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Report No: PAD3007

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT AND
INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED LOAN

IN THE AMOUNT OF US$50 MILLION

AND A
PROPOSED CREDIT

IN THE AMOUNT OF SDR 30.8 MILLION
(US$42.5 MILLION EQUIVALENT)

AND
GRANTS

IN THE AMOUNT OF US$15.05 MILLION

TO THE

INDEPENDENT STATE OF PAPUA NEW GUINEA

FOR A

PAPUA NEW GUINEA RESILIENT TRANSPORT PROJECT

MAY 23, 2022

Transport Global Practice
East Asia and Pacific Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective April 30, 2022)

Currency Unit =	Papua New Guinean Kina (PGK)
US$1=	PGK 3.52
SDR 1 =	US$1.3443

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

AADT	Average Annual Daily Traffic
ADB	Asian Development Bank
AGO	Auditor General's Office
BoQ	Bill of Quantities
BPA	Beijing Platform for Action
CBA	Cost-Benefit Analysis
CEDAW	Convention on the Elimination of All Forms of Discrimination Against Women
CERC	Contingent Emergency Response Component
CPF	Country Partnership Framework
DA	Designated Account
DBM	Design-Build-Maintain
DFAT	Department of Foreign Affairs and Trade (Australia)
DFIL	Disbursement and Financial Information Letter
DoWH	Department of Works and Highways
DSP	Development Strategic Plan
EIRR	Economic Internal Rate of Return
EPM	Employer's Project Manager
ESHS	Environmental, Social, Health, and Safety
ESIA	Environmental and Social Impact Assessment
FCV	Fragility, Conflict, and Violence
FM	Financial Management
FMM	Financial Management Manual
FPA	Family Protection Act
GBV	Gender-Based Violence
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GoPNG	Government of Papua New Guinea
GRM	Grievance Redress Mechanism
GRS	Grievance Redress System
HDM-4	Highway Development and Management Model-4
HEIS	Hands-on Expanded Implementation Support

IA	Implementing Agency
IFR	Interim Financial Report
IPF	Investment Project Financing
iRAP	International Road Assessment Programme
LMP	Labor Management Procedures
M&E	Monitoring and Evaluation
MTDP III	Medium-Term Development Plan III
NC2	Second National Communication
NPV	Net Present Value
NRN	National Road Network
NRNS	National Road Network Strategy
OPBRC	Output- and Performance-Based Road Contract
PFMA	Public Finances Management Act
PM	Project Manager
PNG	Papua New Guinea
POM	Project Operation Manual
PPG	Project Preparation Grant
PPSD	Project Procurement Strategy for Development
RAMS	Road Asset Management System
RF	Resettlement Framework
RMRP	Road Maintenance and Rehabilitation Project
RSSAT	Road Safety Screening and Appraisal Tool
RTP	Resilient Transport Project
SDGs	Sustainable Development Goals
SEA	Sexual Exploitation and Abuse
SEP	Stakeholder Engagement Plan
SH	Sexual Harassment
STEP	Systematic Tracking of Exchanges in Procurement
TSSPII	Transport Sector Support Project II
UN	United Nations
UNDP	United Nations Development Programme
VOC	Vehicle Operating Cost
WASH	Water, Sanitation, and Hygiene

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DATASHEET

BASIC INFORMATION

Country(ies)	Project Name
Papua New Guinea	Papua New Guinea Resilient Transport Project

Project ID	Financing Instrument	Environmental and Social Risk Classification
P166991	Investment Project Financing	Substantial

Financing & Implementation Modalities

[ ] Multiphase Programmatic Approach (MPA)	[✓] Contingent Emergency Response Component (CERC)
[ ] Series of Projects (SOP)	[✓] Fragile State(s)
[ ] Performance-Based Conditions (PBCs)	[ ] Small State(s)
[ ] Financial Intermediaries (FI)	[ ] Fragile within a non-fragile Country
[ ] Project-Based Guarantee	[ ] Conflict
[ ] Deferred Drawdown	[ ] Responding to Natural or Man-made Disaster
[ ] Alternate Procurement Arrangements (APA)	[✓] Hands-on Enhanced Implementation Support (HEIS)

Expected Approval Date	Expected Closing Date
14-Jun-2022	30-Jun-2029

Bank/IFC Collaboration

No

Proposed Development Objective(s)

The Project Development Objective is to enhance the resilience and safety of prioritized road infrastructure of the recipient's highway network, and in case of an Eligible Crisis or Emergency, respond promptly and effectively to it.

Components

Component Name	Cost (US$, millions)
Resilience, Safety Enhancements, and Sustainable Maintenance	96.05
Project Management and Institutional Strengthening	11.50
Contingent Emergency Response Component	0.00

Organizations

Borrower:	Independent State of Papua New Guinea
Implementing Agency:	Department of Works and Highways

PROJECT FINANCING DATA (US$, Millions)

SUMMARY

Total Project Cost	107.55
Total Financing	107.55
of which IBRD/IDA	92.50
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Bank for Reconstruction and Development (IBRD)	50.00
International Development Association (IDA)	42.50
IDA Credit	42.50

Non-World Bank Group Financing

Trust Funds	15.05
Papua New Guinea Strategic Partnership	15.05

IDA Resources (in US$, Millions)

	Credit Amount	Grant Amount	Guarantee Amount	Total Amount
Papua New Guinea	42.50	0.00	0.00	42.50
National PBA	42.50	0.00	0.00	42.50
Total	**42.50**	**0.00**	**0.00**	**42.50**

Expected Disbursements (in US$, Millions)

WB Fiscal Year	2022	2023	2024	2025	2026	2027	2028	2029
Annual	0.10	0.50	8.40	16.50	22.00	21.00	12.00	12.00
Cumulative	0.10	0.60	9.00	25.50	47.50	68.50	80.50	92.50

INSTITUTIONAL DATA

Practice Area (Lead)

Transport

Contributing Practice Areas

Climate Change and Disaster Screening

This operation has been screened for short and long-term climate change and disaster risks

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	Substantial
2. Macroeconomic	Moderate
3. Sector Strategies and Policies	Substantial
4. Technical Design of Project or Program	Moderate
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	Substantial
7. Environment and Social	Substantial

8. Stakeholders	Moderate
9. Other	Substantial
10. Overall	Substantial

COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

[ ] Yes [✓] No

Does the project require any waivers of Bank policies?

[ ] Yes [✓] No

Environmental and Social Standards Relevance Given its Context at the Time of Appraisal

E & S Standards	Relevance
Assessment and Management of Environmental and Social Risks and Impacts	Relevant
Stakeholder Engagement and Information Disclosure	Relevant
Labor and Working Conditions	Relevant
Resource Efficiency and Pollution Prevention and Management	Relevant
Community Health and Safety	Relevant
Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Relevant
Biodiversity Conservation and Sustainable Management of Living Natural Resources	Relevant
Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Relevant
Cultural Heritage	Not Currently Relevant
Financial Intermediaries	Not Currently Relevant

NOTE: For further information regarding the World Bank's due diligence assessment of the Project's potential environmental and social risks and impacts, please refer to the Project's Appraisal Environmental and Social Review Summary (ESRS).

Legal Covenants

Sections and Description

The Borrower shall establish by no later than three (3) months after the Effective Date and thereafter maintain until completion of the Project, a Project Steering Committee chaired by the DoWH, and comprised of at least one (1) qualified representative from each of, inter alia: (i) the Department of National Planning and Monitoring; (ii) the Department of Treasury; and (iii) Department of Transport; and provided with such powers, responsibilities and funding as required to provide general guidance and oversight of the Project to ensure effective coordination and alignment with the Borrower's strategic priorities.
(Section I.A.1 of Schedule 2 of the Loan Agreement)

Sections and Description

The Borrower through DoWH shall recruit and thereafter retain, until twenty-four (24) months after the Effective Date (or such other date which the Bank has confirmed in writing to the Borrower is reasonable and acceptable under the circumstances, as determined by the Bank in its sole discretion), one (1) short-term program implementation support adviser and one (1) short-term output and performance based road contract specialist, each with qualifications, experience and terms of reference satisfactory to the Bank.
(Section I.A.2 of Schedule 2 of the Loan Agreement)

Sections and Description

The Borrower through DoWH shall: (a) retain until completion of the Project, the services of the Employer's Project Manager, under terms of reference, and headed by a qualified and experienced Project manager, with qualified staff in adequate numbers, including at least an accountant with financial management skills, all satisfactory to the Bank, and which shall be responsible for supporting DoWH in all aspects of project implementation, including, inter alia, project management (including engineering and works supervision), contract management, financial management, procurement, environmental and social risks management, and monitoring and evaluation; and (b) enter into arrangements with the Employer's Project Manager satisfactory to the Bank.
(Section I.A.3 of Schedule 2 of the Loan Agreement)

Sections and Description

Section I.A (Institutional Arrangements), Section I.B (Project Operations Manual), Section I.C (Annual Work Plans and Budgets), Section I.D (Environmental and Social Standards), and Section I.E (Contingent Emergency Response) of Schedule 2 to the Loan Agreement are hereby incorporated by reference and shall apply, mutatis mutandis, to this Agreement. Section II (Project Monitoring Reporting and Evaluation) of Schedule 2 to the Loan Agreement is hereby incorporated by reference and shall apply, mutatis mutandis, to this Agreement,
(Sections I.A.1 and Section II.1 of Schedule 2 of the Financing Agreement)

Sections and Description

The Borrower shall prepare and furnish to the Bank, by not later than three (3) months after the Effective Date and August 31 of each subsequent year during the implementation of the Project (or such later interval or date as the Bank may agree), for the Bank's review and no-objection, an Annual Work Plan and Budget and ensure that the

Project is implemented in accordance with the Annual Work Plans and Budgets accepted by the Bank for the respective fiscal year;
(Sections I.C.1 and I.C.2 of Schedule 2 of the Loan Agreement)

Sections and Description
By not later than three (3) months after the Effective Date (or such other date which the Bank has confirmed in writing to the Borrower is reasonable and acceptable under the circumstances, as determined by the Bank in its sole discretion), the Borrower shall: (a) prepare and furnish to the Bank, for its review and no-objection, a Project Operations Manual ; (b) afford the Bank a reasonable opportunity to review the proposed Project Operations Manual; and (c) adopt the Project Operations Manual as accepted by the Bank, and thereafter ensure that the Project is carried out in accordance with the Project Operations Manual.
(Sections I.B.1(a), (b), and (c) of Schedule 2 of the Loan Agreement)

Sections and Description
Section I.A (Institutional Arrangements), Section I.B (Project Operations Manual), Section I.C (Annual Work Plans and Budgets), and Section I.D (Environmental and Social Standards) of Schedule 2 to the Loan Agreement are hereby incorporated by reference and shall apply, mutatis mutandis, to this Agreement. Section II (Project Monitoring Reporting and Evaluation) of Schedule 2 to the Loan Agreement is hereby incorporated by reference and shall apply, mutatis mutandis, to this Agreement.
(Sections I.A.1 and Section II.1 of Schedule 2 of the Financing Agreement)

Sections and Description
The Borrower shall furnish to the Bank each Project Report not later than one (1) month after the end of each calendar semester, covering the calendar semester.
(Section II.1 of Schedule 2 of the Loan Agreement)

Sections and Description
The Borrower shall carry out jointly with the Bank, not later than four (4) years after the Effective Date, or such other period as may be agreed with the Bank, a mid-term review of the Project to assess the status of Project implementation, as measured against the indicators acceptable to the Bank, and compliance with the legal covenants included or referred to in this Agreement.
(Section II.2 of Schedule 2 of the Loan Agreement)

Sections and Description
Section I.A (Institutional Arrangements), Section I.B (Project Operations Manual), Section I.C (Annual Work Plans and Budgets), and Section I.D (Environmental and Social Standards) of Schedule 2 to the Loan Agreement are hereby incorporated by reference and shall apply, mutatis mutandis, to this Agreement. Section II (Project Monitoring Reporting and Evaluation) of Schedule 2 to the Loan Agreement is hereby incorporated by reference and shall apply, mutatis mutandis, to this Agreement.
(Sections I.A.1 and Section II.1 of Schedule 2 of the Grant Agreement)

Conditions

Type	Financing source	Description
Effectiveness	IBRD/IDA	The Financing Agreement has been executed and delivered on behalf of the Borrower. The Grant Agreement has been executed and delivered on behalf of the Borrower. (Section 4.01.(a) and (b) of Article IV of the Loan Agreement)
Type	Financing source	Description
Effectiveness	IBRD/IDA	The Loan Agreement has been executed and delivered on behalf of the Recipient. The Grant Agreement has been executed and delivered on behalf of the Recipient. (Section 4.01.(a) and (b) of Article IV of the Financing Agreement)
Type	Financing source	Description
Effectiveness	Trust Funds	The execution and delivery of this Agreement on behalf of the Recipient have been duly authorized or ratified by all necessary governmental action. As part of the evidence, there shall be furnished to the Bank an opinion or opinions satisfactory to the Bank of counsel acceptable to the Bank or, if the Bank so requests, a certificate satisfactory to the Bank of a competent official of the Member Country, showing on behalf of the Recipient, that this Agreement has been duly authorized or ratified by, and executed and delivered on its behalf and is legally binding upon it in accordance with its terms. (Sections 4.01.(a) and 4.02 of Article IV of the Grant Agreement)
Type	Financing source	Description
Effectiveness	Trust Funds	The Loan Agreement has been executed and delivered on behalf of the Recipient. (Sections 4.01.(b) of Article IV of the Grant Agreement)
Type	Financing source	Description
Disbursement	IBRD/IDA	No withdrawal shall be made for Emergency Expenditures under Category (3), unless and until all of the following conditions have been met in respect of said expenditures: i. (A) the Borrower has determined that an Eligible Crisis or Emergency has occurred, and has furnished to the Bank a request to withdraw Loan amounts under Category (3); and (B) the Bank has agreed with such determination, accepted said request and notified the Borrower thereof; and ii. the Borrower has adopted the CERC Manual and Emergency Action Plan, in form and substance acceptable to the Bank. (Section III.B.1.(c) of Schedule 2 of the Loan Agreement)

Type	Financing source	Description
Effectiveness	Trust Funds	The Financing Agreement has been executed and delivered on behalf of the Recipient. (Section 4.01.(c) of Article IV of the Grant Agreement)
Type	Financing source	Description
Disbursement	IBRD/IDA	No withdrawal shall be made under Category (1) until the Borrower has entered into arrangements with the Employer's Project Manager pursuant to Section I.A.3 of Schedule 2 to this Agreement. (Section III.B.1.(b) of Schedule 2 of the Loan Agreement)
Type	Financing source	Description
Disbursement	IBRD/IDA	No withdrawal shall be made under Category (1) until the Recipient has entered into arrangements with the Employer's Project Manager pursuant to Section I.A.3 of Schedule 2 to the Loan Agreement. (Section III.B.1.(b) of Schedule 2 of the Financing Agreement)
Type	Financing source	Description
Disbursement	Trust Funds	No withdrawal shall be made for payments made prior to the Signature Date, except that withdrawals up to an aggregate amount not to exceed three million United States Dollars ($3,000,000) may be made for payments made prior to this date but on or after April 1, 2022, for Eligible Expenditures. (Section III.B.1.(a) of Schedule 2 of the Grant Agreement)
Type	Financing source	Description
Disbursement	Trust Funds	No withdrawal shall be made under Category (1) until the Recipient has entered into arrangements with the Employer's Project Manager pursuant to Section I.A.3 of Schedule 2 to the Loan Agreement. (Section III.B.1.(b) of Schedule 2 of the Grant Agreement)
Type	Financing source	Description
Disbursement	IBRD/IDA	No withdrawal shall be made for Emergency Expenditures under Category (3), unless and until all of the following conditions have been met in respect of said expenditures: i. (A) the Recipient has determined that an Eligible Crisis or Emergency has occurred, and has furnished to the Association a request to withdraw Financing amounts under Category (3); and (B) the Association has agreed with such determination, accepted said request and notified the Recipient thereof; and ii. the Recipient has adopted the CERC Manual and Emergency

		Action Plan, in form and substance acceptable to the Association. (Section III.B.1.(c) of Schedule 2 of the Financing Agreement)

I. STRATEGIC CONTEXT

A. Country Context

1. **The Independent State of Papua New Guinea (PNG), the largest Pacific Island country, with a population of about 9 million (2020), is located north of Australia in the southwestern Pacific Ocean.** With an area of about 460,000 square kilometers (km^2), it encompasses the eastern half of New Guinea, the world's second-largest island (the western half is made up of the Indonesian provinces of Papua and West Papua); the Bismarck Archipelago (New Britain, New Ireland, Manus, and several other islands); Bougainville and Buka (part of the Solomon Islands chain); and some 600 smaller islets and atolls. The national capital, Port Moresby, is on the southeastern coast of the island of New Guinea at the Gulf of Papua (Coral Sea) and has direct road connectivity with only 2 of the country's 22 provinces. Connectivity among the country's four regions[1] is primarily dependent on air and sea transport.

2. **PNG is a lower-middle-income, resource-dependent economy with a gross domestic product (GDP) per capita of US$2,637 in 2020.** The resource sector (minerals and petroleum), comprising 26 percent of GDP, has been the main driver of GDP growth and dominates the formal economy but accounts for a small proportion of employment. In contrast, most of the population is engaged in the mainly informal agricultural, forestry, and fishing sectors, which have lower productivity and comprise only about 17 percent of GDP.

3. **Lack of economic diversification has made PNG's economy vulnerable to international commodity price fluctuations and the impacts of the COVID-19 pandemic.** The downward trends in commodity prices and tourism, coupled with pandemic related mobility restrictions, have adversely affected the non-resource sectors. As a result, it is estimated that PNG's economy contracted by 3.9 percent in 2020; the fiscal deficit expanded to about 8 percent of GDP, and the debt-to-GDP ratio reached 49 percent.

4. **The formal sector, which employs roughly 16 percent of the labor force, has failed to create sufficient jobs to absorb workers entering the jobs market, particularly the large youth population.** The recent economic contraction has increased unemployment, affecting the most vulnerable households, including women and youth. A lack of formal employment forces the overwhelming majority into low-productivity, informal work. Over 80 percent of the population lives in small, rural settlements and is engaged mostly in subsistence agriculture, trade, and the transportation of goods, especially along the country's transport corridors.

5. **PNG's institutional and social fragility continues to be a development challenge.** Fragmented political and social structures have created political economy dynamics that sustain patronage, resulting in a challenging environment for the effective functioning of the state and service delivery. This also contributes to perceptions of systemic unfairness and low levels of confidence in public institutions. Security also continues to be a challenge with inadequate police coverage resulting in gaps being filled by

[1] Papua New Guinea has four administrative regions: Highlands, Islands, Momase (Morobe, Madang and Sepik-East and West), and Southern, which are further subdivided into 22 provinces.

private security services. Competition for land remains a significant driver of communal conflict requiring sporadic state intervention.

6. **PNG is ranked as the world's eighth most disaster-prone country,[2] highly vulnerable to increasing floods, landslides, and heat waves under a changing climate.**[3] PNG has a hot, humid tropical climate. It has one of the wettest climates in the world with annual rainfall in many areas of the country exceeding 2,500 millimeters (mm) and the heaviest events occurring in the highlands area, where annual average rainfall can reach 8,000 mm. As such, floods are a major risk in PNG. The United Nations Development Programme (UNDP) suggests that 18 percent of PNG's landmass is either permanently or regularly inundated.[4] PNG experiences coastal, river (fluvial), and surface (pluvial) flooding. The country's Second National Communication to UNFCCC[5] on Climate Adaptation suggests that at least 22,000 people are affected annually by river flooding, causing average damage of over US$8 million.[6] Although there is relatively high uncertainty about future rainfall patterns in the Pacific, future precipitation in PNG appears likely to further concentrate in two wet seasons. This is likely to increase the risk of extreme rainfall and flooding. Landslides are another critical risk occurring directly because of flash flooding, causing fatalities and infrastructure damage. The risk of landslides is likely to increase with increases in the intensity of high rainfall events and frequency of wet days. Warming over PNG's land surface, as measured in the difference between average temperature in 1900–1917 and 2000–2017, has been approximately 0.8–0.9 degrees Celsius (°C). If the baseline against which heat waves[7] are measured remains unchanged, the warming and increased climate variability associated with climate change are projected to dramatically increase the frequency of heat waves in the future.

7. **PNG remains one of the lowest-ranked countries regarding gender equality.** PNG ranked 161 out of 162 economies in the 2019 UNDP Gender Inequality Index. Women are severely underrepresented in government and decision-making. PNG is one of only five countries worldwide with no female Members of Parliament.[8] PNG also suffers from high rates of gender-based violence (GBV), with 62.9 percent of women who are or were previously married reporting experiencing physical or sexual partner violence at least once in their lifetime.[9]

8. **The PNG National Strategy to Prevent and Respond to GBV 2016–2025 aims to guide an inclusive Government-led approach to implementing all legislation, policies, and programs.** The Development Strategic Plan (DSP) 2010–2030 has also given gender a strategic significance. The DSP strongly promotes equality for all citizens, including gender equality and equal opportunities to participate and benefit from development. PNG is a signatory to and has ratified several international conventions and treaties and regional policy frameworks on human rights and gender equality, including the Convention on the

[2] Bündnis Entwicklung Hilft e.V. 2020. *World Risk Report 2020, Focus: Forced Displacement and Migration*.
[3] Climate Risk Country Profile, World Bank Climate Change Knowledge Portal, 2021.
[4] UNDP. 2018. "National Adaptation Plan Process in Focus: Lessons from Papua New Guinea." United Nations Development Programme. https://www.undp.org/content/undp/en/home/librarypage/climate-and-disaster-resilience-/national-adaptation-plan-process-in-focus--lessons-from-Papua-New-Guinea.html
[5] The United Nations Framework Convention on Climate Change.
[6] Papua New Guinea. 2014. "Second National Communication." https://unfccc.int/sites/default/files/resource/Pngnc2.pdf.
[7] A 'heat wave' is defined as a period of three or more days where the daily temperature is above the long-term 95th percentile of daily mean temperature.
[8] Annual Progress Report 2019, United Nations in Papua New Guinea
[9] National Statistical Office (NSO) (Papua New Guinea) and ICF. 2019. "Papua New Guinea Demographic and Health Survey 2016-18." NSO, Port Moresby, Papua New Guinea, and ICF, Rockville, Maryland, USA.

Elimination of All Forms of Discrimination Against Women (CEDAW), the Beijing Platform for Action (BPA) (1995), and the 2030 Sustainable Development Goals (SDGs). However, translating these commitments into national policies, strategies, plans, and programs for comprehensive implementation with adequate budgetary support for comprehensive implementation has proved challenging. In 2013, PNG passed the Family Protection Act (FPA) 2013, which created a new offense of domestic violence. Depending on the severity of the offense, perpetrators could be charged under the FPA or the Criminal Code. The FPA also made its Family Protection Orders more accessible to victims. In 2017, the Government of PNG (GoPNG) passed regulations to implement the law, but enforcement remains weak and inconsistent; police and prosecutors rarely pursue investigations or criminal charges against people who commit family violence. In 2022, GoPNG amended the FPA to include clauses increasing the penalty for the offense of domestic violence and the offense of breach of Family Protection Order, introducing an offense of aggravated domestic violence which carries higher penalties than the offense of domestic violence, and introducing authorized persons who can issue Urgent Protection Orders (which last for up to 14 days).

9. **A rapidly spreading COVID-19 outbreak emerged in PNG in early 2021.** Recognizing that the country's limited health system could easily be overrun, GoPNG has attempted to manage transmission through international border restrictions, restricted movement between provinces, and lockdowns. Low vaccination rates and other factors led to a sustained surge, however, which peaked in October of 2021 and strained the health system. As of May 17, 2022, there have been more than 44,000 confirmed cases and about 650 confirmed deaths from COVID-19 in PNG[10]; however, rates of testing are low.

B. Sectoral and Institutional Context

10. **PNG's mainland suffers from poor connectivity due to a highly fragmented road network that leaves various regions of the country disconnected.** Road transport is the primary mode of transport, but climate, topography, and other challenges have impeded the creation of an integrated road network. Roads have been developed around ports, coastal plains, and along the central highlands and river valleys where construction costs are lower. There are no road links between most provinces, and individual ports serve isolated hinterlands. Underdevelopment of the road network forces many communities to depend upon maritime transport and civil aviation, but these modes are often costly, provide limited services, and are poorly integrated with road transport.

11. **Inadequate road access and poor conditions further constrain economic growth and social inclusion.** Only 23 percent of the rural population lives within 2 km of an all-season road, well below the East Asia and Pacific regional average of 77 percent.[11] In the landlocked Highlands Region, where more than one-third of the national population resides, some people must walk more than four hours to reach the nearest road. Many communities lack road connectivity and depend entirely upon small planes to deliver food and provide access to health services. Poor conditions pose a challenge to those with access to roads. Out of 8,738 km of national roads, only 38 percent are sealed (paved), and over 60 percent of road network becomes impassable at some point during the year on account of flooding, inundation, landslides, and riverine/coastal erosion.

[10] WHO: https://covid19.who.int/region/wpro/country/pg
[11] Rural Access Index Measurement Tool: https://rai.azavea.com/.

12. **The poor condition of the National Road Network (NRN) is primarily due to chronic underfunding of maintenance and reliance on inefficient contracting practices.** Despite enacting legislation to establish a Road Fund[12] in 2003, annual funding for road maintenance and restoration of national roads has been around one-fifth of estimated needs since the 1990s. Reliance on small, input-based road works contracts has spread limited funding too thin to sustain critical road links and has failed to leverage commercial incentives to organize maintenance work efficiently. Roads are also not surveyed regularly or with a consistent approach to properly ensure maintenance needs are met.

13. **PNG's road network is vulnerable to natural disasters and climate change.** Floods, landslides, earthquakes,[13] and volcanic eruptions,[14] which occur often, severely affect the serviceability and structural integrity of PNG's road infrastructure. Three-quarters of the country's entire (30,000 km) road network becomes impassable at some point during the year on account of flooding, inundation, landslides, and riverine/coastal erosion.[15] Most roads are not designed or constructed to withstand climatic and natural disasters—roads are unpaved and road shoulders unsealed, making water ingress a severe threat to road surface and road base integrity. There is limited or blocked drainage along national roads that are easily overwhelmed by floods. Roads in highland areas are not protected by any slope stabilization measures.

14. **In addition to inadequate design standards, the lack of effective maintenance is another critical factor that makes national roads vulnerable to climate risks.** In the absence of regular asset condition monitoring, early-stage deterioration of road assets cannot be detected to allow preventative maintenance interventions. Critical maintenance activities to prevent slope erosion and landslides such as drainage clearing and planting on side slopes are not carried out. Introducing tightened maintenance contracting schemes and compliance checks would be essential to establishing and sustaining the level of climate resilience of the road assets.

15. **Road safety is a major challenge throughout PNG.** The rate of road fatalities (16.8 deaths per 100,000 population) is estimated to be second highest in the South Pacific region, about three times higher than Fiji. Pedestrians account for 29 percent of road traffic fatalities. While reliable road crash statistics are not available, anecdotal evidence suggests a high incidence of collisions is a result of speeding, drunk driving, and unsafe roads and vehicles. The Department of Works and Highways (DoWH), which is responsible for managing the NRN, has established an interdisciplinary road safety committee and recruited a road safety engineer in its design division.

16. **The safety of women on public transport is also a concern.** A study conducted by United Nations (UN) Women in 2014 in Port Moresby found that over 90 percent of women and girls reported experiencing some form of sexual violence when accessing public transportation, on buses, while waiting

[12] A fund collecting resources from road users to be used effectively and efficiently for maintenance of the network, to safeguard road assets developed.
[13] On February 26, 2018, a magnitude 7.5 earthquake struck the Highlands Region with significant aftershocks of 6.5–6.9 magnitude for three weeks thereafter.
[14] On June 26, 2019, Mount Ulawun on the northeastern island of New Britain erupted, shooting an ash column 18 km (11.18 miles) into the air, while nearby Mount Manam erupted a day later, sending dangerous pyroclastic flows down its slopes. The eruptions forced 15,000 villagers to flee their homes and destroyed homes, plantations, and wells, leaving villagers without food and water, while ash columns disrupted domestic flights (Reuters).
[15] A record of recent flooding and landslide events in PNG is available at https://floodlist.com/tag/papua-new-guinea.

at bus stops, and walking to and from bus stops, or in taxis. The most common types of violence reported by women and girls included verbal sexual remarks, extortion, robbery, threats or intimidation, inappropriate touching, and indecent exposure.[16]

17. **A range of challenges tests the resources and capacity of PNG's road sector institutions.** Public entities in PNG, including those in the road sector, struggle to build adequate capacity, effective accountability mechanisms, and strong project management skills. The absence of effective accountability mechanisms in the road sector has constrained development of the institutional capital needed to rehabilitate and maintain roads. Changes in policies, often stemming from major events such as the ongoing COVID-19 crisis and elections, pose a challenge to institutional capacity effectiveness. The Government counterpart's weak capacity for financial management (FM) and proactive environmental and social risk management, as well as safeguards and the lengthy and intricate public procurement processes, pose significant challenges to the effectiveness of sector institutions.

18. **Addressing the maintenance funding and capacity gaps is vital to climate resilience and sustainability of the road network in general.** GoPNG's current road strategy, National Road Network Strategy 2018–2038 (NRNS), responds to the ongoing shortfall in maintenance funding by prioritizing the use of limited maintenance funding for the restoration and sustainable maintenance of a limited number of Core Road links. These 2,309 km of Core Road links are vital to sustaining key industries, exports, intermodal connectivity, and Government functions but account for less than one-fourth of the NRN.[17] The strategy also adopts a shift to increasing use of long-term and performance-based contracting approaches and strengthening small and medium-size contractors. It also encourages the participation of local communities in routine maintenance.

19. **GoPNG has also developed a long-term road infrastructure development program, Connect PNG 2020–2040, to promote economic diversification by closing gaps in the primary road network to facilitate growth corridors.** The rolling 20-year program covers 16,200 km of strategic roads, including priority roads and Core Roads identified in the NRNS, at a cost of PGK 20 billion (about US$5.6 billion).

20. **The road sector is undergoing major institutional and policy reforms following the enactment of two new road sector acts:**[18] Road (Fund and Management) Act 2020 in January 2021 and the Connect PNG (Implementation and Funding Arrangements) Act 2021 in November 2021. The primary objective of the Road Act[19] is to establish a coordinated institutional framework for planning, management, and financing of PNG's public road infrastructure, including maintenance. It calls for the establishment of a PNG Highway Corporation to serve as the road authority for the NRN and a new PNG Road Fund. Following

[16] UN Women. 2014. *Ensuring Safe Transport with and for Women and Girls in Port Moresby*. Papua New Guinea: UN Women.
[17] The recently published list of Core Road links includes all or part of the following: Highland Highway, Sepik Highway, the Ramu-Madang Highway, Hiritano and Magi Highways, New Britain Highway, Boluminski Highway, and the West Coast Highway in New Ireland province.
[18] The Road (Fund and Management) Act 2020 repeals the Road Maintenance Act 1971 and the National Road Authority Act 2003 (which established the former National Road Authority and National Road Fund, which are now dissolved) and exempts the Papua New Guinea Road Fund from provisions of the Public Money Management Regularisation Act 2017. The act allows the establishment of special purpose companies under the provisions of the Companies Act 1997**,** such as a PNG Highways Corporation. See http://www.parliament.gov.pg/uploads/acts/20A_41.pdf.
[19] This includes setting up a road management system and establishing a Roads Advisory Committee to advise the Minister of Works. The Department of Transport will be responsible for overall transport policy. Regulatory responsibility for road safety and road use will remain with the Road Traffic Authority (under Department of Transport).

National Executive Council approval in November of 2021, the proposed Highway Corporation will be established under the Companies Act. The PNG Road Fund has been established to oversee the collection, disbursement, and monitoring of funds for the maintenance, road safety, and rehabilitation of the NRN, and is operational. The Road Fund will not be financed by project funds. The Connect PNG Act allows for establishment of a Connect PNG Trust Fund under the management of the PNG Road Fund, to fund capital investment in the road sector. Legislative protections have been put in place to ensure funds of the Road Fund are used solely for road maintenance and rehabilitation.

21. **As a transitional arrangement, DoWH has been restructured to assume the management of the NRN.** With the establishment of a Highway Management Wing within DoWH, the department has been reorganized to carry out interim functions.[20] A significant part of the Highway Management Wing is expected to be transferred to the Highway Corporation once this institution is created. At this stage, however, it is expected that DoWH will continue to be institutionally responsible for improvements to, and maintenance of, the existing NRN for the duration of project implementation. The Road act also empowers provincial and district authorities to be road authorities of their networks.

22. **Improving the condition of PNG's road network will require a sustained commitment from the Government and development partners.** The World Bank and other development partners have consistently invested in road sector infrastructure and capacity building. However, much remains to be done to raise the network's condition to a satisfactory level. In 2017, the Asian Development Bank (ADB) approved a US$866.5 million investment program over 10 years (now under implementation) to support the upgrading and performance-based maintenance of the Highlands Highway, the country's most economically significant road corridor.[21] Australia's Department of Foreign Affairs and Trade (DFAT) has funded the second phase of the Transport Sector Support Program (TSSPII) with a budget of AUD 625 (US$ 450) million over 2013–2022.[22] In addition to rehabilitation and maintenance,[23] TSSPII facilitates the ongoing road sector reforms, including (a) overall coordination of road sector reform, (b) regulatory and institutional reform to reduce inefficiencies in the sector including support to the newly established Road Fund, and (c) institutional and funding support to introduce more effective and efficient road management practices.

23. **Since 2002, the World Bank has supported PNG's road sector through two investment operations:** the Roads Maintenance and Rehabilitation Project (RMRP) was approved in 2002 and closed in 2012, and the Roads Maintenance and Rehabilitation Project II (RMRPII) was approved in 2011 and is under implementation.[24] Both projects support NRN rehabilitation and maintenance. RMRPII utilizes a

[20] Department of Works and Highways. 2021. "DoWH New Structure and Functions and Executive Director Acting Arrangements Circular Memorandum No 80." DoWH, Port Moresby.
[21] ADB, "Papua New Guinea: Sustainable Highlands Highway Investment Program", https://www.adb.org/sites/default/files/project-documents/48444/48444-005-pfrr-en.pdf.
[22] 2020–21 Papua New Guinea Development Program Progress Report, DFAT, Annex II, p.10 https://www.dfat.gov.au/publications/development/2020-21-papua-new-guinea-development-program-progress-report
[23] 1,768 km of PNG national priority roads maintained in 2019.
[24] RMRPII closes on April 28, 2023.

hybrid output- and performance-based road contract (OPBRC)[25] for maintenance of 110 km of the Hiritano Highway in Central province. This contract was initiated as a pilot project to test whether the performance-based routine maintenance of a national highway in PNG could be financially, contractually, and operationally successful. Based on clear evidence of success on all three criteria, the length was increased to 125 km in 2020 and the contract has now been extended to April 2023.

24. **Building on the achievements of RMRPII, GoPNG has requested World Bank support for expanding long-term and performance-based contracting to additional Core Road links, the 175 km Ramu Highway and a further 22.5 km of the Hiritano Highway.** These two highways are among the Core Roads identified in the NRNS as the highest priority roads and are part of GoPNG's Connect PNG program. The Ramu Highway forms the primary link between Madang and Lae city ports and connects those cities to Madang, Morobe, and Eastern Highland provinces[26] and is part of the Madang-Baiyer-Karamui-Gulf Economic Corridor that links Madang, Simbu, Gulf, and Western Highlands. The highway supports important mining and major agro-industrial activities in the region, specifically beef, sugar, and palm oil production, as well as extensive domestic cocoa production.[27] It is also one of the two roads providing port access to the Highlands Highway, which connects to all of the Highlands provinces where about one-third of the PNG population resides. Businesses in the Ramu and Markham regions incur higher transport costs by shipping produce directly to Madang through Le Port to avoid the significant risks involved with transportation via the Central Ramu Ranges sections of the Ramu Highway.

25. **The Hiritano Highway connects the country's capital, Port Moresby, and the capital of the Gulf region, Kerema.** It falls within an economic corridor identified by GoPNG to support the medium- and long-term economic development plans of the Central and Gulf provinces. GoPNG has requested support to expand the same hybrid OPBRC approach piloted under RMRPII to the 22.5 km of the Hiritano Highway from Laloki to Brown River. This section of the Hiritano Highway rests between Port Moresby and the portion of the Hiritano Highway currently being maintained under the ongoing contract financed under RMRPII. Rehabilitation and maintenance of this additional section of road will maximize the benefits of investment in repair and maintenance of those northern sections of the highway and provide a seamless link to the capital.

C. Relevance to Higher Level Objectives

26. **The proposed project is well-aligned with the current Papua New Guinea Country Partnership Framework (CPF) for FY2019–FY2023 (Report #128471-PG)**, which focuses on building a more resilient PNG by supporting economic diversification, decentralized service delivery, and social inclusion. Building

[25] A hybrid OPBRC differs from the World Bank's Standard Procurement Document for OPBRC. The hybrid contract has elements of a traditional roadworks contract with bill of quantities (BoQ)/unit prices and an OPBRC and reflects an appropriate balancing of contractual risk between the employer and the contractor. Moreover, a hybrid OPBRC permits inclusion of specific road improvements related to safety, climate resilience, environmental mitigation, and sexual harassment (SH)/abuse-related services. With its multi-year duration and transfer of maintenance programming and management responsibility from the owner to the contractor, OPBRC provides for improved sustainability and more resilient road infrastructure.

[26] The Petroleum Resource Area Economic Corridor links the Southern Highlands and parts of Enga, Gulf, and Central provinces. (PNG Development Strategic Plan 2010–2030)

[27] A 6.5 km cocoa feeder road accessed from the Ramu Highway was upgraded under the recently completed World Bank-funded Productive Partnerships in Agriculture Project.

resilient road infrastructure supports all three strategic focus areas,[28] but particularly Focus Area 2: *Support for more effective and inclusive delivery of services, particularly in underserved areas* and Focus Area 3*: Enabling private sector development and inclusive growth in the non-resource sector*. Objective 2.1 of the CPF is to *Improve management and maintenance of PNG's road infrastructure*. The development of road infrastructure acts as a multiplier for progress in all sectors supported by the World Bank Group, including agriculture and rural development.

27. **The operation aligns with the World Bank Group's commitment to support countries experiencing protracted institutional and social fragility** as outlined in the IDA19 Special Theme on Fragility, Conflict, and Violence (FCV) as well as the World Bank Group's FCV Strategy. Strengthening the state's capacity to deliver basic services to underserved communities by building institutional capacity to manage the road network contributes to PNG's ongoing efforts to address some of the fragility drivers and enhance resilience.

28. **The proposed project supports key elements of the Government's economic development plans.** Vision 2050, the PNG Development Strategic Plan 2010–2030, and the third Medium-Term Development Plan III 2018–2022 (MTDP III) all identify resilient transport infrastructure as a key driver of economic and social development by creating an enabling environment for private sector-led growth.[29] The most recent five-year plan, MTDP III, identifies reliable road connectivity as critical to creating integrated economic development and industrial zones, attracting foreign direct investment, creating employment, and generating public revenue. The project will support achievement of the MTDP III Key Results Area of creating a more sustainable and disaster-resilient road network and the performance target of increasing the proportion of priority roads in good condition.

29. **The project directly aligns with the NRNS,[30] the Connect PNG program, and the ongoing road sector institutional reforms.** Proposed rehabilitation and maintenance of the Ramu and Hiritano Highways and related capacity building will support the NRNS goal of ensuring that the Core Road links remain in fair or good condition to bolster key industries and increase road access and connectivity and therefore stimulate economic opportunity in interior regions. Institutional capacity building support for planning and implementation of road maintenance aligns with the NRNS focus on sustaining quality road services through consistent maintenance as well as reducing future public sector road maintenance costs. Support for long-term performance-based maintenance contracting as a standard for sustainable maintenance also aligns well with the planned institutional reforms.

[28] Focus Area 1: Improved macro and fiscal resilience; Focus Area 2: More effective and inclusive service delivery, particularly in underserved areas; and Focus Area 3: Enabling private sector development and inclusive growth in the non-resource sector.
[29] The proposed project will contribute to the achievement of the following MTDPIII objectives: (a) increasing the revenue base and improving revenue collection, (b) increasing exports, (c) reducing imports, (d) improving and increasing opportunities for citizens to create wealth, and (e) improving the quality and effectiveness in the delivery of public goods and services.
[30] These are (a) support sustainable and inclusive economic growth, (b) provide access to as many people possible within the maintainable sections of the national road network, (c) improve management of national road network assets, and (d) improve road safety along the national road network.

II. PROJECT DESCRIPTION

A. Project Development Objective

PDO Statement

30. The Project Development Objective (PDO) is to enhance the resilience and safety of prioritized road infrastructure of the recipient's highway network, and in case of an Eligible Crisis or Emergency, respond promptly and effectively to it.

PDO Level Indicators

31. Achievement of the PDO will be measured with four PDO indicators.[31]

(a) Core national roads with improved resilience (km)

(b) Core national roads with road safety measures implemented (km)

(c) Roads maintained in good condition under multi-year maintenance contracts (km)

(d) Population having access to roads with upgraded safety and climate resilience (number).

B. Project Components

32. **The project has three components:** (1) Resilience, Safety Enhancements, and Sustainable Maintenance; (2) Project Management and Institutional Strengthening; and (3) Contingent Emergency Response Component (CERC).[32] Details of the activities under these components can be found in Annex 2.

Component 1: Resilience, Safety Enhancements, and Sustainable Maintenance (US$96.05 million; IDA: US$38.0 million; IBRD: US$45.0 million; Papua New Guinea Strategic Partnership (PNGSP) Multi-Donor Trust Fund (MDTF): US$13.05 million)

33. This component will finance the rehabilitation of up to 62.5 km of the Ramu and Hiritano Highways and the extended performance-based maintenance of 197.5 km of the highways.

34. **Subcomponent 1.1: Ramu Highway (US$72.05 million).** This will finance two roadwork contracts on the Ramu Highway, which is currently in a variable and deteriorating condition: (a) reconstruction of approximately 40 km of the road in the Ramu Ranges section, which is in extremely poor condition, with

[31] The PDO reflects a multi-dimensional concept of resilience because, in the context of PNG, measures to bolster climate resilience will also bolster resilience to other sustainability risks. Such measures as sustainable maintenance practices, regular drain clearing, improving of structural integrity of works, slope stabilization works, and improving of maintenance contracting approaches (leading to more efficient use of maintenance funding and more sustainable outcomes) to build resilience to climate change and other natural hazards.

[32] The project interventions are part of an integrated project design that addresses complementary aspects of resilience, encompassing effective and efficient maintenance planning, funding, and contracting approaches; other measures (particularly resilient construction methods) that simultaneously mitigate climate risks as well as other natural hazard risks to sustainability of the country's road infrastructure; and emergency response.

an extended defects liability/maintenance period and (b) rehabilitation, repair, and maintenance of approximately 135 km of the highway between Waterais Junction and Madang (except the Ramu Ranges section) through a hybrid OPBRC. The hybrid OPBRC includes initial repairs/improvement works on the coastal and most of the valley section, and rehabilitation of some portions of the valley section that are in poor condition, followed by output- and performance-based maintenance. The hybrid OPBRC will include a provision for upgrading of drainage infrastructure and emergency response and repairs to reduce risks of extreme weather events and other natural disasters, such as flood and landslide. The hybrid OPBRC operates similar to a design-build-maintain (DBM) contract. The contractor will be responsible for all rehabilitation design, all works, and extended maintenance. The streamlined procurement process for this contract format will enable the valley rehabilitation works to start at least six months and possibly twelve months earlier than the Ranges rehabilitation/reconstruction works.

35. **Subcomponent 1.2: Hiritano Highway (US$22.0 million).** This will finance the rehabilitation and extended maintenance of the heavily trafficked 22.5 km section between Laloki River (on the boundary of the National Capital District) and Brown River under a design, build and performance-based maintenance contract. This highway section was not improved under the ongoing RMRPII and is currently in poor condition, with damaged bridges and culverts, resulting in potentially dangerous crossings. Also, washed-out pavement and seals which were not constructed to an adequate standard have resulted in excessive roughness along the highway.

36. **The proposed rehabilitation and maintenance works on both the Ramu and Hiritano Highways under Subcomponents 1.1 and 1.2 will address the following climate change-related and safety risks to the roads**: (a) unstable slopes causing frequent and slow-moving landslides, (b) steep gradients requiring vertical realignment and/or climbing lanes, (c) the risk of accidental damage (including leakage and spillage) to the slurry pipeline that runs adjacent to the Ramu Highway, (d) poor to very poor pavement surface condition, and (e) drainage-related problems. To deal with these issues, the works would include (a) raising of the road embankment in low-lying and flood-prone areas; (b) sealing of shoulders; (c) measures to improve the slope stability of embankments and cuttings to prevent landslips; (d) increased size and number of longitudinal and cross-drainage to reduce incidence of flooding and inundation from expected increases in frequency, intensity, and duration of storms; (e) provision of subsoil drainage through cuttings and areas with a high water table; and (f) maintenance of road surface and drainage. An indicative list of engineering interventions for each road section and estimated cost share is provided in the Technical Appraisal Section.

37. **Subcomponent 1.3: Road Safety and Community Facilities (US$2.0 million).** This will finance construction and improvement of safety and community facilities along the project roads. These activities will be undertaken along the same sections of the Ramu and Hiritano Highways that will be improved under Subcomponents 1.1 and 1.2 and will be part of the same road works contracts. The project will fund countermeasures to reduce road traffic crash injuries and fatalities on the Ramu and Hiritano Highways. The road safety risk of both highways will be assessed for different road users based on the International Road Assessment Programme (iRAP) data collection[33] undertaken in 2016. Safety countermeasures for

[33] iRAP analysis is road safety risk assessment using the iRAP methodology developed by the International Road Assessment Programme.

both project roads will be developed based on the existing data and incorporated into the works designs and then subject to a road safety audit process[34] before construction.

38. **The project will also contribute to improving the quality and safety of pedestrian facilities** along both the roads and bridges and implement targeted traffic safety campaigns and awareness measures, prioritizing the needs of women traders working in roadside markets and school children who use the roads as pedestrians. As part of broader COVID-19 protection measures, opportunities will be identified to install water, sanitation, and hygiene (WASH) facilities whose broad health and hygiene impacts also support the 'Nuipela Pasin'[35] measures to increase basic hygiene and reduce risk of COVID-19 and other infectious diseases. Priority will also be given to women in routine road maintenance and OPBRC activities to enhance women labor force participation and economic opportunities under the project.

Component 2: Project Management and Institutional Strengthening (US$11.5 million; IDA: US$4.5 million; IBRD: US$5.0 million; PNGSP MDTF: US$2.0 million)

39. This component will finance (a) support for implementation of the road rehabilitation and maintenance works, including employment of a consulting firm to serve as the Employer's Project Manager (EPM) within DoWH and other project implementation support consultants and completion of any Project Preparation Grant (PPG) activities that remain incomplete following expiry of the PPG; (b) a road safety capacity assessment and related technical assistance; and (c) selected institutional strengthening initiatives to support management and technical skills development in the road sector and preparation of future road works activities.

40. **Subcomponent 2.1: Project Management (US$8.5 million).** This will support DoWH in all aspects of project implementation. It will finance the EPM which will support DoWH in areas including highway engineering and project management, procurement, FM, works contract supervision and monitoring, contract management, environmental and social risk management (safeguards), and gender. The EPM will be headed by a Project Manager (PM) and staffed with specialists in project management/engineering, safeguards, procurement and contract management, FM, and monitoring and evaluation (M&E). In addition to implementation support, the EPM will provide skills transfer and capacity building to DoWH staff.

41. This subcomponent will fund the following additional project implementation support, separately from the EPM contract: (a) consultant services for preparing the proposed road contracts—including digital terrain modelling, traffic surveys, geotechnical and road condition surveys of the Hiritano and Ramu Highways, and preparation of bid documents—and other technical assistance to augment DoWH[36] project implementation capacity; this includes completion of activities funded by the PPG that remain outstanding following expiry of that grant;[37] (b) training programs for DoWH staff, local contractors, and

[34] A road safety audit is performed by a multidisciplinary team independent of the project. Road safety audits consider all road users, account for human factors and road user capabilities, are documented in a formal report, and require a formal response from the road owner.
[35] The 'New Normal' in Papua New Guinea.
[36] This may include a road safety consultant, environmental and social specialists, or other consulting services to support DoWH with implementation of the project.
[37] This will include an OPBRC Specialist Advisor, a Program Implementation Support Advisor, an Environmental Specialist, and a Social Specialist. The PPG expiration date is December 31, 2022.

other project beneficiaries; and (c) other administrative and technical assistance for project implementation.

42. **Subcomponent 2.2: Road Safety (US$1.0 million).** This will support a road safety management capacity review to map the road safety situation, identify key stakeholders, propose actions to improve road safety outcomes in the country, and establish a road safety reform agenda and time-bound action plan. Activities under the safe system approach will be further developed during project implementation after the completion of the capacity review.

43. **Subcomponent 2.3: Technical Assistance and Training (US$2.0 million).** This will finance technical assistance and training to support implementation of the ongoing road sector institutional reforms and to address other emerging challenges in the road sector.

(a) Assistance for implementation of institutional reforms embodied in the Road (Fund and Management) Act 2020 and the NRNS[38]. This could include (i) technical and advisory support for adoption of long-term, performance-based road maintenance contracting and quality control/quality assurance; (ii) enhancement of the Road Asset Management System (RAMS) established in DoWH; and/or (iii) capacity building support to the Road Fund.

(b) Support for preparation of a hybrid OPBRC for the preservation and maintenance of the entire Hiritano Highway corridor and/or other national highways.

(c) Other priority technical assistance and training (including advisory support) for GoPNG staff in areas such as climate, natural hazards, and environmental and social risk management based on a needs assessment undertaken in the first six months of implementation.

44. Prioritization, selection, and timing of activities will be determined in coordination with DoWH and development partners during the first 12 months of project implementation in accordance with procedures outlined in the Project Operation Manual (POM).[39]

45. **Component 3: Contingent Emergency Response Component (CERC) (US$0.0 million).** Following an eligible crisis or emergency, the Borrower may request the World Bank to reallocate project funds to support emergency response and reconstruction. This component would draw from the uncommitted loan/credit/grant resources under other project components to cover emergency response.

C. Project Beneficiaries

46. **The primary project beneficiaries are the road users and transport service providers utilizing the two project corridors**, who will benefit from the rehabilitation and road safety improvements, including better road quality and level of serviceability, lower vehicle operating costs (VOCs), and time savings. These beneficiaries include firms and informal businesses along the road and connecting routes and farmers living and working along the Ramu and Hiritano Highway corridors. The project will also improve access to numerous rural communities, particularly in Madang and Morobe provinces (Ramu Highway) and Central province and National Capital District (Hiritano Highway), with population of approximately

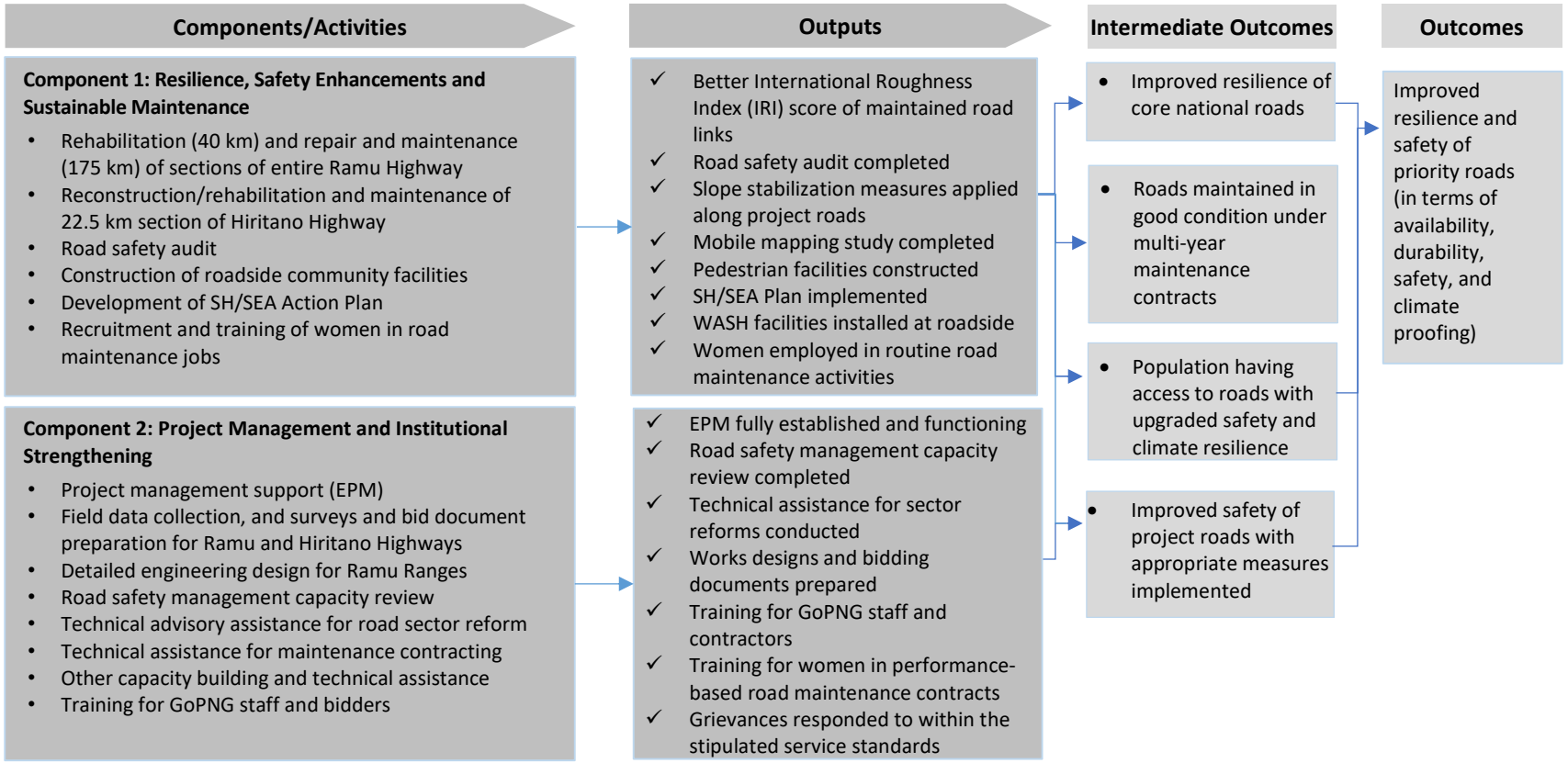
[38] This complements with the activities being carried out through the DFAT-financed TSSPII

172,000 along the two highways, through linking communities to both roadside and established markets, especially for agricultural products and commercial goods. It will also reduce transport costs and improve road safety for all road users. The proposed project will provide employment to local communities, specifically targeting women in routine road maintenance and OPBRC activities, allowing more of them to take part in the DoWH workforce.

D. Results Chain

47. The Results Chain for the project is shown below.

Problem statement: A fragile road network hindered by weak institutional capacity and safety vulnerabilities.



Assumptions:

Component 1: Resilience, Safety Enhancements and Sustainable Maintenance

1. Transport service providers will increase service availability and/or quality in areas benefiting road improvements.
2. There is adequate availability of contractors with sufficient capacity to compete for the project works contracts.

Component 2: Project Management and Institutional Strengthening

3. The project EPM will be able to recruit and retain competent staff to support implementation.

E. Rationale for Bank Involvement and Role of Partners

48. **The World Bank has extensive global experience working in the transport sector with capacity-constrained clients and in fragile settings.** This global experience supporting road infrastructure projects, maintenance contracting, and institutional and policy change processes offers considerable value-added to GoPNG.

49. **The preparation of this project builds on the two decades of World Bank-funded assistance in national road rehabilitation and maintenance in PNG with the same implementing agency (IA).** Development of a strong collaborative relationship with DoWH and experience gained implementing similar projects has positioned the World Bank as a valuable partner for improving PNG's road sector. DoWH has expressed interest in expanding the scope of hybrid OPBRC introduced under RMRPII, which has shown positive results in the quality of maintenance outputs and results as well as improved financial, contractual, and operational viability. World Bank support is also necessary to address the capacity and financing gaps that remain in the road sector and tackle major sector challenges related to road maintenance, resilience, and safety.

50. **World Bank engagement through this project is closely coordinated with other development partners supporting the transport sector objectives of GoPNG.** DFAT and the ADB have sizeable programs in PNG's transport sector. These programs also support the road sector institutional reforms, including road maintenance aspects.[40] The proposed project will therefore be closely coordinated with DFAT's wide-ranging support for road sector reform and will complement the technical assistance provided under TSSP II.

51. **Public sector financing is the appropriate vehicle for this project.** All road assets considered in this project are managed by DoWH. Private sector financing to undertake a road project of this nature is not available because the investment costs cannot be recovered through tariffs and the dispersed nature of the network and low traffic volumes would likely make profitability unachievable. However, the project is designed to enhance private sector participation in road maintenance through OPBRC as it will be a longer-term contract than a traditional roadwork contract. In this context, the project will contribute to an enabling environment for a sustainable private sector.

F. Lessons Learned and Reflected in the Project Design

52. **The project design incorporates global lessons learned from transport sector engagements in fragile settings, including in PNG.** These lessons stress the importance of flexibility, simplicity, and adaptability in project design, including designing scalable components and using CERCs to rapidly respond to emergencies. These global lessons (and experience gained implementing road projects in PNG) also stress the importance of using project preparation financing to improve the quality of preparation and project readiness and the benefits of closely supporting IAs from identification through implementation.

[40] The project's Technical Assistance and Training support will complement the road sector reform program currently being supported by DFAT's TSSP II advisory team, which includes several technical experts housed within DoWH. The ongoing DFAT assistance to DoWH covers reorganization of DoWH and establishment of a National Highway Corporation, the staffing and operation of the PNG Road Fund, revitalizing of the RAMS, and consolidating of long-term, performance-based maintenance.

53. **Proactive and close coordination with GoPNG and other development partners is crucial to avoid duplication and ensure consistency, particularly for institutional and capacity development.** The World Bank's regular participation in the Transport Sector Coordination Monitoring and Implementation Committee forum in PNG helps to ensure that this is achieved.

54. **DoWH requires proactive and intensive support for project implementation.** DoWH has limited capacity to manage large road works projects. The project adopts lessons learned from prior projects by incorporating support to DoWH through hands-on expanded implementation support (HEIS), use of a PPG,[41] and retention of a consultant EPM team of specialists. The EPM arrangement includes a capacity development role in addition to its technical, fiduciary, safeguards oversight, and works supervision functions.

55. **The World Bank's two decades of experience with the EPM project management model under the RMRP projects has shown that it is critical to project implementation success, given institutional capacity and constraints.** This experience has also highlighted that the success very much depends on the qualifications and experience of each technical specialist in the EPM being appropriate for, and commensurate with, the specialist's specific project-related tasks and responsibilities. Particular care will be taken in preparing the terms of reference and Request for Proposals for the EPM to ensure that only firms with the highest caliber of specialists will be selected.

56. **The project also adopts specific lessons from the implementation of road works in PNG.** These include the following: (a) procurement of large works contracts (over US$10 million) can take many months or years and (b) long-term and performance-based road maintenance contracting has been successful at achieving quality outcomes in PNG in the recent past, provided that suitable contractors are available and appropriate contractor training is ensured before bidding.[42]

57. **Capacity building in fragile settings is a slow process that must be sustained over time.** It is most effective when narrowly tailored around clearly identified needs and outcomes and directly supporting project implementation.[43] The Resilient Transport Project (RTP) adopts these lessons through training and mentoring of DoWH staff in key skillsets, including all areas of performance-based maintenance contracting as well as in procurement, FM, environmental and social risk mitigation, and gender.[44]

[41] The PPG of US$4.0 million has been funded by the PNGSP MDTF, for expediting environmental, social, and engineering studies and its closing date is December 31, 2022. The key preparatory activities to be financed under the PPG include (a) mobile mapping and topographic survey activities; (b) consultancy for field investigations, surveys, and design; and (c) two individual short-term consultancies for an Implementation Support Adviser and a Performance-based Maintenance Specialist. GoPNG has utilized alternative funding to undertake the Environmental and Social Impact Assessment (ESIA) and Environmental Management Plan (EMP).

[42] The RTP will adopt contracting formats that have previously been used in World Bank-funded roads projects, which are therefore familiar to the roads construction industry and operators in PNG and have been the subject of training programs locally. Specifically, the World Bank Standard Procurement Document for Works Contracts, the World Bank's OPBRC documents, and the DoWH Standardized Specifications for Roads and Bridges will be utilized.

[43] Department of Foreign Affairs and Trade. *Road Management in Papua New Guinea: An Evaluation of a Decade of Australian Support 2007–2017.*

[44] Such training will encompass risk mitigation and response to SEA/SH and provide employment opportunities for women through road and infrastructure development.

58. **The project design places a high priority on building road network resilience to climate events and other natural hazards.** This includes incorporating appropriate requirements into rehabilitation and maintenance contracts and building the institutional capacity of DoWH to ensure adequate planning, funding, and implementation for resilient infrastructure. Greater focus will on mitigating risks related to heavy rainfall and flooding as past experience indicates that these are among the most significant causes of road failure in PNG in the past decade.[45]

59. **Close monitoring of environmental and social risks is essential.** The implementation of RMRPII was adversely affected by noncompliance with World Bank safeguards policies. Those issues were eventually addressed through intensive monitoring by the World Bank, and both parties learned valuable lessons from this experience to ensure better safeguards compliance in the future.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

60. **DoWH will be the sole IA for all components of the project**. DoWH has acted as IA throughout the prior 20 years of World Bank-supported roads project implementation in PNG under RMRP and RMRPII. As a result of this long involvement, the DoWH management is familiar with the World Bank's policies relating to project implementation and the requirements for IAs to comply with those policies. DoWH also benefits from sustained technical assistance through DFAT's TSSPII and ADB support. DoWH will be responsible for all aspects of activities relating to capacity building, training, and any technical assistance requirements outside the mandate of the EPM.

61. **The project will maintain a similar implementing arrangement as under RMRPII in employing the services of an EPM.** The EPM will be responsible for supporting DoWH in all aspects of project implementation.[46] This includes highway engineering and project management, procurement, FM, works contract supervision and monitoring, contract management, environmental and social risk management (ESF), and gender. Engagement of the EPM will be a disbursement condition for Category 1 (Civil Works) of the project financing.

62. **The EPM will also assist DoWH in the administrative aspects of project supervision and monitoring.** It will support DoWH with reviewing the performance of contractors and consultants, implementing the financial control system for project-related expenditures, and ensuring that reports and project audits are submitted on time.

63. **A PPG of US$4.0 million is financing preparatory activities before project approval.** These activities include the procurement of (a) the implementation support team outlined below, (b) a mobile mapping study of Ramu Highway road conditions, and (c) roadwork design and bid document preparation consulting services for the Ramu Ranges works contract. The implementation support team will include a Program Implementation Support Adviser and a Performance-based Contracts Specialist, both of whom will support DoWH in preparing and implementing the project; an Environmental Specialist; and a Social

[45] ILO. 2013. *PNG Decent Work Country Programme 2013–15*. http://www.ilo.org/public/english/bureau/program/dwcp/download/png.pdf.
[46] EPM staffing is outlined in annex 1.

Specialist. The Performance-based Contract Specialist and Program Implementation Support Adviser will support preparation of bid documents for the Ramu Highway hybrid OPBRC and the Hiritano Highway DBM contract and procurement of the EPM, respectively. The Environmental and Social Specialists will support preparatory activities in the respective disciplines. To ensure DoWH has adequate support during the initial project implementation period, the short-term Program Implementation Support Adviser and short-term OPBRC Specialist will be retained for the first 24 months following effectiveness. If needed, all four consultants funded by the PPG would continue as technical support under Subcomponent 2.1 after effectiveness.

64. **The project implementation arrangements include extensive support to mitigate procurement delays and risks.** The World Bank has approved HEIS to accelerate procurement of activities financed by the PPG and ensure quality of the initial procurement activities before mobilization of the EPM. In addition, the Program Implementation Support Adviser recruited under the PPG through HEIS will assist DoWH in procurement of the EPM and preparation of the POM.

65. **Retroactive financing is permitted** for an amount of up to US$3,000,000 for payments made by the project against eligible expenditures incurred before the signing date of the Grant Agreement of the project but on or after April 1, 2022. The disbursement conditions are described in Annex 1.

B. Results Monitoring and Evaluation Arrangements

66. **The EPM will be responsible for project M&E.** This includes collection and analysis of all data relating to the results indicators with technical support from DoWH. The project will provide biannual reports on project progress and the achievement of targeted indicators as in the Results Framework. Project reports should be submitted within a month of the end of the reporting period.

C. Sustainability

67. **Project activities form part of a broader development partner-supported approach to road network sustainability.**[47] The rehabilitation and maintenance activities, capacity building, and institutional strengthening in the areas of maintenance planning and management will enable the network to better withstand future natural hazards and reduce the frequency of disruptions. Slope stabilization, drainage improvements, and other interventions will further enhance the resilience of project roads, including climate resilience. Project support for the adoption of long-term maintenance contracting will also contribute to sustainability. The experience of hybrid OPBRC maintenance contracting under RMRPII and the long-term maintenance contracts supported under DFAT's TSSPII indicate that more consistent and higher-quality maintenance outputs and more efficient maintenance planning improve efficiency and slow asset deterioration. Moreover, the multi-year site presence of the same road maintenance contractor with incentivized accountability for service delivery contributes to sustainable maintenance outcomes and more resilient road infrastructure.

68. **GoPNG has demonstrated a commitment to prioritize funding the maintenance of Core Roads, including the project roads, by enacting the Road (Fund and Management) Act 2020.** Despite this, the

[47] This includes a broad-based program of DFAT support for road sector management under TSSPII and ongoing World Bank support for hybrid OPBRC under RMRPII.

current low level of spending on overall NRN maintenance remains a concern. Through the act, GoPNG intends to reduce the gap in NRN maintenance funding in the MTDP III and has made improvements in the policy environment, but essential reforms are still at a nascent stage of implementation and the impact remains to be seen. The project will mitigate the sustainability risks by exploring mechanisms to strengthen incentives for contractors to ensure quality of workmanship, including options to utilize Road Fund resources to finance long-term performance-based maintenance for project rehabilitation works.

IV. PROJECT APPRAISAL SUMMARY

A. Technical and Economic Analysis

(i) Technical Analysis

69. **The project design will strengthen the resilience and safety of the road network through a combination of physical works, capacity development, and institutional strengthening.** The interventions are part of an integrated project design that addresses aspects of resilience and safety, including (a) effective and efficient maintenance planning, funding, and contracting approaches; (b) road safety capacity and infrastructure improvements; and (c) resilience to natural and extreme climate hazards. Undertaking rehabilitation and long-term performance-based maintenance contracts concurrent with capacity building in these areas builds on prior lessons that 'learning by doing' is an effective way to sustainably enhance institutional capacity.

70. **The current condition of the selected road sections of the Ramu Highway and Hiritano Highway is poor and vulnerable to climate and natural disasters.** On the Ramu Highway, sections between Tapo-Madang (including the Ramu Ranges section) are considered as along the coast area but in general are several kilometers from the coast. Two short sections of the Ramu Highway are within 1 km of the coast but have elevations of 15–20 m above sea level. The Tapo-Waterais section is located in the mountainous area and is vulnerable to flash floods and landslides. Pavement and seal were not constructed to an adequate standard and have washed out on sections of the highway, resulting in excessive roughness and numerous safety and traffic upgrades are required. Various river crossings along these sections are subject to flooding, and extreme weather events and overloading have damaged several bridges and culverts, resulting in periodic disruption of road access and potentially dangerous crossings. The project section of the Hiritano Highway lies between 20 and 30 km from the coast, running through flat to undulating terrain, and is mostly at an elevation of 30–40 meters (m) above sea level, with the lowest point at 25 m and highest point at approximately 85 m. It is highly exposed to coastal flood and cyclone risks. The design of the reconstruction works will include a strong emphasis on improving the resilience of the entire road profile of this section of the highway.

71. **Long-term maintenance contracting, including hybrid OPBRC, is being promoted because the use of these approaches in PNG has been shown to provide higher quality and more resilient roads than alternative contracting approaches.** The positive results under the ongoing RMRPII are also consistent with international experience. The long-term and hybrid OPBRC maintenance contract formats align commercial incentives with road management agency goals for quality, levels of service, and reliability. Improved quality of rehabilitation and maintenance outputs should help preserve critical road links and reduce long-term public sector risks and costs, enhance road resilience to climate events, and lower

transport costs. These outcomes provide improved conditions for all road users, facilitate public service delivery, and secure reliable road access to remote areas with higher poverty.

72. **Innovative resilience measures would be explored for the Ramu Ranges section to mitigate risks of recurring landslips and pavement failure.** Road improvements and maintenance on the Hiritano Highway will involve traditional, well-tested methods for construction and repairs to granular pavement layer works, surfacing, and drainage, all of which—with careful quality control applied through standardized specifications and close supervision—present low technical risks. The Ramu Ranges section, however, will present greater risks and will require innovative technical solutions to address the recurring landslips and pavement failures caused by the relatively unstable geology of the area and increasingly extreme climate. To mitigate these risks, a specialist consultancy is included in the project preparation to assess the short-, medium-, and long-term slope stability issues through field testing and analysis of the geology and geotechnical conditions in vulnerable locations and make recommendations on the most appropriate technical stabilization solutions on a case-by-case basis.

73. Table 1 provides and indicative breakdown of engineering interventions and share of costs for three road sections. This is subject for validation and update during the detailed engineering design.

Table 1. Indicative Interventions with Cost Breakdown

Project Road Section	Contract Type	Major Works Involved	Indicative Share of Cost (%)	Climate Adaptation
Ramu Highway Ranges section - 40 km	Traditional input-based work contract	Reconstruction of pavement	25	Partially driven by the need to increase road surface resilience to flooding, along with improving road safety and logistic efficiency
		Embankment level uplift in flood-prone areas	10	Entirely driven by the need to adapt to increasing flooding levels
		Embankment and riverside protection	20	Entirely driven by the need to adapt to increasing risks of embankment failure due to riverbank erosion
		Major earthworks for slope stabilization	25	Entirely driven by the need to adapt to increasing flooding and landslide risks
		New drainage and culverts	20	Entirely driven by the need to adapt to increasing extreme rain and flooding risks
Ramu Highway Valley and Coastal Section - 135 km	Hybrid OPBRC (repair and maintenance)	Road pavement rehabilitation	15	Partially driven by the need to increase road surface resilience to flooding, along with improving road safety and logistic efficiency
		Embankment level uplift in some low-lying areas in the valley section	5	Entirely driven by the need to adapt to increasing flooding levels
		Embankment and riverside protection across many river crossings	10	Entirely driven by the need to adapt to increasing risks of embankment failure due to riverbank erosion

Project Road Section	Contract Type	Major Works Involved	Indicative Share of Cost (%)	Climate Adaptation
		Extensive addition of side drainage and building culverts with high capacity	30	Entirely driven by the need to adapt to increasing extreme rain and flooding risks
		Bridge structure enhancement and abutment scour protection	40	Entirely driven by the need to adapt to increasing extreme rain and flooding risks
Hiritano Highway Laloki/Brown River Section - 22.5 km	DBM contract	Full pavement rehabilitation and reconstruction	30	Partially driven by the need to increase road surface resilience to flooding, along with improving road safety and logistic efficiency
		Embankment levels uplift in low-lying areas	15	Entirely driven by the need to adapt to increasing flooding levels
		Embankment and riverside protection near Brown River	5	Entirely driven by the need to adapt to increasing risks of embankment failure due to riverbank erosion
		Earthworks for slope stabilization	10	Entirely driven by the need to adapt to increasing flooding and landslide risks
		Full replacement of side drainage with stronger physical resilience	10	Entirely driven by the need to adapt to increasing extreme rain and flooding risks
		Addition of new culverts with increased capacity	25	Entirely driven by the need to adapt to increasing extreme rain and flooding risks
		Bridge abutment protection at Brown River	5	Entirely driven by the need to adapt to increasing extreme rain and flooding risks

(ii) Economic Analysis

74. **Economic analysis was conducted based on a standard methodology applied for appraisal of road works.** The economic evaluation focuses on Component 1: Resilience, Safety Enhancements, and Sustainable Maintenance. The analysis utilizes a Highway Development and Management Model-4 (HDM-4) (based on the latest data from the World Bank project in PNG) to calculate VOCs, including fuel consumption, under varying levels of road conditions to determine VOC savings. The analysis also utilized the World Bank's Road Safety Screening and Appraisal Tool (RSSAT) to calculate the road safety benefits (or costs) during the road's 20-year life cycle.

75. **The results of the analysis demonstrate that the project investment is economically justified** with the overall economic internal rate of return (EIRR) of 26.4 percent and net present value (NPV) of US$259.9 million at a discount rate of seven percent.[48] The cost-benefit analysis (CBA) was conducted to

[48] World Bank. 2016. "Guidance Note on Discounting Costs and Benefits in Economic Analysis of World Bank Projects."

calculate the EIRR and NPV of the project covering the period of 20 years (2022–2041). Key economic benefits of the project mainly arise from (a) reduced VOCs due to improved road conditions, (b) travel time savings, and (c) improved road safety. The standard conversion factor is assumed to be 0.85. A sensitivity analysis was also performed to assess the rebatement of economic benefits in different cost increase and traffic variation scenarios (Table 2). Annex 3 describes the economic analysis in more detail.

Table 2. CBA Results and Sensitivity Analysis

Scenarios	EIRR (%)	NPV (US$, millions)	B/C Ratio
Base case	**26.4**	**259.9**	**4.6**
Ramu Highway (all sections)	25.5	186.9	4.4
Hiritano Highway	29.2	72.9	5.5
Investment cost increases by 20%	23.5	245.6	3.9
Benefits are 20% lower than expected	22.8	193.7	3.7
Both investment costs +20% and benefits −20%	20.2	179.4	3.1

Note: B/C = Benefit-cost.

76. **Greenhouse gas (GHG) emissions.** An analysis of GHG emissions was undertaken based on the fuel consumption rate at different speeds under with-project and without-project scenarios. Without the project, the road's deteriorated condition limits vehicle speed and leads to higher fuel consumption per vehicle-km compared to the with-project scenario where improved road condition leads to improved speed and hence lower fuel consumption. Gross GHG emission under the with-project scenario is estimated to be 2,016,886 metric tonne of carbon dioxide equivalent (tCO_2e). Total net GHG emission is estimated to be −71,269 tCO_2e, a net reduction over the evaluation period (20 years). The annual average net GHG emission is −3,563 tCO_2e/year. The social benefit from GHG reduction is estimated to be US$4.1 million.[49]

B. Fiduciary

(i) Financial Management

77. **An FM assessment was carried out in accordance with World Bank procedures.**[50] Under the World Bank's Policy for Investment Project Financing (IPF) operations, the Borrower and the project IAs are required to maintain FM arrangements—including planning and budgeting, accounting, internal controls, funds flow, financial reporting, and auditing arrangements—acceptable to the World Bank to provide reasonable assurance that the proceeds are used for the purposes for which they were granted. These arrangements are deemed acceptable if they are capable of correctly and completely recording all transactions and balances relating to the project. In addition, they are acceptable if they can facilitate the preparation of regular, timely, and reliable information regarding project resources and expenditures and safeguard the project assets and are subject to auditing arrangements acceptable to the World Bank.

[49] Based on social cost of emission reduction from the World Bank's Guidance Note on Shadow Price of Carbon in Economic Analysis (2017).

[50] The World Bank Directive 'Financial Management Manual for World Bank Investment Project Financing Operations' issued by the Vice President, Operations Policy and Country Services (OPCS) on February 10, 2017 and as further elaborated on in the World Bank Guidance 'Financial Management in World Bank Investment Project Financing Operations' issued by the Director, Operations Risk Management, OPCS on February 28, 2017.

There is one IA for the project, DoWH. The existing FM arrangement of the Borrower and proposed IA (DoWH) is assessed as adequate to meet the FM requirements in World Bank's Policy for IPF operations.

(ii) Procurement

78. **DoWH will carry out procurement for the project in accordance with the World Bank Procurement Regulations** for IPF Borrowers (Procurement Regulations), November 2020, as well as the provisions given in the IDA Financing Agreement, IBRD Loan Agreement and Grant Agreement, and the World Bank's Anti-Corruption Guidelines dated October 15, 2006, revised in January 2011, and July 1, 2016. The use of the World Bank's Systematic Tracking of Exchanges in Procurement (STEP) system will be mandatory. The project will finance works, goods, non-consulting services, and consultant services (firms and individuals) for the IA. Procurement support to DoWH will be provided by a Procurement Specialist in the EPM. This support will include facilitating procurement processes, using existing procurement systems and tools (such as the STEP system), and capacity building.

79. **A review of the IA's existing capacity and experience for managing procurement was recently carried out.** DoWH has been implementing World Bank-financed projects for more than a decade. There is limited capacity for procurement in DoWH. HEIS has been requested by the Government (via a letter of request dated October 19, 2021) and will be utilized to support agreed preparatory procurement activities under the PPG. Advance contracting and retroactive financing will be included in the project and reflected in the Project Procurement Strategy for Development (PPSD). This will enable the IA to undertake other procurement activities not included in the PPG in advance of project effectiveness.

80. **Procurement Plan and PPSD.** A detailed Procurement Plan for the first 18 months of the project has been prepared based on the completed PPSD.

81. **Project Preparation Grant.** A PPG has been signed for the project and is being used to progress agreed preparatory procurement activities ahead of the project's effectiveness. A simplified PPSD and Procurement Plan for the PPG have already been approved. The related procurement activities have been loaded to the STEP system and are currently pending/under implementation (some revisions may be required because of lengthy project preparation).

C. Legal Operational Policies

	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Areas OP 7.60	No

D. Environmental and Social

82. **The Project will be implemented in compliance with the Bank's Environmental and Social Framework (ESF).** Due diligence identified that all Environmental and Social Standards (ESSs) apply with the exception of ESS8 Cultural Heritage and ESS9 Financial Intermediaries. DoWH has assessed environmental and social impacts through the development of the following instruments: a preliminary

Environmental and Social Impact Assessment (ESIA); a Resettlement Framework (RF); Labor Management Procedures (LMP); Stakeholder Engagement Plan (SEP); and a Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH) Action Plan. The preliminary ESIA includes (a) an environmental and social management plan with mitigation, monitoring, and institutional measures to be taken during implementation and operation of the project to eliminate adverse environmental, health and safety, and social risks and impacts and offset or reduce them to acceptable levels and (b) an environmental and social risk management capacity-building assessment and plan that reflects lessons learned from RMRPII. The preliminary ESIA has also confirmed that other works currently being completed on Ramu Highway are not associated facilities. Both the ESIA and Component 2 include environmental and social risk management capacity-building activities, and technical assistance activities will be completed consistent with the World Bank's ESF. The preliminary ESIA will be finalized on completion of design works and before the commencement of the bidding process. Should the contractor propose to establish new quarries, they will be considered associated facilities. The final ESIA will identify and assess, to the extent appropriate, the potential environmental and social risks and impacts of associated facilities[51] and manage these risks in accordance with the requirements of the environmental and social standards, to the extent that the Government has control or influence over such associated facilities.

83. Given the current risk of COVID-19 transmission, all works will be completed in accordance with the World Bank's ESF/Safeguards Interim Note: COVID-19 Considerations in Construction/Civil Works Projects. DoWH will incorporate the relevant aspects of the Environmental and Social Commitment Plan (ESCP) and other environment and social instruments, ESS2 requirements, and any other required environmental, social, health, and safety (ESHS) measures into the ESHS specifications of the procurement documents and contracts with contractors, subcontractors, and supervising firms. Thereafter, they will ensure that the contractors, subcontractors, and supervising firms comply with the ESHS specifications of their respective contracts. Requirements for both the management of contractors and subcontractors are also included in the World Bank's Standard Procurement Documents. The SEP was publicly disseminated by the World Bank on March 3, 2022, the ESIA, SEA/SH Action Plan, LMP, RF on March 28, 2022, and the negotiated ESCP on May 8, 2022.

84. **The project will prepare a SEA/SH Action Plan which will outline SEA/SH prevention and response measures in accordance with the World Bank's requirements.**[52] The project has been screened using the SEA and SH Risk Assessment Tool. The SEA/SH risk screening rating is Moderate as the project entails medium-scale infrastructure construction. The project construction is likely to occur near school routes, market areas, and other pedestrian areas that women and children use for their daily activities. Based on the assessment, the project will develop an SEA/SH Action Plan, which will include SEA/SH mitigation and response mechanisms such as codes of conduct; worker and manager training; community awareness raising activities; mapping of and training to build institutional capacity of support services for survivors of violence around the Ramu and Hiritano Highways; and development and implementation of project SEA/SH-related grievance redress mechanism (GRM)/referral pathways. The project will include SEA/SH training programs for the contractors working on and in the vicinity of the Ramu and Hiritano

[51] Associated facilities are facilities or activities that are not funded as part of the project and are (a) directly and significantly related to the project; (b) carried out, or planned to be carried out, contemporaneously with the project; and (c) necessary for the project to be viable and would not have been constructed, expanded, or conducted if the project did not exist.
[52] World Bank. 2020. *Good Practice Note for Addressing SEA/SH Risk in Investment Project Financing involving Major Civil Works*.

Highways and also explore possible support to specialized GBV service providers to strengthen the GBV services and referral pathways around the project sites.

85. **Gender.** The proposed project would contribute to reducing identified gender inequality in economic opportunity, mobility, and safety from violence through the following activities: (a) enhancing paid employment opportunities for women in project works and improving women's access to technical training within DoWH, (b) facilitating women's access to income generation at roadside markets in project areas, and (c) improving pedestrian safety by upgrading infrastructure and addressing unsafe driving behaviors. The identified gender gaps and activities to address them and associated indicators are detailed in annex 4.

86. **The project will contribute to the empowerment of women, especially those living in the influence areas of the two project roads.** The project will establish mechanisms to directly contribute to increase women's labor force participation in routine road maintenance. This may be required through bidding documents, together with a requirement for the contractors to articulate a strategy/approach ensuring women will have equal job opportunities alongside men in these types of activities. In parallel, the project would also enhance employment opportunities for women from local communities in paid jobs under the hybrid OPBRCs for road maintenance. As in other areas of PNG, female labor in the two targeted regions is mainly concentrated in rural, informal, and subsistence work, primarily in the agriculture sector focused on subsistence crops, fishing, and petty trade of garden products.[53] The project's approach will therefore open further work opportunities for those women. At the DoWH level, the project would aim for greater participation of the female workforce within DoWH and training of female staff on management and supervision of road contracts to enhance their future participation in leadership positions regarding the planning and decision-making process in the road sector. The project will also identify opportunities to reduce barriers to women's employment in DoWH by creating a safe working environment for them. This could, for example, include supporting the implementation of GoPNG's Gender Equality and Social Inclusion Policy within DoWH and enforcing workplace polices to address family and sexual violence and sexual harassment.

87. **Community and stakeholder engagement.** The project will implement an inclusive and culturally sensitive stakeholder engagement program as outlined in the Stakeholder Engagement Plan, with a focus on identified project-affected people and vulnerable stakeholders. This engagement will begin early in the project cycle, providing stakeholders with an opportunity to influence project planning and design (for example, identifying the locations for construction of safe pedestrian facilities along the highways) and will continue during construction and operation and maintenance phases. This will include the dissemination and soliciting of feedback on key project activities and project work plans. The project will ensure that project documents are widely available so that beneficiaries are able to provide feedback on the project design and implementation and that this feedback is integrated into project plans. All stakeholders will be encouraged to submit their feedback to the EPM. There will be continuous monitoring and reporting throughout the project life cycle on stakeholder feedback and on any changes that have been implemented because of feedback. The project will include two performance indicators related to citizen engagement: ''Grievances responded to within the stipulated service standards'' to monitor the implementation of the project GRM and 'Percentage of survey respondents satisfied with pedestrian

[53] ILO. 2013. "PNG Decent Work Country Programme 2013-15." http://www.ilo.org/public/english/bureau/program/dwcp/download/png.pdf.

safety improvements' to monitor beneficiary feedback.

88. **Grievance redress mechanism.** A GRM is a locally based, formal way to receive, assess, and resolve community feedback and complaints. The GRM provides important feedback for the continued improvement of projects. A project-level GRM has been established by DoWH under RMRPII. The RTP GRM will follow the same procedures. LMP also stipulates a worker-specific GRM, which will be made available to all workers on the project during implementation. The GRM process will also be promoted to communities (those in proximity to project sites) to ensure the mechanism is understood and that individuals have the opportunity to provide feedback and complaints about the project, impacts, or the workforce. A specific pathway to receive complaints of SEA and SH will be established within the GRM to encourage reporting and reduce barrier to reporting SEA or SH perpetrated by project workers.

V. GRIEVANCE REDRESS SERVICES

89. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

VI. KEY RISKS

90. **The overall risk to achievement of the PDO is rated Substantial.** The risk assessment is based on residual risk after accounting for mitigation measures. The main concerns involve (a) political and governance risks, (b) sector strategies and policies risks, (c) institutional capacity for implementation and sustainability risks, (d) fiduciary risks, (e) environment and social risks, and (f) other risk, discussed in detail below.

91. **Political and Governance risks - Substantial.** The key risks are related to governance challenges and the rapidly changing political environment in PNG. Although the project supports critical national road links, political alliances and priorities can shift quickly in PNG. This can result in the prioritization of support for specific constituencies over national priorities. The upcoming 2022 election could result in a weakened GoPNG commitment to implement the project. The risk to implementation is moderated by the fact that the project does not rely on counterpart financing. Poor governance of the road sector poses additional risks and could result in delays, contract management challenges, and possibly cost escalation. Support from the EPM and the World Bank for implementation will reduce these risks to the project outcomes but the residual risk remains Substantial due to the potential impacts on efficiency and the risk that changing

political priorities could contribute to implementation delays.

92. **Sector Strategies and Policies risks - Substantial.** Policy and strategy reforms have been inconsistently implemented in the past. While the adoption and implementation of reform legislation signals GoPNG's commitment to increasing and prioritizing road maintenance funding, the ongoing reforms remain at a nascent stage, and it is uncertain whether the reforms can be sustained. The project will mitigate these challenges by coordinating GoPNG dialogue with development partners engaged in these areas and by providing technical assistance needed to support successful implementation of reforms. With the proposed establishment of the Highway Corporation, the mandate of DoWH to manage the road network is likely to change, but the risks to project implementation are minimal as it expected the Highway Corporation will be established with the key staff of DoWH's Highway Unit. However, the project would need to be restructured to reflect the change in IA.

93. **Institutional Capacity for Implementation and Sustainability risks - Substantial.** The low capacity of the IA poses a risk to effective and timely execution of road works, and it is possible that the project may not be implemented as successfully as expected and that implementation delays could affect full utilization of the PNGSP MDTF Grant, which is to close in year three of implementation. The project approach is to mitigate these risks through use of the PPG to fund preparatory activities, HEIS to expedite procurement under the PPG, and an EPM during implementation. The PPG is funding procurement of consultants to undertake field surveys and prepare bidding documents. The EPM will be mobilized in time to support DoWH to ensure quality and timely procurement and execution of project works. The project design will mitigate the risk of poor EPM performance by utilizing HEIS and drawing individual specialist advisers to help prepare the EPM contract and oversee the EPM procurement. The specialist advisers will explore mechanisms to enhance accountability in the EPM contract such as performance-based measures and/or triggers for DoWH to initiate changes in underperforming EPM staff. The project will also provide capacity-building support for DoWH staff. World Bank implementation support missions will continue their capacity building role through timely assistance. Despite the mitigation measures, the risk to implementation is considered Substantial due to the heavy reliance on the EPM and the potential difficulty in recruiting and retaining qualified EPM staff in PNG, particularly in a fragile context and given the potential impacts of the pandemic.

94. **Fiduciary risks - Substantial.** The project's overall FM risk is rated Moderate while the procurement risk is rated Substantial. Therefore, the overall fiduciary risk is rated Substantial. Regarding the fiduciary aspects, experience shows limited capacity within DoWH and delay in scheduling and implementing procurement processes and resultant delays to the eventual contracting of civil works and consultancy contracts. This low capacity for procurement in DoWH compounds the already lengthy time needed to coordinate procurements over PGK 1 million (US$300,000) in value through the National Procurement Commission and obtain National Executive Council approval for large contracts of more than PGK 10 million (US$3 million). The risk rating has been increased from 'Moderate' in RMRPII because this is reflective of the implementation challenges mentioned earlier, affecting RMRPII and also expected to impact this project. DoWH has been implementing World Bank-financed projects for two decades. HEIS has been requested by the Government and will be utilized to support agreed preparatory procurement activities under the PPG. Advance contracting and retroactive financing will be included in the project and reflected in the PPSD; this will enable the IA to undertake other procurement activities not included in the PPG in advance of the project signing. Even after accounting for these mitigation measures, the residual risks are considered Substantial.

95. **Environmental and Social risks - Substantial.** There are no potential significant or irreversible impacts associated with the project. Environmental and social risks and impacts can be managed through environmentally sustainable/safe road design and the implementation of standard environmental, social, and health and safety management measures during construction. Long-term positive impacts are anticipated from the project as it is expected to enhance the resilience of priority road infrastructure and result in several positive environmental and social impacts, including safer and more reliable travel, improved access to services, and women's empowerment. Although there have been capacity constraints on previous PNG transport projects, performance has improved with the World Bank's support. Environmental and social risk management capacity building has been included both in project design as part of Component 2 activities and as an ESCP commitment. The nature and magnitude of potential environmental and social impacts and risks are expected to be temporary, site specific, predictable, and reversible with the implementation of mitigation measures. However, given the IA's limited capacity—and because technical aspects are still to be determined—the residual environmental and social risk is rated Substantial. Details of each risk are given below.

96. **Environmental risks - Substantial.** Potential environmental impact would include noise, dust and air emissions, waste disposal, management of storm water, hydrocarbon spills, community and workers' health and safety, sourcing of construction materials, and impacts on biodiversity along the road corridors and supporting facilities such as laydown areas and quarries that may require land clearance during project implementation. The project involves the reconstruction, rehabilitation, and maintenance of existing highways. It does not pass conservation areas or protected areas and is therefore not expected to significantly affect natural habitats. There are also potential risks to biodiversity due to increased traffic.

97. **Social risks - Substantial.** Minor land acquisition may be required during reconstruction of sections of the Ramu Highway. Reconstruction and rehabilitation works may affect small structures, economic crops and trees, and other assets that are present within the road corridor. A few market areas may be temporarily affected by works, and small stalls and market vendors may experience temporary disruptions to business. Other potential social risks and impacts include (a) community health and safety risks resulting from hazards caused by construction equipment and worksites and from the presence of and interaction with the project workforce including communicable disease (that is HIV/AIDS and COVID-19), SEA, SH, and other antisocial behavior; (b) minor nuisance level noise and dust impacts and potential access restrictions during construction; (c) increased risk of traffic incidents during road construction activities and during operation; and (d) disproportionate impacts on vulnerable groups (that is, poor households, women and children) and community dissatisfaction and conflict arising from real or perceived inequities and/or failure to adequately manage/mitigate any of these social risks and potential impacts. Operational phase risks may include amplified road safety related risks to the community and road users—a key concern being pedestrian safety around schools, markets, and other sensitive receptors.

98. **Other risk - Substantial.** A local outbreak of COVID-19 has resulted in severe social impacts and disruption to the operations of the RMRPII EPM. PNG addressed the local outbreak through international border restrictions, restrictions on movement between provinces, and lockdowns. Although these measures have been lifted, they directly interrupted the implementation of the ongoing RMRPII. Should such measures come into effect again, they may possibly affect this project, resulting in delays due to difficulties mobilizing international contractors or consultants. Although greater use of local contractors and consultants is anticipated to reduce dependency on international resources, the project still needs

international expertise in some areas. The residual risk to project implementation remains substantial because delays or difficulty recruiting qualified contractors and consultants could easily affect project implementation and achievement of the PDO.

99. **Climate and disaster risk screening.** The following risks for the project are considered high based on the screening: precipitation and flooding, drought, sea level rise, storm surge, and strong winds. PNG has a hot, humid tropical climate with year-round warm temperatures averaging between 26 and 28°C. Since 1950, increase in rainfall has been observed in all regions during the wet season and in the Northern region during the dry season. The Highlands, where average rainfall can reach 8,000 mm, have a long history of severe floods. The project location has been exposed to strong winds due to tropical cyclones, causing flooding and damage to communities. The frequency of moderate intensity tropical cyclones may decline, but the increase in wind speeds associated with category five cyclones is projected to surge. In addition, PNG's earthquake hazard, tsunami hazard, volcanic hazard, and susceptibility to landslides are classified as high.

VII. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY: Papua New Guinea

Papua New Guinea Resilient Transport Project

Project Development Objectives(s)

The Project Development Objective is to enhance the resilience and safety of prioritized road infrastructure of the recipient's highway network, and in case of an Eligible Crisis or Emergency, respond promptly and effectively to it.

Project Development Objective Indicators

Indicator Name	PBC	Baseline	End Target
Enhance the resilience and safety of prioritized road infrastructure			
Core national roads with Improved resilience (Kilometers)		0.00	197.50
Core national roads with road safety measures implemented (Kilometers)		0.00	197.50
Roads maintained in good condition under multi-year maintenance contracts (Kilometers)		0.00	197.50
Population having access to roads with upgraded safety and climate resilience (Number)		0.00	172,389.00

Intermediate Results Indicators by Components

Indicator Name	PBC	Baseline	End Target
Component 1: Resilience, Safety Enhancements, and Sustainable Maintenance			
International Roughness Index (IRI) score of maintained road links (Number)		9.80	4.00
Road Safety Audits completed (Yes/No)		No	Yes
Slope stabilization measures applied along project roads (Yes/No)		No	Yes
Mobile mapping study completed (Yes/No)		No	Yes
Pedestrian facilities constructed (Number)		0.00	8.00
SH/SEA Plan implemented (Yes/No)		No	Yes
Wash facilities constructed at roadside locations (Number)		0.00	8.00
Women employed in routine road maintenance activities (Percentage)		0.00	15.00
Percentage of survey respondents satisfied with pedestrian safety improvements. (Percentage)		0.00	80.00
Component 2: Project Management and Institutional Strengthening			
EPM is fully established and functioning (Yes/No)		No	Yes
Road safety management capacity review completed (Yes/No)		No	Yes
Technical assistance for sector reforms (Yes/No)		No	Yes
Works designs and bidding documents prepared (Number)		0.00	3.00
Training for GoPNG/DoW staff and contractors (Hours)		0.00	500.00
Training for women in performance-based road maintenance contract supervision (Hours)		0.00	240.00
Grievances responded to within the stipulated service standards (Percentage)		0.00	100.00

Monitoring & Evaluation Plan: PDO Indicators					
Indicator Name	**Definition/Description**	**Frequency**	**Datasource**	**Methodology for Data Collection**	**Responsibility for Data Collection**
Core national roads with Improved resilience	Rehabilitation, repairs, and maintenance activities will enhance climate resilience. Resilience enhancement measures will include: i) raising the road embankment in low-lying and flood-prone areas; ii) sealing shoulders; iii) measures to improve the slope stability of embankments and cuttings to prevent landslips; iv) increased size and number of longitudinal and cross-drainage to reduce incidence of flooding and inundation from expected increases in frequency, intensity, and duration of storms; v) provision of subsoil drainage through cuttings and areas with a high water-table; and (vi)	Annual	Progress Report	Data of work progress	DoWH through EPM

	preventive maintenance of road surface and drainages. The target is therefore defined as a sum of 175km reconstruction and/or maintenance of Ramu Highway and 22.5km rehabilitation and maintenance of Hiritano Highway.				
Core national roads with road safety measures implemented	The indicator measures improved safety of the project roads as reflected in installation of safety improvements identified through the road safety assessment, audit, and/or iRAP Assessments.	Annual	Progress Reports	EPM monitoring and reporting	DoWH, through EPM
Roads maintained in good condition under multi-year maintenance contracts	Roads will be maintained in a good conditions under Output and Performance-based Road Maintenance Contracts (OPBRC). Good condition is defined as IRI less than 6.0.	Annual	Progress Reports	DoW and EPM monitoring and reporting	DoWH through EPM
Population having access to roads with upgraded safety and climate resilience	The population who will have access to roads with upgraded safety and climate resilience is defined as the estimated population of districts along the project	Annual	Progress report	Work progress and Census	DoWH

	sections of the highways. The population end target is an estimate made using the national census 2011. It includes the population of the following local-level government (LLG) districts along the project highways: Ambenob Rural LLG (54,038), Madang Urban LLG (35,971), and Usino Rural LLG along Ramu Highway (35,286); and Hiri LLG along Hiritano Highway (47,094). The definition of roads with upgraded safety and climate resilience will be the same as the PDO indicators #1 and #2.				

Monitoring & Evaluation Plan: Intermediate Results Indicators					
Indicator Name	**Definition/Description**	**Frequency**	**Datasource**	**Methodology for Data Collection**	**Responsibility for Data Collection**
International Roughness Index (IRI) score of maintained road links	The weighted average IRI score of roads under rehabilitation and maintenance contracts will be reduced to the target level and maintained within the target level under	Annual	Progress Reports	EPM supervision staff will supervise roughness measurements undertaken by contractors.	DoWH through EPM

	OPBMC contracts. The baseline will be updated based on field data collection undertaken through the PPG financed activities.				
Road Safety Audits completed	Pre- and post-construction road safety audits are completed and recommendations are implemented.	Annual	Progress Reports	DoWH and EPM monitoring and reporting	DoWH, through EPM
Slope stabilization measures applied along project roads	The engineering assessments of the project road sections will identify areas requiring slope stabilization interventions and the recommended measures. These will be implemented as required during the rehabilitation stage of works.	Annual	Progress Reports	DoWH and EPM monitoring and reporting	DoWH through EPM
Mobile mapping study completed	The mobile mapping study will use car-mounted mobile phones to collect basic geocoded road condition data to be used for road maintenance planning.	Annual	Progress Reports	DoWH and EPM monitoring and reporting	DoWH, through EPM
Pedestrian facilities constructed	The need for pedestrian facilities will be identified in pre- and post-construction road safety audits and in road safety screening of the	Annual	Progress Reports	DoWH and EPM monitoring and reporting	DoWH through EPM

	road sections under maintenance only contracts. Such facilities are also expected to be required in proximity to schools, markets, community facilities/public services, and other developed areas.				
SH/SEA Plan implemented	The SH/SEA plan will be approved by the World Bank and incorporate mitigation and response mechanisms that are appropriate to the context. Key elements will be implemented prior to or concurrent to the commencement of road works, and implementation will continue for the duration of the project works.	Annual	Progress Reports	DoW and EPM monitoring and reporting	DoWH through EPM
Wash facilities constructed at roadside locations	The need for construction of WASH facilities, including locations and facility composition, will be identified through community consultations during the ESIA preparation. The indicator measures construction of the WASH facilities at markets as identified in the ESIA.	Annual	Progress Reports	EPM monitoring and site supervision	DoWH through EPM

Women employed in routine road maintenance activities	The share of workers employed in routine maintenance activities who are women.	Annual	Progress Reports	EPM monitoring and reporting	DoWH through EPM
Percentage of survey respondents satisfied with pedestrian safety improvements.	The indicator will report the results of a stakeholder survey in the project areas.	Annual.	Stakeholder survey	The stakeholder survey methodology will attempt to collect feedback from a representative sample alone the project roads.	EPM
EPM is fully established and functioning	The project EPM contract is signed, its staff are fully mobilized, and the EPM is supporting project implementation and monitoring.	Annual	Progress Reports	DoWH reporting	DoWH
Road safety management capacity review completed	The road safety management capacity review will be conducted to assess the status of the road safety management in PNG through the lens of the Safe Systems approach.	Annual	Progress Reports	EPM Monitoring and reporting	DoWH through EPM
Technical assistance for sector reforms	Detailed support will be identified in coordination with DoWH during the first 12 months of project implementation. Project's technical assistance may include some of the	Annaul	Progress Reports	EPM reporting	DoWH, through EPM

	following areas: (i) technical and advisory support for adoption of long-term, performance-based road maintenance contracting and quality control / quality assurance; (ii) enhancement of the Road Asset Management System (RAMS) established in DoWH; and / or (iii) support to the Road Fund to enable sustainable maintenance funding.				
Works designs and bidding documents prepared	Project technical assistance activities include preparation of bid documents for the three project works contracts. Additional data collection and bid documents may be prepared for a future hybrid OPBRC contract for the entire length of the Hiritano Highway and/or other national roads.	Annual	Progress Reports	DoWH and EPM monitoring and reporting	DoWH, through EPM
Training for GoPNG/DoW staff and contractors	The full-time and part time EPM staff will be assigned to mentor and transfer skills to key support staff to develop skills in their areas of expertise, including	Annual	Progress Reports	DoWH and EPM monitoring and reporting	DoWH, through EPM

	procurement, financial management, environment, gender, social development, maintenance planning, maintenance contract supervision, road safety, and OPBRC contracting. The EPM will employ nine specialists who will transfer skills to local staff. The indicator assumes six weeks of mentoring per EPM specialist per year for five years.				
Training for women in performance-based road maintenance contract supervision	DoW will provide technical training in performance-based road maintenance contract supervision to female engineers and technicians (or other relevant staff), to enhance women's more equal participation in technical positions in DoW. This will be measured in person-hour.	Annual	Progress Reports	DoW and EPM monitoring and reporting	DoWH through EPM
Grievances responded to within the stipulated service standards	The GRM will stipulate service standards for ensuring the project provides timely responses to citizen feedback and grievances.	Annual	Progress Reports	EPM monitoring and reporting	DoWH through EPM

ANNEX 1: Implementation Arrangements and Support Plan

COUNTRY: Papua New Guinea
Papua New Guinea Resilient Transport Project

Project Institutional and Implementation Arrangements

1. The RTP will be implemented over a seven-year period following project effectiveness. The proposed implementation arrangements will involve DoWH as the single IA. DoWH has acted as IA throughout the more than 20 years of World Bank-supported roads project implementation in PNG, previously under RMRP and currently under RMRPII. As a result of this long involvement, the DoWH management is familiar with the World Bank's policies relating to project implementation, and the requirements for IAs to comply with those policies. DoWH also enjoys continued technical assistance through DFAT's TSSP and through ADB support.

2. Despite this sustained support, however, DoWH's institutional and managerial capacity is limited due to budget constraints and staff turnover. It has been necessary to retain the services of a full-time EPM consultancy to assist DoWH throughout implementation of prior and ongoing World Bank projects, to provide competent project management, technical, fiduciary, and safeguards-related support. The EPM carries out detailed scoping, prepares bidding documents, and oversees procurement besides supporting the DoWH headquarters and provincial staff to monitor the construction and long-term maintenance contract(s) under implementation. The EPM is also responsible for on-the-job training and skills transfer to DoWH counterparts at its headquarters and in the provinces. The EPM provides support to DoWH in carrying out its environmental and social safeguards duties: the EPM's Safeguards Specialists are internationally recruited and provide on-job training to locally recruited DoWH specialists who were brought on board during RMRPII implementation.

3. The EPM for this project would include a full-time PM who will head the unit, full-time Senior Engineer, full-time OPBRC Engineer, full-time FM Officer, full-time procurement specialist, part-time Environmental and Social Safeguards Specialists, part-time M&E Specialist, and provincially based supervision and/or contract management engineers. The services of the PM and FM Officer will be retained throughout the project. To strengthen DoWH, project support will be provided to enhance performance-based maintenance management capacity and international experts would have national counterparts, including locally recruited EPM staff and DoWH staff who will closely work with them, aiming at on-site transfer of knowledge through on-the-job training. Staff composition of the EPM may be revised to align with implementation needs, upon agreement of the World Bank.

Figure 1.1. EPM Organogram

4. The PM is expected to provide close and sustained support to the DoWH World Bank Project Director throughout his/her employment, particularly at every stage of the bid documents preparation, bidding processes, evaluation and contract award processes for all project consultant individuals and firms, non-consulting entities (for example, surveyors), and works contractors. This includes assisting the Project Director in guiding documents through administrative procedures and obtaining timely signatures and/or clearances from the DoWH Secretary, National Procurement Commission, National Executive Committee, State Solicitor's offices, and others as required.

5. The project will benefit from a Steering Committee, which should be established within three months after effectiveness. The Steering Committee will include at a minimum each of the representatives

from the Department of National Planning and Monitoring, the Department of Treasury, DoWH, and Department of Transport (among others) and will be chaired by the representative of the DoWH. It will provide general guidance and oversight of the project to ensure effective coordination among the various agencies and alignment with GoPNG strategic priorities.

6. **Specialist advisers.** The project will recruit the following two specialist advisers, initially using PPG financing, to support initial start-up activities: (a) a short-term Program Implementation Support Adviser and (b) a short-term OPBRC Specialist.[54] These advisers will support initial preparatory activities, preparation of bid document, procurement of the EPM, preparation of the POM, training for bidders, and other tasks needed to ensure project activities commence rapidly. To ensure that DoWH has adequate support during the initial implementation period, retention of these two advisers throughout the first 24 months after effectiveness will be a covenant.

7. **Project Operation Manual**. It will be prepared by DoWH and adopted within three months of project effectiveness to set forth (a) institutional arrangements for day-to-day execution of the project; (b) procedures for the preparation and successive updates of the Procurement Plan and its implementation arrangements; (c) implementation arrangements for the environmental and social standards and the ESCP; (d) budgeting, disbursement, and FM arrangements; (e) project monitoring, reporting, evaluation, and communication arrangements; (f) criteria and procedures for the prioritization and selection of technical assistance and training activities under Subcomponent 2.3(a) and 2.3(c); and (h) any other administrative, financial, technical, and organizational arrangements as shall be necessary for the implementation of the project and the achievement of its development objectives. The project Implementation Support Adviser to be financed by the PPG will prepare a draft POM and the EPM, once mobilized, will revise and finalize the POM with inputs from each professional specialist.

8. **CERC Manual.** The project will prepare a CERC Manual, which will be an annex to the POM and will lay out, in as much detail as possible, the provisions for activating and implementing the CERC. The CERC Manual will include the operational, fiduciary, and technical details of the CERC to facilitate its implementation during changing post-disaster circumstances.

9. **Emergency Action Plan.** In the event of an emergency requiring CERC activation, the Borrower will finalize the Emergency Action Plan in a form that is acceptable to the World Bank. The Emergency Action Plan will include the amount of the original project's uncommitted funds to be reallocated to the CERC. The Emergency Action Plan also lists the emergency activities to be financed from the CERC, including the itemized costs of (a) specific technical studies;[55] (b) capacity-building activities; (c) types and amounts of goods; (d) types, locations, and numbers of civil works; and/or (e) incremental management, operational and technical oversight expenses. It confirms the CERC's implementation modalities outlined in the CERC annex or proposed changes. It also summarizes the safeguard implications and any safeguard instruments to be prepared and includes the Procurement Plan.

10. **CERC disbursement conditions.** Adoption of the CERC Manual and Emergency Action Plan will be disbursement conditions for the CERC Component.

[54] The advisers are also described in annex 2, paragraph 27.
[55] Including assessments, feasibility studies, designs, bidding documents, safeguard instruments, and additional audits.

11. **Project Preparation Grant.** This is funding two support activities to the Ramu Highway subcomponent: (a) a mobile mapping/survey assignment that will provide a detailed digital terrain model over the full length of the road, to support the design of road improvements, slope stability, and drainage and (b) a fieldworks and detailed design consultancy. It is also funding the employment of an Implementation Support Specialist and an OPBRC Adviser to DoWH. The Implementation Support Specialist and OPBRC Adviser will continue their services after the PPG financing expires by drawing on the project financing under Subcomponent 2.1. The fieldworks and design consultancy will initially—over a period of eight months—undertake a number of technical investigations, surveys, and studies on the existing road, culminating in a pavement assessment and improvement strategy. The outcome of this strategy, to be reviewed and cleared by DoWH and the World Bank, will determine the way forward for design and construction of improvements, particularly the complex geological and potentially unstable areas of the Ramu Ranges section, which might not be appropriate for a DBM framework.

12. **Annual work plan and budget.** DoWH, through the EPM, will prepare and submit to the World Bank the annual work plan and budget within three months of effectiveness and no later than August 31 of each subsequent year. This will include, among others, a list of all activities (including training and workshops) proposed to be implemented under the project during the following fiscal year; provision of a budget for their financing; and description of the environmental and social measures taken or planned.

13. **Project reports.** DoWH, through EPM, will prepare semesterly reports that track progress in distribution of inputs, disbursement of funds, and achievement of targeted indicators as outlined in the Results Framework (section VII). DoWH will submit to the World Bank each project report not later than one month after the end of each calendar semester, covering the calendar semester.

14. **Midterm review report.** DoWH will prepare a midterm review report including progress achieved in carrying out the project during the period preceding the date of such report, setting out of the measures recommended to ensure the efficient carrying out of the project, and the achievement of the objectives and result indicators. The DoWH will submit this report to the World Bank at least one month before the date of the midterm review.

Project Institutional and Implementation Arrangements

(i) Financial Management and Disbursements

15. **Budgeting.** All donor-funded projects will be included in GoPNG Public Investment Program and National Budget to have aid on plan and on budget. Currently the RTP has been included in the Public Investment Program 2022–2026 and the 2022 National Budget. Annual budgets will need to be submitted by DoWH to the Department of Treasury for subsequent budgets in 2023 and onward until project closing. A budget for the whole project is required and will need to be broken down by year, with appropriate levels of detail (for example, component or category, activities, whichever is deemed most relevant and useful).

16. **Counterpart funding.** No counterpart funding is envisaged.

17. **Funds flow.** Funds will flow from the World Bank to GoPNG via (a) advances, (b) direct payments, (c) reimbursement of GoPNG expenditure, and (d) special commitments, if required (refer the Disbursements section for more details on disbursement arrangements).

18. **Accounting and maintenance of accounting records**. All Government funds are bound by the Public Finances Management Act (PFMA) 1995 and the PNG Financial Management Manual (FMM). DoWH transitioned to an Integrated Financial Management Information System and will use it to record accounting information. DoWH and GoPNG operate on a cash basis of accounting. Accounting records are to be maintained by DoWH and are to be made available to both auditors and the World Bank, as required.

19. **Internal controls, including internal audit.** DoWH is bound by the PFMA and PNG FMM for its policies and procedures manual. Finance instructions require all departments to have an internal audit division and an audit committee; DoWH has both. The project should be included in the annual internal audit plan for DoWH and in relevant reports to the audit committee.

20. **Periodic financial reporting.** Unaudited interim financial reports (IFRs) of the project will be prepared on a quarterly basis. The financial reports will include an analysis of actual expenditure for the current period, year-to-date and for the cumulative to date, plus outstanding commitments compared against total project budget. The format will be developed and agreed by the IA, DoWH, and the World Bank before the due date for submission of the first IFRs. The IFRs will be forwarded to the World Bank within 45 days of the end of each calendar quarter.

21. **External audit.** An annual audit of the project financial statements will be required. The Auditor General's Office (AGO) of PNG is mandated to audit all Government funds. The AGO can choose to subcontract the audit of World Bank-funded projects to private audit firms overseen by the AGO. The cost of this subcontract is eligible for financing under the project. The Auditor General requires annual financial statements to be prepared in accordance with International Public Sector Accounting Standards. The audited financial statements, audit report, and Management Letter must be received by the World Bank within six months of the end of the fiscal year and shall be made publicly available by the Recipient in a manner acceptable to the World Bank as per the General Conditions for IDA Financing, Investment Project Financing.

22. **Disbursement methods and supporting documentation arrangements.** The project could use four disbursement methods: (a) advances, (b) direct payment, (c) reimbursement, and (d) special commitments. Direct payment would only be used for large payments or when payments are in currencies that the Borrower may have difficulty obtaining. Reimbursement would only be used if the GoPNG funds were used for project expenses rather than expenditure through the Designated Account (DA). Special commitments may be needed if goods are purchased from overseas. Documentation of eligible expenditures will be against Statements of Expenditure. Required supporting documentation for disbursements will be outlined in the Disbursement and Financial Information Letter (DFIL).

23. **Designated Account.** The PFMA and FMMs allow for donor-sourced funds for projects to be held in separate trust accounts. One separate pooled DA will be required in the IA, DoWH, for receipts of funds from IBRD loan, IDA credit, and PNGSP MDTF grant only. The currency of the DA would be Papua New Guinean kina. At present, a single central treasury account is not being used for donor projects. Should donor projects be moved to a single central treasury account, although there may be one physical bank account, there will need to be general ledger sub-codes for each IA and project to ensure the segregation of funds. The ceiling for the DA will be specified in the DFIL and be set to enable enough cash flow to cover three to four months of project operations expected to be financed through the funds in the DA. The project is to be jointly financed by IBRD loan, IDA credit, and PNGSP MDTF grant. Given the earlier closing

date of the PNGSP MDTF grant, to the extent practical, disbursing the proceeds from the PNGSP MDTF grant needs to be prioritized.

Table 1.1. Eligible Expenditures

Category	Amount of the IBRD Allocated (expressed in US$)	Percentage of Expenditures to Be Financed (inclusive of taxes)	Amount of the IDA Allocated (expressed in US$)	Amount of the IDA Allocated (expressed in SDR)	Percentage of Expenditures to be Financed (inclusive of taxes)	Amount of the TF0B8358 Allocated (expressed in US$)	Amount of the TF0B8359 Allocated (expressed in US$)	Percentage of Expenditures to Be Financed (inclusive of taxes)
(1) Civil works	44,875,000	100	38,000,000	27,500,000	100	7,196,900	5,850,000	100
(2) Goods, non-consulting services, consulting services, and Training and Workshops for the Project	5,000,000	100	4,500,000	3,300,000	100	1,000,000	1,000,000	100
(3) Contingent Emergency Response Component (CERC).	0	100	0		100	Not applicable	Not applicable	Not applicable
(4) Front end fee	125,000	100	Not applicable	Not applicable		Not applicable	Not applicable	
(5) Interest cap/collar	0		Not applicable	Not applicable		Not applicable	Not applicable	
Total amount	50,000,000		42,500,000	30,800,000		8,196,900	6,850,000	

24. **Disbursement condition.** The IBRD Loan Agreement, IDA Financing Agreement, and Grant Agreement will include a disbursement condition requiring the Borrower/Recipient to engage the EPM in accordance with the terms of the legal agreements before making any withdrawals from Category 1 of the project financing (table 1.1).

Table 1.2. Funding Sources

Source	Amount (US$, millions)	Share of Total (%)	Component 1 (US$, millions)	Component 2 (US$, millions)
IBRD - Loan	50.00	46.5	45.00	5.00
IDA - Credit	42.50	39.5	38.00	4.50
PNGSP MDTF - Grant	15.05	14.0	13.05	2.00
Total	**107.55**	**100.0**	**96.05**	**11.50**

25. **Lapsed loans.** The use of advance method (and associated DA) will not be allowed under the project until the list of lapsed loans below is fully resolved:

(a) IDA Credit No. 4928 - Small and Medium Enterprise Access to Finance Project

(b) IDA Credit No. 6051 - PNG Tourism Sector Development Project

26. **Retroactive financing.** The Grant Agreement will include a provision for retroactive financing for an amount up to US$3,000,000 for payments made by the project against eligible expenditures incurred before the signing date of the Grant Agreement of the project, made on or after April 1, 2022. Other sources of financing will not provide for retroactive financing.

27. **Fast Disbursing Loan (FDL).** As part of disbursement arrangements where grants are expected to be utilized first, cumulative disbursements of the IBRD loan for the first two years from board approval are not expected to exceed 60% of the loan proceeds. Therefore, restrictions of FDL in terms of grace period and average repayment maturity do not apply to this IBRD loan under the project.

(ii) Procurement

28. **Institutional arrangement for procurement.** The IA will be responsible for ensuring the procurement requirements of all the components and subcomponents are met.

29. **Applicable Procurement Regulations.** Procurement for the RTP will be carried out in accordance with the World Bank Procurement Regulations for IPF Borrowers (Procurement Regulations), November 2020, and the provisions stipulated in the IDA Financing Agreement, IBRD Loan Agreement and Grant Agreement. For international competitive procurement activities based on method thresholds, the World Bank's Standard Procurement Documents shall be used.

30. **Procurement risk assessment.** A procurement risk assessment of the IA responsible for implementing the procurement activities under the project has been carried out and the overall procurement risk rating is Substantial.

31. **Procurement types.** Table 1.3 lists the various types of procurements to be undertaken by the project as well as indicative cost estimates.

Table 1.3. Procurement Methods and Estimated Costs

Type of Procurement
1. Works (US$96.05 million equivalent)
2. Goods (US$0.30 million equivalent)

3. Consulting services (US$11.20 million equivalent)

32. **Non-consulting services** will include engagement of a service provider to undertake topographical, geotechnical, and other surveys as needed to inform civil works and a firm to undertake the project assessment survey (baseline, annual, mid, and end).

33. **Procurement of goods** will include vehicles, office equipment, and digital tools for data collection and monitoring.

34. **Procurement of consulting services (firms and individuals).** Details of all the proposed consulting services will be in the PPSD and related Procurement Plan. They will include the engagement of an EPM as well as various individual consultants to support project implementation or other technical areas.

35. **Advance contracting.** Provision for advance contracting and retroactive financing will be included for the project and detailed in the PPSD.

36. **Frequency of procurement supervision**. In addition to the prior review to be carried out by the World Bank, implementation support missions will be undertaken at least once per year. One in five procurement packages not subject to World Bank prior review will be examined ex post on an annual basis.

37. **Procurement Plan.** A project Procurement Plan has been prepared covering the planned procurement activities for the first 18 months of project implementation. The procurement arrangements for the key procurement activities under the project are detailed in the PPSD. A Procurement Plan for the PPG has also been approved and includes all the planned and approved preparatory procurement activities.

38. **Systematic Tracking of Exchanges in Procurement.** Use of the World Bank's STEP system will be mandatory under the RTP. This system is currently being used on RMRPII and other projects in PNG. Regular virtual STEP training is being conducted given COVID-19 restrictions on travel. Face-to-face training will resume when it is safe to do so.

(iii) Strategy and Approach for Implementation Support

39. The Implementation Support Plan is based on experience and lessons learned from other road sector projects in PNG as well as the project's risk profile. The approach is to provide ongoing and regular implementation support.

40. Each implementation review mission will result in the production of an Aide Memoire that will be discussed at a wrap-up meeting to be chaired by the Department of Planning. It is envisaged that the Aide Memoire will provide an overall view of the current situation relating to project implementation, including findings and observations from the World Bank. Representatives from the relevant GoPNG agencies will be invited to attend the kick-off, wrap-up, and technical meetings. Furthermore, any adjustment requiring more frequent reviews will be discussed, agreed upon, and documented in the Aide Memoire.

41. A midterm review mission will be held not later than four years after the effective date of the project or such other period as may be agreed with the World Bank. It is envisaged that the midterm

review will be conducted at either the halfway point of the project period or when the funds are 50 percent disbursed and provides an opportunity to review the project and take stock of implementation progress. Following the midterm review, adjustments to project support may be required, including a project restructuring and/or possible additional financing from any other sources based on the implementation experience. The World Bank will work with the Department of Finance and DoWH to clarify the requirements necessary to effect any changes. Any changes to the project that require amendments to the IDA Financing Agreement, IBRD Loan Agreement and Grant Agreement will mandate a formal request from the Government's signatory to the Agreements.

42. Six months before the closing date of the project, the Government will commence the preparation of its Implementation Completion and Results Report (ICR). The World Bank ICR author will participate in the final implementation review and will gather the necessary information to help prepare the ICR.

43. Missions to support implementation for the RTP will be carried out every 3–6 months, either in country or virtually. At least once per year, the missions will include technical, fiduciary, and safeguards team members, who will provide input into infrastructure design and construction, carry out post reviews on contract management, review safeguards compliance, and provide formal training where required. The implementation support plan will be reviewed annually to ensure that it meets the support needs of the project. The estimated level of annual support needed to implement the RTP is outlined in table 1.4.

Table 1.4. Project Support Plan

Time	Focus	Skills Needed
First 12 months	Project launch and start-up	• Task Team Leader • Co-Task Team Leader • Operations Officer • Project Engineer • OPBRC Specialist • Procurement Specialist • FM Specialist • Environment Safeguards Specialist • Social Safeguards Specialist • Road Safety Specialist • Administrative Support • Gender Specialist
12–60 months	Project implementation	• Task Team Leader • Co-Task Team Leader • Operations Officer • Project Engineer • OPBRC Specialist • Procurement Specialist • FM Specialist • Environment Safeguards Specialist • Social Safeguards Specialist • Road Safety Specialist • Administrative Support • Gender Specialist

Table 1.5. Skills Mix Required for Each Year of Project Implementation

Skills Needed	Number of Staff Weeks per Year	Number of Trips per Year
Task Team Leader	10	3
Co-Task Team Leader	4	3
Operations Officer	4	On ground
Project Engineer	4	3
OPBRC Specialist	2	1
Procurement Specialist	3	2
FM Specialist	3	2
Environment Safeguard Specialist	3	2
Social Safeguards Specialist	3	2
Road Safety Specialist	3	1
Gender Specialist	3	1
Administrative Support	3	0

ANNEX 2: Detailed Project Description

COUNTRY: Papua New Guinea
Papua New Guinea Resilient Transport Project

1. **Project scope.** The RTP is a continuation of RMRPII—the ongoing World Bank project—and its predecessor, RMRP, which have funded road maintenance and rehabilitation in 10 coastal and island provinces, including Madang and Morobe provinces in the Momase region (served by the Ramu Highway) and Gulf, Central, and Milne Bay provinces in the Southern region. The project will improve the short- and medium-term condition of the 175 km Ramu Highway and will extend the successful rehabilitation and performance-based maintenance program already running since 2017 on the Hiritano Highway to approximately 150 km, equivalent to 50 percent of the total length of the highway. The project with include three components.

Component 1: Resilience, Safety Enhancements, and Sustainable Maintenance (US$96.05 million)

2. **Subcomponent 1.1: Ramu Highway (US$72.05 million).** GoPNG has designated the Ramu Highway, located in Madang and Morobe provinces, as the primary focus of the World Bank's investment under this proposed project. This highway is a critically important land transport route in PNG and is one of the 'Core Priority Roads' identified in the 2018 NRNS. The Ramu Highway forms the primary link between Madang and Lae city ports and helps connect those cities to the Highlands and Sepik provinces. The highway supports important mining and agro-industrial activities in the region, specifically, beef, sugar, and palm oil production. The current poor condition of the highway restricts businesses in moving products, as some of its sections are not always usable by heavy vehicles. Road conditions are so poor that businesses in the Ramu and Markham regions generally prefer to ship produce to Madang through Lae Port to avoid the significant risks involved with transportation via the Ramu Ranges section of the highway and thereby incur higher transportation costs. The Ramu Highway, in particular the Ramu Range Section, is vulnerable to natural disasters such as flood and landslide due to heavy rains,

3. The project will focus primarily on improving and sustainably maintaining the Ramu Highway. Other donors have recently been or are currently working with DoWH on several sections of the Ramu Highway—notably DFAT through the TSSPII funding of two long-term maintenance contracts and the ADB/European Union constructing six new major bridges along the highway. The World Bank support would complement this donor assistance and help complete unfunded crucial rehabilitation works on this highway and fund performance-based maintenance activities over a three- to four-year timeframe.

4. The project will finance two contracts on the Ramu Highway: (a) a traditional input-based works contract for the reconstruction of approximately 40 km of the road in the Ramu Ranges section, with an extended defects liability/maintenance period and (b) a hybrid OPBRC comprising initial repairs/improvement works on the valley and coastal sections, including some rehabilitation of sections in poor condition, followed by output- and performance-based maintenance over the combined length of these two sections—approximately 135 km. This contract will also include a provision for emergency repairs following extreme events. These sustained improvements will leverage the Government's significant investment in the Highlands Highway and the DFAT-financed existing rehabilitation works

under the TSSPII, which when completed will create a rehabilitated road corridor from the Coastal Highway north of Madang to the Highlands Highway.

5. The treatment of the highway can be considered through four sections as shown in table 2.1.

Table 2.1. Potential Treatment Options for Ramu Highway

Section		Approx. Length (km)	Topography	General condition	Land use	Possible Treatment
1	Waterais Junction / Yokia Bridge	62	Ramu valley – flat	Fair to good	Commercial agriculture (oil palm / sugar / cattle)	Repair and maintain
2	Yokia Bridge / Usino Junction	40	Ramu valley - flat	Poor / fair to good	Grassland	Repair / rehab and maintain
3	Usino Junction / Tapo Ford (Ramu Ranges section)_	45	Ramu Ranges - rugged	Very poor to fair	Grassland / forest	Reconstruct and maintain
4	Tapo Ford / Madang	29	Coastal plain - undulating	Fair to good	Cultivated	Repair and maintain

6. Based on an initial review of two previous studies,[56] and discussions with DoWH and TSSPII technical staff, an estimated total of US$72.05 million would be required to cover the following:

- Slope stabilization, repair, rehabilitation, reconstruction of critical sections of the Ramu Ranges section of the highway (see Section 3 in table 2.1), followed by extended defects liability/maintenance until project close
- Initial repairs, rehabilitation of the remaining length (Sections 1, 2, and 4 in table 2.1) followed by performance-based routine and periodic maintenance over a nominal three-year period until project close.

7. These interventions are intended to bring the entire Ramu Highway into a maintainable status. However, this preliminary estimate will be subject to a more detailed review of costs and appropriate level of treatment following the mobile mapping surveys, initial field investigations, and detailed design of the Ranges works, set to be undertaken during project preparation.

8. The two studies referenced above highlight the problems on the Ramu Ranges section: (a) unstable slopes causing frequent and slow-moving landslips, (b) steep gradients requiring vertical realignment and/or climbing lanes, (c) the slurry pipeline which runs adjacent to the road (see para 11), and (d) numerous drainage-related issues. These issues, which are also related to climate change effects, will be carefully assessed during the engineering fieldwork and design stage to ensure that appropriate measures (such as the development and/or application of climate-resilient norms) are included in the design of works.

9. The PPG is funding two support activities to the Ramu Highway subcomponent: (a) a mobile

[56] Ramu Highway Study Report Vols I–IV, RMJV, Dec 2015. Pre-feasibility Design Report, Cardno/SMEC, Dec 2017.

mapping/survey assignment that will provide a detailed digital terrain model over the full length of the road, to support the design of road improvements, slope stability, and drainage and (b) a fieldworks and detailed design consultancy. The fieldworks and design consultancy will initially—over a period of eight months—undertake a number of technical investigations, surveys, and studies on the existing road, culminating in a pavement assessment and improvement strategy. The outcome of this strategy, to be reviewed and cleared by DoWH and the World Bank, will determine the way forward for design and construction of improvements, particularly the complex geological and potentially unstable areas of the Ramu Ranges section, which might not be appropriate for a DBM framework.

10. **Slurry pipeline running adjacent to road in Ranges section.** The slurry pipeline, which runs from the Ramu nickel-cobalt mine at Usino to the refinery at the coast, closely follows the road alignment for up to 50 km in Sections 3 and 4. The pipeline is laid partly above ground, crosses under the road in several places, and has been affected by ground movements. The pipeline represents an environmental risk and liability if it is damaged through construction works, with potentially severe consequences including the contamination of surrounding soils and watercourses as well as commercial compensation claims for losses from the pipeline owners and operators. The Ranges design consultant will be required to prepare a hazard assessment and pipeline management plan using the following outputs:

- Topographic survey, road inventory, and physical inspections to identify the location and condition of the existing pipeline infrastructure (that is, pipe. support structures, and pump stations)
- Plans and cross-sections of the improved road profile to identify the limit of works, and where the roadworks will affect the pipeline infrastructure
- Consultations with the pipeline owners and operators.

11. The hazard assessment will identify the most likely risks of damage to the pipeline and how these can be mitigated through design changes and/or through preventative measures during construction. Based on the outcome of the assessment, the consultant will prepare a pipeline management plan and a pipeline rupture contingency plan to be implemented during construction works.

12. **Subcomponent 1.2: Hiritano Highway (US$22.0 million).** The proposed project will finance the rehabilitation of the heavily trafficked 22.5 km section between Laloki River (on the boundary of the National Capital District) and Brown River in Central Province under a DBM contract. The design and construction are expected to take approximately 30 months after project effectiveness, leaving an approximately four-year extended maintenance period.

13. The Laloki to Brown River section of the Hiritano Highway carries a high volume and percentage of fully loaded and overloaded trucks, mostly carrying quarried or river-extracted materials back to Port Moresby, resulting in the road generally being in poor condition. The pavement design will need to accommodate the high axle load, but it will also be necessary to introduce some effective form of axle load enforcement to prevent overloading, which causes exponentially high damage to the road surface and pavement.

14. This section of the Hiritano Highway lies 20–30 km from the coast, running through undulating terrain, and is mostly at an elevation of 30–40 m above sea level. The design of the reconstruction works

will include a strong emphasis on improving the resilience of the entire road profile of this section of the highway. This will include raising the road embankment in low-lying and flood-prone areas; sealing shoulders; taking measures to improve the slope stability of embankments and cuttings to prevent landslips; increasing the size of longitudinal and cross-drainage to prevent local flooding by accommodating increased frequency, intensity, and duration of storms in the design parameters; and providing subsoil drainage in cuttings and areas with a high water table, to increase pavement resilience.

15. The topographic survey of this section would be undertaken through the same mobile mapping contract as for the Ramu Ranges, yet to be procured under the PPG. Combining these services offers the most economical and timely opportunity to provide the DBM contractor with a complete and accurate digital terrain model for detailed design.

16. Implementation of the current World Bank-funded RMRPII will end in April 2023. The project currently includes two works contracts for the Hiritano Highway: the upgrade to seal from Epo to Kerema (10 km) in Gulf province and the performance-based maintenance from Brown River to Bereina (126 km) in Central province. It is anticipated that additional financing opportunities will enable renewal of performance-based maintenance of Brown River/Bereina once the current RMRPII contract expires, thereby bringing the total length to 150 km, or approximately half the 300 km long highway, under a performance-based maintenance regime. The longer-term objective is for the entire length of the Hiritano Highway to be improved in stages and maintained under a similar hybrid OPBRC.

17. **Subcomponent 1.3: Road Safety and Community Facilities (US$2.0 million).** This will finance construction and improvement of safety and community facilities along the sections of the Ramu and Hiritano Highways being repaired/reconstructed/rehabilitated under Subcomponents 1.1 and 1.2. These activities will be included within the scope of the contracts for Subcomponents 1.1 and 1.2 and will not be separate contracts. The road safety risk of both highways will be assessed for different road users based on the iRAP data collection, and the project will fund countermeasures to reduce road traffic crash injuries and fatalities on the Ramu and Hiritano Highways.

18. The project will also contribute to improving the quality and safety of pedestrian facilities along both the roads and bridges and implement targeted traffic safety campaigns and awareness measures, prioritizing the needs of women traders working in roadside markets and school children who use the roads as pedestrians. As part of broader COVID-19 protection measures, opportunities will be identified to install WASH facilities whose broad health and hygiene impacts support the 'Nuipela Pasin'[57] measures to increase basic hygiene and reduce risk of COVID 19 and other infectious diseases. Community facilities will be identified and developed through collaboration with affected beneficiaries.

19. **Component 2: Project Management and Institutional Strengthening (US$11.5 million).** This component will finance (a) employment of a consulting firm to operate as EPM within DoWH and other project implementation support consultants and completion of any PPG activities that remain incomplete following expiry of the PPG; (b) a road safety capacity assessment and related technical assistance; and (c) a range of institutional strengthening initiatives to support management and technical skills development in the road sector.

[57] The 'New Normal' in Papua New Guinea.

20. **Subcomponent 2.1: Project Management (US$8.5 million).** It will support DoWH in all aspects of project implementation. It will finance the EPM which will support DoWH with all aspects of project implementation, including highway engineering and project management, procurement, FM, works contract supervision and monitoring, contract management, environmental and social (safeguards), and gender. In addition to implementation support, the EPM bidding documents will require bidders to outline a proposed approach to skills transfer and capacity building to DoWH. Once mobilized, the EPM will prepare a skill transfer and capacity building plan to support this function for formal agreement with DoWH.

21. This subcomponent will also finance the following additional project implementation support (which will be undertaken separately from the EPM contract): (a) consultant services for preparation of the proposed road contracts—including digital terrain modelling, traffic surveys, geotechnical and road condition surveys of the Hiritano and Ramu Highways—preparation of bid documents, and other technical support to augment DoWH,[58] including completion of PPG-funded activities that are pending following expiry of the PPG; (b) training for GoPNG staff, contractors, and other stakeholders; and (c) other technical assistance supporting project implementation.

22. **Employer's Project Manager.** It is proposed to continue the project management approach that has been successfully used for the implementation of RMRP and RMRPII over the last two decades. An EPM team would be employed through a consulting firm and will comprise a full-time Senior Road Engineer with extensive experience in PNG and World Bank-funded projects as the PM. The PM will be assisted by a full-time Senior Engineer, full-time OPBRC Engineer, full-time FM Specialist, full-time Procurement Specialist, part-time Environmental and Social Safeguards Specialists, part-time M&E Specialist, and provincially based supervision and/or contract management engineers to oversee the design and construction of improvements on the Ramu and Hiritano Highways. It is expected that the PM and team will be based at DoWH headquarters in Port Moresby. The Safeguards Specialists will be primarily based in Madang.

23. The EPM will work closely with the DoWH headquarters and Provincial Works Manager staff to carry out their duties required during project implementation—preparing terms of reference for consultancies and designs, specifications, drawings, and BoQs as required for works contracts involving improvements and/or maintenance. However, the EPM will primarily be responsible for actively managing all contracts—consultancies and construction—on behalf of DoWH. The EPM will be expected to provide at least two full-time engineering supervisors to work with the locally recruited supervision engineers and DoWH Provincial Works Manager staff to oversee the works and administer works/maintenance contracts.

24. The project may also finance other project management support consultants, such as a Road Safety Specialist or other specialists to support DoWH and EPM technical capacity in specific areas.

25. **Ramu Ranges detailed design preparation.** This subcomponent will also finance the preparation of the detailed design and bid documentation of the Ramu Ranges slope stabilization/rehabilitation works that might remain outstanding at the expiry of the PPG in December 2022 due to any delays. The contract

[58] This may include a road safety consultant, environmental and social specialists, or other consulting services to support DoWH with implementation of the project.

would be extended to cover any outstanding design and documentation activities.

26. **Specialist advisers.** As part of the PPG activities, GoPNG is hiring additional experts: a short-term Program Implementation Support Adviser, who will advise and support DoWH in preparing the RTP; a short-term OPBRC Specialist who is expected to have oversight in preparing and implementing the proposed OPBRC for the Ramu Highway and the DBM contract for the Hiritano Highway; and an Environmental Specialist and a Social Specialist, both of whom will support in finalizing the ESIAs and other preparation requirements. All four of these advisers will be based in Port Moresby, in DoWH headquarters, and will be expected to travel to the Central province and Madang when requested. The consultants will work in close collaboration with the DoWH World Bank Projects Coordination Branch and other branches. They will report to the World Bank Project Coordination Director, DoWH. These specialist advisers may continue as technical support under Subcomponent 2.1 after effectiveness.

27. **Preparation of Ramu hybrid OPBRC and Hiritano DBM contract.** This subcomponent will finance the preparation activities required for the proposed hybrid OPBRC for the Ramu Highway and the proposed DBM contract for the Hiritano Highway. This will involve traffic surveys and geotechnical/condition surveys of the Hiritano (the Ramu surveys are being undertaken separately under the PPG), followed by preparation of bid documentation for both contracts. It will also include the development and execution of a training program for local contractors and DoWH, for staff to get familiar with the roles, responsibilities, and risks associated with DBM and OPBRC contracting. The preparation activities will be carried out by individual specialist consultants, including the OPBRC Specialist through an extension of the initial PPG-funded contract, and supported by DoWH staff and local contractors to undertake the fieldwork as required.

28. **Subcomponent 2.2: Road Safety (US$1.0 million).** This will support a road safety management capacity review to map the road safety situation, identify key stakeholders, propose actions to improve road safety outcomes in the country, and establish a road safety reform agenda and time-bound action plan to be endorsed by GoPNG. Activities under the safe system approach will be further developed during project implementation after the completion of the capacity review.

29. **Subcomponent 2.3: Technical Assistance and Training (US$2.0 million).** This will finance technical assistance and training to support implementation of the institutional reforms and other emerging challenges in the road sector. Procedures for finalizing the scope of these activities will be outlined in the POM and therefore subject to review and agreement by the World Bank. This will include the following:

(a) **Institutional strengthening.** For more than a decade, several donors have supported GoPNG on the issues affecting the management of national roads and the underlying institutional and funding constraints. Proposed support to GoPNG to implement the sector reform agenda embodied in *Road (Fund and Management) Act 2020* must be closely coordinated with other donors and aligned with the rapidly evolving institutional reforms. While the current Government has begun to implement proposed reforms, changes could emerge after the 2022 election. Support for the institutional reforms embodied in *the Road (Fund and Management) Act 2020* and the NRNS will therefore need to be further discussed with DoWH and development partners and finalized during the first 12 months of project implementation. The final scope will complement activities being carried out through the

DFAT-financed TSSP II. This may include (i) technical and advisory support for adoption of long-term, performance-based road maintenance contracting and quality control/quality assurance; (ii) enhancement of the RAMS established in DoWH; and/or (iii) capacity building to the Road Fund.

(b) **Hybrid OPBRC bid documents for future works.** The project will finance preparation of a hybrid OPBRC for the preservation and maintenance of the entire Hiritano Highway corridor and/or other national roads. The choice of roads and contracting approaches will be in alignment with the institutional reforms and NRNS and undertaken in collaboration with GoPNG and development partners. Preparation of bid documents will support long-term maintenance contracting of high priority national roads in alignment with future funding scenarios as the reform processes continue to develop. The project does not plan to finance any downstream activities of the OPBRC prepared under this activity.

(c) **Technical Advisory Assistance and Training.** The project will support additional priority technical assistance and training for GoPNG staff in relevant and emerging topics such as advisory support for strengthening climate, natural hazard, environmental, and social risk management. The final scope and timing of these activities will be determined in coordination with DoWH and development partners during the first 12 months of project implementation.

30. **Component 3: Contingent Emergency Response Component (CERC, US$0.00).** This component is designed to provide swift response in the event of an eligible crisis or emergency,[59] by enabling GoPNG to request the World Bank to reallocate project funds to support emergency response and reconstruction. Like other Pacific Island Countries, PNG remains vulnerable to climate change and severe weather events. Therefore, this component would help in financing activities that will enhance long-term strategic planning, as needed, and reduce the impacts of future extreme events.

Table 2.2. Estimated Project Costs (US$, millions)

	Component	Cost
1	**Resilience, Safety Enhancements, and Sustainable Maintenance**	**96.05**
1.1	Ramu Highway - 175 km (Rehabilitation and maintenance)	72.05
1.2	Hiritano Highway – 22.5 km (Rehabilitation)	**22**.00
1.3	Road Safety and Community Facilities	2.00
2	**Project Management and Institutional Strengthening**	**11.50**
2.1	Project Management	8.50
2.2	Road Safety	1.00
2.3	Technical Assistance and Training	2.00
3	**Contingent Emergency Response Component (CERC)**	**—**
	Total	**107.55**

[59] Defined as "an event that has caused, or is likely to imminently cause, a major adverse economic and/or social impact associated with natural or man-made crises or disasters," Bank Guidance – Contingent Emergency Response Components

ANNEX 3: Economic Analysis

COUNTRY: Papua New Guinea
Papua New Guinea Resilient Transport Project

1. **Economic analysis was conducted based on a standard methodology applied for appraisal of road works, which demonstrates the overall EIRR of 18.8 percent and NPV of US$120.5 million.** The economic evaluation focuses on Component 1: Resilience, Safety Enhancements, and Sustainable Maintenance. For the Ramu Highway, the analysis focuses on OPBRC of approximately 175 km of the Ramu Highway, from Waterais junction in Morobe province to Madang airport junction in Madang province, including the reconstruction of 40 km section. For the Hiritano Highway, the analysis focuses on the rehabilitation of the heavily trafficked 22.5km section between Laloki River and Brown River under a DBM contract. The discount rate is assumed to be 7 percent[60] and the standard conversion factor to be 0.85. The CBA was conducted to calculate the EIRR and NPV of the project covering the period of 20 years (2022–2041).

A. Economic Evaluation Assumptions

2. The general information on road characteristics and the assumption on traffic are presented in table 3.1. The estimated unit costs for the output- and performance-based maintenance is approximately US$150,000 per km and for the reconstruction is around US$900,000–US$1,350,000 per km. The traffic growth is assumed to be 10 percent per year in 2022 and gradually decreases over time. The generated traffic is assumed to be 7 percent for all sections except for Ramu Section 3. Induced traffic for Ramu Section 3 is assumed to be 20 percent as the project interventions are expected to attract more traffic to this section.

Table 3.1. Basic Assumptions on Road and Traffic Characteristics

Road	Location	Length (km)	Treatment	General Condition	AADT (2021 est.)
Ramu Section 1	Waterais Junction/Yokia Bridge	60	Maintain	Fair to good	600
Ramu Section 2	Yokia Bridge/Usino Junction	45	Maintain	Fair to good	600
Ramu Section 3	Usino Junction/Tapo Ford	40	Reconstruct	Poor to fair	700
Ramu Section 4	Tapo Ford/Madang	30	Maintain	Fair to good	1,400
Hiritano	Brown River/Bereina	24	Reconstruct	Poor to fair	2,000

Note: AADT = Average annual daily traffic.

3. Key economic benefits of the project mainly arise from (a) reduced VOCs due to improved road condition, (b) travel time savings, and (c) improved road safety. The analysis utilizes an HDM-4 (based on latest data from the World Bank project in PNG) to calculate the VOCs (including fuel consumptions) under different levels of road condition to determine VOC savings. Table 3.2 shows the assumptions on vehicle fleet economic unit costs and characteristics used under the HDM-4 to calculate the average VOC. The time savings are calculated from improving average speed (from approximately 60 km/hour to around 75

[60] Based on the 3.5 percent growth rate for GDP per capita and the World Bank guidance note (2016), *Discounting Costs and Benefits in Economic Analysis of World Bank Projects*.

km/hour for the improvement to good condition, and from approximately 30 km/hour to around 50 km/hour for the improvement to fair condition). The analysis also utilizes the World Bank's RSSAT to estimate the road safety benefits (or costs) during the road's life cycle of 20 years.

Table 3.2. Vehicle Fleet Economic Unit Costs, and Characteristics

	Car	Pickup	Truck Light	Truck Medium	Truck Heavy	Truck Articulated	Bus
New vehicle cost (US$)	21,689	34,949	36,020	125,729	217,477	230,552	37,170
New tire cost (US$)	66	181	181	236	252	324	99
Fuel cost (US$/liter)	0.87	0.86	0.86	0.86	0.86	0.86	0.86
Lubricant cost (US$/liter)	5.01	6.71	6.71	6.71	6.71	6.71	5.86
Maintenance cost (US$/hour)	2.85	2.85	2.85	4.03	4.03	4.03	2.85
Crew cost (US$/hour)	0.00	2.28	2.85	2.85	4.03	8.05	3.36
Interest rate (%)	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Work time (US$/hour)	1.24	1.24	0.17	0.17	0.17	0.17	0.17
Annual utilization (km)	18,000	30,000	45,000	55,000	65,000	65,000	45,000
Annual utilization (hours)	750	1,400	1,900	2,750	3,250	3,250	1,900
Service life (years)	10	10	5	6	10	10	6
Passengers (#)	3	3	1	1	1	1	19
Operating weight (tons)	1.1	2.6	7.8	15	20	45	6.5
Traffic composition (%)	21	15	4	9	6	3	42

B. Economic Evaluation Results

4. Based on the CBA, the investment on the improvement and sustainable maintenance of the Ramu and Hiritano Highways (Component 1) yields EIRR of 25.2 percent and 29.2 percent, respectively, and NPVs of US$186.9 and US$72.9 million, respectively. The sensitivity of the EIRR was also tested against three cost variation scenarios and their combinations, which has confirmed the robustness of economic returns. The results of the sensitivity analysis are illustrated in table 3.3.

Table 3.3. CBA Results and Sensitivity Analysis

Scenarios	EIRR (%)	NPV (US$, millions)	B/C Ratio
Base case	26.4	259.9	4.6
Ramu Highway: Section 1	49.9	81.1	13.1
Ramu Highway: Section 2	37.2	34.9	8.0
Ramu Highway: Section 3	13.8	35.5	1.9
Ramu Highway: Section 4	46.5	35.4	11.6
Ramu Highway (all sections)	25.5	186.9	4.4
Hiritano Highway	29.2	72.9	5.5
Investment cost increases by 20%	23.5	245.6	3.9
Benefits are 20% lower than expected	22.8	193.7	3.7
Both investment costs increase by 20% and benefits are 20% lower than expected	20.2	179.4	3.1

5. The project is generally robust to the large degree of variations of benefits and cost. The switching values[61] in table 3.4 illustrate the degree of variation which would cause respective NPVs to reduce to zero. For example, if the total cost of Ramu Highway: Section 3 increases by 75 percent or if the VOC saving benefit is reduced by 70 percent, its NPV will be reduced to zero. And if each of the three benefits for Ramu Highway: Section 3 are 47 percent lower at the same time, its NPV will also be reduced to zero.

Table 3.4. Switching Values for the Benefits and Costs (%)

Road Sections	VOC Saving Benefit	Time Saving Benefit	Road Safety Benefit	Total Benefit	Total Cost
Ramu Highway: Section 1	−143	-552	−492	−92	1,213
Ramu Highway: Section 2	−165	−634	−265	−87	696
Ramu Highway: Section 3	−76	−141	−967	−47	88
Ramu Highway: Section 4	−-161	−663	−311	−91	1,058
Ramu Highway (all sections)	−128	−368	−418	−77	339
Hiritano Highway	−102	−465	−3877	−82	454
Total Project	**−119**	**−391**	**−557**	**−78**	**365**

C. GHG Accounting

6. **GHG emissions.** An analysis of GHG emissions was undertaken based on fuel consumption rate at different speeds under with-project and without-project scenarios. Without the project, the road's deteriorated condition limits vehicle speed and leads to higher fuel consumption per vehicle-km compared to the with-project scenario where improved road condition leads to improved speed and hence lower fuel consumption. Gross GHG emission under the with-project scenario is estimated to be 2,016,886 tCO_2e. Total net GHG emission is estimated to be −71,269 tCO_2e—a net reduction over the evaluation period (20 years). The annual average net GHG emission is −3,563 tCO_2e/year. The social benefit from GHG reduction is estimated to be US$4.1 million, based on social cost of emission reduction from the World Bank's Guidance Note on Shadow Price of Carbon in Economic Analysis (2017).

[61] The switching value is the percentage change in a benefit (or cost) element, which results in NPV = 0.

ANNEX 4: Gender Assessment

COUNTRY: Papua New Guinea
Papua New Guinea Resilient Transport Project

Country Context

1. As of 2019, PNG has a Gender Inequality Index value of 0.725 and ranks 161 out of 162 countries.[62] Although PNG women play an essential role in conflict prevention, peacebuilding, health, and development, they remain severely underrepresented in education, the formal labor market, and governance and decision-making. PNG's national parliament is among only five countries in the world with no female Members of Parliament.[63] Gender constraints such as culturally embedded patriarchal norms prevent women from participating in political life. Other decision-making structures, including those in customary, religious, and private spheres, are also male dominated.[64] Additionally, only 10 percent of adult women have attained at least secondary education compared to 15 percent of their male counterparts. For every 100,000 live births, 145 women die from pregnancy-related causes, and the adolescent birth rate is 52.7 births per 1,000 women ages 15 to 19.[62]

2. Women play a prominent but often undervalued role in agriculture and the rural economy of PNG, especially in subsistence farming and food production for household consumption. Although women's labor force participation rate is similar to that of men (47 percent compared to 48 percent for men),[65] men are almost twice more likely than women to hold a wage job in the formal sector, and women are three times more likely than men to work in the informal sector[66].

3. Women's access to knowledge and skills is limited, as gaps in education, literacy, skills, safety and security issues, and participation in training activities persist. Gender inequalities persist in tertiary and technical and vocational education and training: university enrollments comprise 61 percent men and 39 percent women, and sex segregation is evident with females being concentrated in the fields of education, nursing, and commerce.[67] Gender disparities in education contribute to gendered employment patterns and inequities in the formal sector because fewer women would qualify for formal or wage employment, particularly at skilled professional levels. Self-reported literacy also indicates a significant gender gap: 57 percent of women (as opposed to 69 percent of men) reported they can read and write.[68]

[62] UNDP. 2020. "Human Development Report 2020 - Briefing Note for Countries on the 2020 Human Development Report: Papua New Guinea." http://hdr.undp.org/sites/default/files/Country-Profiles/PNG.pdf.
[63] United Nations. 2019. *Annual Progress Report 2019*. United Nations in Papua New Guinea
[64] Pacific Women. 2017. "Experiences of Female Candidates in the 2017 Papua New Guinea General Election." Papua New Guinea. https://pacificwomen.org/research/experiences-female-candidates-2017-papua-new-guinea-general-election/.
[65] World Bank Development Indicators. 2021. "Labor Force, Female (% of total labor force) - Papua New Guinea."
[66] FAO. 2019. "Country Gender Assessment of Agriculture and the Rural Sector in Papua New Guinea."
[67] Office for Higher Education. 2009. "Papua New Guinea Higher Education Statistics." Commission for Higher Education, Port Moresby.
[68] National Statistical Office. 2012. "Papua New Guinea Household Income and Expenditure Survey 2009–2010: Summary Tables." Port Moresby.

Violence against Women

4. The 2009–2010 PNG Household Survey[69] reported that crime affects women's willingness to walk at night (54.9 percent), walk to work/garden (18.8 percent), use public transport (16.9 percent), and shop in the shops/market (15.9 percent). When asked about the crime that they are most afraid of, 31.9 percent of women reported sexual assault, which was also the most common response by them, followed by alcohol and drug-related crime (26.4 percent). UN Women reports 27.3 percent of women ages 20–24 were married or in a union before age 18. The PNG Demographic and Health Survey 2016–2018 found that 62.9 percent of ever-partnered women reported experiencing intimate partner violence at least once in their lifetime (physical or sexual).[70] In the Autonomous Region of Bougainville, 80.4 percent of ever-partnered men reported perpetrating physical and/or sexual partner violence in their lifetime.[71]

5. The COVID-19 pandemic has reduced women's access to income due to restrictions on movement. For example, women and men reported reduced access to markets for selling cash crops due to movement restrictions and that increased transport costs affected profit margins. Some women reported that they had stopped selling at markets due to restrictions or to prevent the spread of COVID-19.[72] Women and men in formal employment also reported salary reductions and job losses due to reduced working hours. Restrictions on movement and implementation of isolation and quarantine measures limited women's access to support and services related to GBV and sexual and reproductive health. For example, there was a reported 31 percent overall decrease in the number of clients accessing GBV services during the State of Emergency.[73] Indirect impacts of the pandemic, including economic hardship created by lockdown measures intended to stem spread of the virus, have fallen disproportionally on the most vulnerable and marginalized groups in society.

Policy and Legislative Context

6. PNG has made limited progress toward achieving the gender objectives defined in the Government's Vision 2050, the DSP 2010–2030, and MTDP III. These three overarching documents outline broad aspirations about gender equality but offer few concrete targets for mainstreaming gender issues across sectors and programs.

7. PNG is signatory to and has ratified a number of international conventions and treaties and regional policy frameworks on human rights and gender equality including the CEDAW, BPA (1995), and 2030 SDGs. However, translating these commitments into national policies, strategies, plans, and programs with adequate budgetary support has proved to be challenging. In 2013, PNG passed the FPA 2013, which created a new offense of domestic violence. This means that, depending on the severity of the offense, perpetrators could be charged under the FPA or the Criminal Code. The FPA also made protection orders more accessible for victims of family and sexual violence. In 2017, the Government

[69] National Statistical Office (NSO) (Papua New Guinea). 2010. "Papua New Guinea 2009-2010 Household Income and Expenditure Survey Summary Tables." NSO, Port Moresby, Papua New Guinea.
[70] National Statistical Office (NSO) [Papua New Guinea] and ICF. 2019. "Papua New Guinea Demographic and Health Survey 2016-18." NSO, Port Moresby, Papua New Guinea, and ICF, Rockville, Maryland, USA.
[71] Fulu, E., X. Warner, S. Miedema, R. Jewkes, T. Roselli, and J. Lang. 2013. *Why Do Some Men Use Violence Against Women and How Can We Prevent It? Summary Report of Quantitative Findings from the United Nations Multi-Country Study on Men and Violence in Asia and the Pacific.* Bangkok: UNDP, UNFPA, UN Women and UNV.
[72] Robinson, K., L. Magiar, and S. Ali. 2020. *PNG Rapid Gender Analysis COVID-19: November 2020.* Australia: CARE Australia.
[73] UN Women. 2020. *Gender Alert on COVID-19 in Papua New Guinea.* Port Moresby, Papua New Guinea: UN Women.

passed regulations to implement the law, but enforcement remains weak and inconsistent; police and prosecutors rarely pursued investigations or criminal charges against people who commit family violence.[74] In 2022, GoPNG amended the FPA to include clauses increasing the penalty for the offense of domestic violence and the offense of breach of Family Protection Order, introducing an offense of aggravated domestic violence which carries higher penalties than the offense of domestic violence, and introducing authorized persons who can issue Urgent Protection Orders (which last for up to 14 days).

8. GoPNG has introduced policies to promote gender equality including the Gender Equity and Social Inclusion policy, which aims to address gender inequalities and discrimination in central agencies and the public sector. The PNG National Strategy to Prevent and Respond to GBV 2016–2025 is a strategy to guide an inclusive Government-led approach to implement all legislation, policies, and programs. Despite these policies, sociocultural norms of both men and women remain barriers to women playing a greater role in leadership and decision-making. Other barriers include low education attainment and limited access to financial resources.

Gender Gaps Relevant to the Project

9. **Women in PNG have limited access to employment opportunities, including within the infrastructure and transport sectors.** Data from the 2010 Household Income and Expenditure Survey show that less than one-third of wage employees in PNG are women. Women's underrepresentation is even more prominent in the transport and infrastructure sectors, where they account for only about 12 percent and 9 percent of the workforces, respectively, and are almost completely absent from technical and field occupations. Consultations during project preparation revealed that while about 30 percent of employees in the Department of Transportation are women, they are mostly concentrated in office and support services roles. Moreover, there were no women in technical roles in the Department of Works in Madang, despite the fact that 25 of the department employees were women. Women were also underrepresented in field staff positions (traffic controllers and road maintenance)—less than 10 percent of workers, with no women working in road maintenance roles at all.

10. At the same time, women represent the majority of vendors at roadside markets across the country. A survey of roadside market sellers in Madang revealed that for women, selling their produce at roadside markets is an important source of income, often allowing them access to earnings higher than the average wage in the country.[75] At the same time, women face a number of constraints accessing these income sources, including poor transport and market infrastructure.[76] Lack of WASH facilities and lack of shelter have been identified as major issues by women informal vendors.[77] In addition, lack of reliable

[74] Human Rights Watch. 2019. *World Report 2019 – Papua New Guinea, Events of 2018*.
[75] Anderson, T. 2008. "Women Roadside Sellers in Madang." *Pacific Economic Bulletin* 23 (1): 59–73.
[76] Wang, Y. 2014. *Women's Market Participation and Potential for Business Advancement: A Case Study of Women Traders in Papua New Guinea*. National Research Institute of Papua New Guinea.
[77] Wang, Y. 2014. *Women's Market Participation and Potential for Business Advancement: A Case Study of Women Traders in Papua New Guinea*. National Research Institute of Papua New Guinea.

roadside lighting exacerbates risks of violence, especially later in the day when women are carrying cash from their earnings,[78] and could deter women from travelling after dark.

11. **Men and women make different use of the roads, with women predominantly using them as pedestrians, which heightens their vulnerability to unsafe infrastructure and traffic collisions.** The many narrow bridges present a particularly acute risk for slow-moving pedestrians, such as women loaded with heavy or bulky items, market items, or children. Women also tend to be more likely than men to use informal means of transportation where road safety issues are poorly addressed (that is, unsealed roads and tracks), and this can make their travel slower and more precarious. For example, inadequately cleared vegetation alongside highways further increases vulnerability, often forcing pedestrians to walk on roads with fast-moving traffic. Data from the 2011–2015 Road Safety Data Report in PNG show that two out of every five road fatalities are pedestrians.[79] At the same time, men represent 98 percent of drivers involved in fatal car accidents and the majority of road casualties overall. This is due to men's much higher likelihood to operate motor vehicles as well as their engagement in unsafe road practices, including drink-driving, speeding, and not wearing seat belts.[80]

Project Activities to Address Identified Gender Gaps

12. **The project will address the identified gaps in access to employment and safety through the following activities:**

- Explore opportunities to directly increase women's paid employment in the transport sector by enhancing women's participation in routine road maintenance. This may entail minimum employment provisions in bidding documentation, together with a requirement for the contractors to articulate a strategy/approach to ensure equality of employment opportunities for women.
- Identify and implement rehabilitation of priority infrastructure at key local roadside markets, and improve women's access to income-generating opportunities within project communities. Potential investments include improved WASH facilities under Subcomponent 1.3.
- Ensure participation of both men and women from the communities in consultation and planning stages of the project.
- Rehabilitate road infrastructure to accommodate safe pedestrian traffic, including footpaths and pedestrian crossings.

Monitoring and Evaluation

13. The following indicators in the Results Framework will monitor progress toward addressing the identified gaps:

- Share of workers engaged in road maintenance works who are women (percent): Baseline

[78] UN Women. 2014. "Ensuring Safe Public Transport for Women in Port Moresby."
[79] 2011–2015 National Road Safety Data Report. Papua New Guinea.
[80] 2011–2015 National Road Safety Data Report. Papua New Guinea.

0, Target: 15 percent; Training for women in performance-based road maintenance contract supervision (Hours): Baseline 0, Target: 240 hours; Wash facilities constructed at roadside locations: Baseline 0, Target: 8

- Pedestrian facilities constructed (Number): Baseline: 0, Target: 8.

ANNEX 5: Map

COUNTRY: Papua New Guinea
Papua New Guinea Resilient Transport Project