening the bridge and road to traffic at night will create a new dynamic. There needs to be some kind of compromise. Having the road corridor / new bridge open all night will put Fair View people at risk of crime and unwanted intruders and will put wildlife at greater risk from illegal trapping and road kill.	This is a policy decision and will not impact on the design.
12	**Waste Management**		

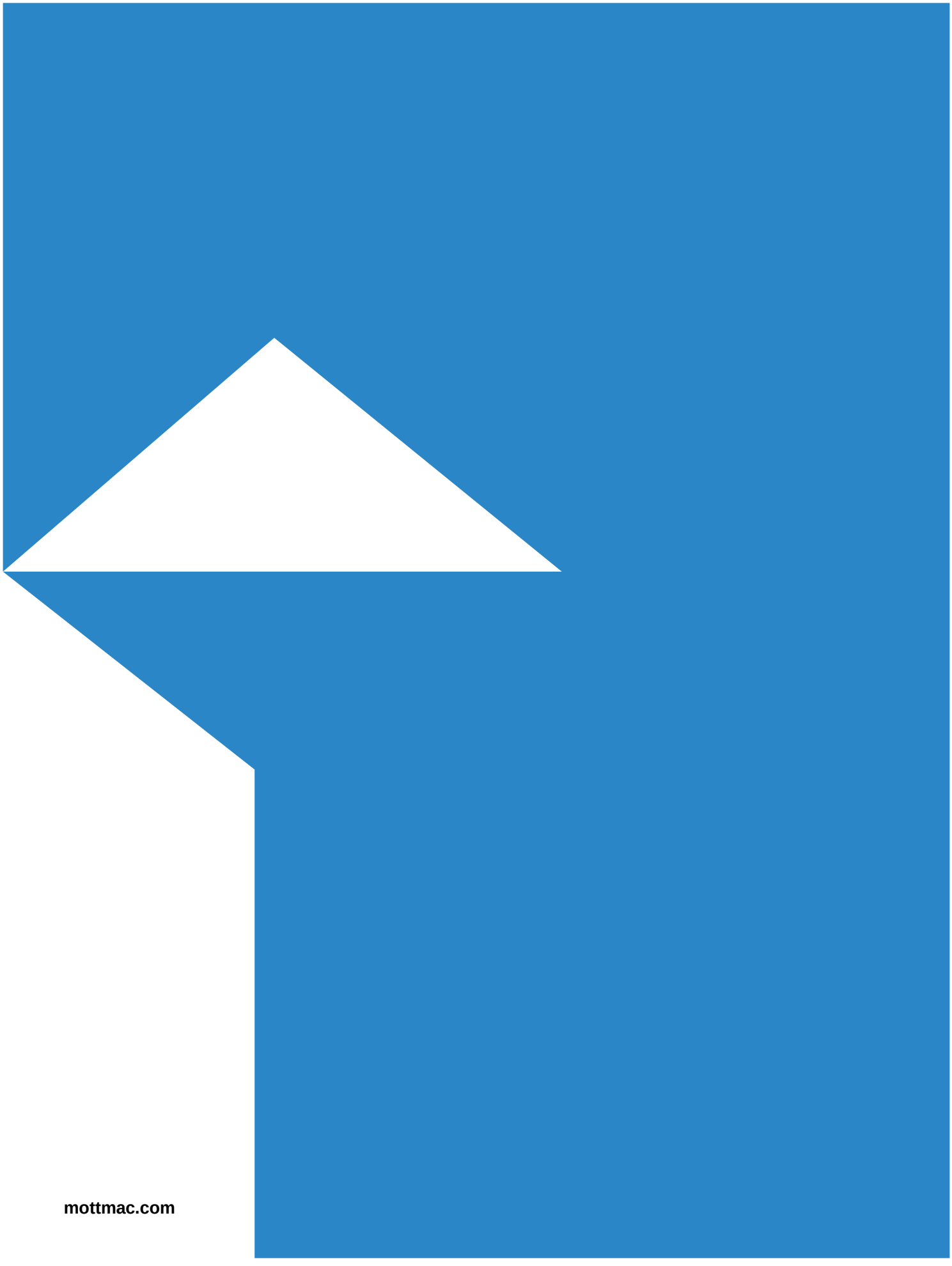
Ref.	Stakeholder Issues / Concerns	Recommendation / Responses Provided at Engagement Events	Design Organisation Response
12.1	**Waste Management** Is there a Waste Management Plan? There will be increased waste with increased traffic / road use. There also needs to be Garbage plan or policy so that road / bridge users do not toss garbage out onto the River when crossing the bridge. Currently, the pontoon has a garbage bag affixed to side of the ferry.	**Response** Garbage collection and monitoring is done by Iwokrama rangers on a monthly basis. Garbage includes plastic, glass, Styrofoam food boxes etc. the glass is the heaviest weight. Garbage control and waste management will have to be systemised and carefully controlled. This will be a policy decision. Enforcement will be key with stiff penalties. For Construction Phase there needs to a Plan and System developed.	As per the response given at the event. This is a policy / enforcement issue and will not impact on the design.
13	**Tourism Centred Bridge Design**		
13.1	**Tourism Centred Bridge Design** I hope the bridge takes into its designs the fact that this is a protected forest and an eco-tourism area, so it has to be a bridge that adds to the scenic beauty and not detract from it. Local peoples' ideas need to be brought on board.	**Response** The bridge should be special because it is in protected place. Iwokrama Forest is protected by law and also internationally certified. Iwokrama Tourism is world class and Fair View community is developing its own brand. The bridge needs careful and appropriate design.	A concrete box-girder bridge is being proposed which is considered by the design organisation to be more aesthetically pleasing that other cheaper alternatives. A footpath will be provided alongside the bridge to allow tourists to walk along it and take in the scenery. Footpaths could be provided on both sides of the bridge if the additional cost is approved by the MOPI. All local people's ideas will be included within the matrix and the design team will listen and respond. .
13.2	**3D Visualisation** Apart from the technical drawings which might be hard for people to "see" what kind of bridge is proposed - can we also have a 3D impression so we can see what the bridge will actually look like?	**Response** Request will be made for a 3D image of the bridge design as feedback to Iwokrama and Fair View community.	A 3D impression will be produced and shown at future stakeholder engagement events
14	**Location of Bridge**		

Ref.	Stakeholder Issues / Concerns	Recommendation / Responses Provided at Engagement Events	Design Organisation Response
14.1	**Location of Bridge in terms of flooding and the falls** The placement, height & design of the Bridge has to ensure that it takes into account heavy flooding and also the Kurupukari Rapids. Bridge/River surveys should be done in both rainy and dry seasons.	**MOPI Response:** Addressing your concern for the location of the bridge, I know that is a valid concern with the bridge being so close to the falls. With the studies we are doing two things to guide us on the optimal location: In terms of the surveys it's not necessary to have it during the rainy season because the profile of the river bed and where the out crops and the rocks are etc. that remains the same. And as we've said, we've consulted with local people and are seeing evidence of the high water mark, so, the seafloor / riverbed measurements will inform the decisions on the optimal location for the bridge.	As per the response from the MOPI.
14.2	**Location of Bridge in terms of the Petroglyphs** The design of the bridge should take into account the location of the Petroglyphs. It must not be located anywhere too close to this historic and touristic location.	**MOPI Response:** We will be taking into account the location of the KK falls and petroglyphs to ensure their integrity is kept intact.	The location of the bridge will be situated 75m downstream from the existing ferry crossing so will not impact on the KK falls or petroglyphs.
15	**Rising river levels, flooding and climate change**		
15.1	**Rising river levels, flooding and climate change** This river area is not tidal but rainy season affects the height of flooding and the design should consider this. Climate Change issues also need to be taken into consideration. The road and bridge's feasibility studies should include local residents to have a better idea of issues.	**EMC Response:** We will look at historical information on water levels and run simulations to cater to future scenarios and best indications of local knowledge. There have been extremes with El Nino and La Nina and these will be taken into consideration. Some future development scenarios will also be done.	The Hydrology / Drainage Key Expert has undertaken a site visit to the bridge location to better understand the local area. He discussed historic flood levels with local residents and listened to their concerns. The hydrological river model has been developed to incorporate these levels / concerns and the impacts of climate change and the bridge designed accordingly.
16	**Bridge Construction Phase**		

Ref.	Stakeholder Issues / Concerns	Recommendation / Responses Provided at Engagement Events	Design Organisation Response
16.1	**Construction Traffic** When the bridge is being constructed will there be problems with traffic flows and pontoon crossing?	**Response** The two main components concerning the bridge as we look at design is that for operational aspect: it has to accommodate vehicular river traffic and type of river vessels which traverse. During construction phase: Existing arrangements for people to move (on the river) should not be disrupted. These are the issues designers take into consideration regarding construction. Every attempt will be made to ensure no / limited disruption of traffic/pontoon crossing during construction phase.	The location of the bridge is proposed to be 75m downstream from the existing ferry crossing which should allow the pontoon to operate uninterrupted during construction. Currently, no other traffic flow issues are anticipated during construction.
16.2	**Employment of Local Labour and Benefits for Youth** Shouldn't members of the community be given priority for jobs on the road - when construction commences? *"We were given contracts at one time but they got taken away and the contractor gave it to their own workers. Nobody from the community got any kind of work".* I hope there would be local employment; the village can support with workers. I am a road user, and the road is beneficial for youths. Will there be an opportunity for the younger generation to work alongside the Ministry groups on community issues?	**MOPI Response:** Yes, we usually encourage contractors to employ from the local communities. We will add a clause in the contract to guarantee a percentage of jobs for community members. Also opportunities for community members for employment for other skilled jobs - once they have the expertise. We expect that youth will benefit and provision for youth in various capacities can be made in the Environmental and Social Management Plan.	As per the response from the MOPI - There should be a clause written into the contract which requires the contractor employ a certain percentage of local labour. This clause could also include training, however it is important that the training develops skills that the local labour will be able to utilise in the future and not just specific to bridge construction as there will unlikely be a similar bridge built again in the region.

Ref.	Stakeholder Issues / Concerns	Recommendation / Responses Provided at Engagement Events	Design Organisation Response
16.3	**Construction Yard / Camp for Workers** For bridge construction there will need to be a yard/camp for workers which could have major impact on the area, as well as considerations about how this will affect Iwokrama & Fairview I am a bit scared for the island (Michelle's Island) for tourism with all the construction noise. On the other hand, there may be an increase in business sales for shops, restaurants etc. from workers.	**Response:** The bridge construction workers camp should not be near to Iwokrama or on Fair View lands. Perhaps it can be on the other side nearer to MMC. We have to be very careful and very clear regarding village safety measures; village rules / penalties and these should be officially made known to contractors. Rangers, Community Police and Police Ranks might all have to be deployed - given special monitoring and safe-guarding responsibilities during construction phase - and also afterwards during operational phase. In terms of noise level - this will have to be explained to tourists before they book. In terms of noise impacts on birds and wildlife - it was found that during the Iwokrama Canopy Walkway construction - that birds were affected - but that afterwards, they returned to the habitat. So it was only a short-term impact.	The construction yard for the bridge is currently proposed to be on the Linden side of the river and not the Iwokrama side. There will also be road construction camps that might be located near to #58. Both need further discussion and consideration going forwards into the next design stage.
16.4	**Obstruction during Construction** Will there be traffic jams, road blocks, bottle-necks during construction of the Linden to Mabura Hill road? How will this affect road users?	**Response / Recommendations:** Construction Work Zones will be defined and clearly identified. A Traffic Management Plan will be developed and implemented. At no time will traffic be completely blocked off. There will always be one lane open to help avoid this. Community members can monitor the road works and file complaints if there any breaches.	As per the response provided at the event.
17	**Timeline**		
17.1	**Waiting a long time for paved road** The residents have been waiting a long time for a road upgrade and we need it. Our hopes are high for this improvement and are happy to know that the road will actually improve. This would impact the community positively, including the aspect of community business/economic boost.	**Response** We hope the Road & Bridge bring both short-term and especially long-term benefits to stakeholders	As per the response at the event.

Ref.	Stakeholder Issues / Concerns	Recommendation / Responses Provided at Engagement Events	Design Organisation Response
	There are 10 persons with small businesses in the community and the road would benefit them greatly. And encourage more enterprises. Good opportunity for youth to get on board. A few months back a governmental group was supposed to go to the village but as a result of the road condition they abandoned the trip. If the road was improved there would be more attention from the government and more investment from the donors and private sector.		
17.2	**Timeframe for Design, Tender and Construction** What is the average time between design, tender and construction? Will it be timely?	**MOPI Response** It varies. But the Linden to Mabura Hill road is high priority. If all goes well then construction could begin sometime in late 2020 or early 2021. But this not definite.	As per the response at the event. The design phase is due to be completed in December 2019.



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