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Report No: PAD4770

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF EUR 97.7 MILLION
(US\$109 MILLION EQUIVALENT)

TO

GEORGIA

FOR A

KAKHETI CONNECTIVITY IMPROVEMENT PROJECT

March 1, 2022

Transport Global Practice
Europe and Central Asia Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective January 31, 2022)

Currency Unit = Georgian Lari (GEL)

GEL 3.3994 = EUR 1

GEL 3.0521 = US\$1

EUR 0.8961 = US\$1

FISCAL YEAR

January 1 - December 31

ABBREVIATIONS AND ACRONYMS

AADT	Average Annual Daily Traffic
COVID-19	Coronavirus Disease 2019
CPF	Country Partnership Framework
CSC	Construction Supervision Consultant
CTC	Trans-Caucasus Transit Corridor
DA	Designated Account
EaP	Eastern Partnership
EIA	Environment Impact Assessment
EIRR	Economic Internal Rate of Return
ENPV	Economic Net Present Value
ESCP	Environmental and Social Commitment Plan
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ETCIC	Eurasian Transport Corridor Investment Center
EU	European Union
EV	Electric Vehicle
EWI	East-West Highway
EWHIP	East-West Highway Improvement Project
EWHCIP	East-West Highway Corridor Improvement Project
E&S	Environmental and Social
FDI	Foreign Direct Investment
FM	Financial Management
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GoG	Government of Georgia
GRS	Grievance Redress Service
HDM-4	Highway Development and Management Model
IFI	International Financial Institution
IFR	Interim Financial Report



IPD	International Procurement Division
IPF	Investment Project Financing
iRAP	International Road Assessment Program
ITS	Intelligent Transport Systems
KCIP	Kakheti Connectivity Improvement Project
LMP	Labor Management Procedures
LPI	Logistics Performance Index
M&E	Monitoring and Evaluation
MoU	Memorandum of Understanding
MRDI	Ministry of Regional Development and Infrastructure
NBG	National Bank of Georgia
NDC	Nationally Determined Contribution
OHS	Occupational Health and Safety
OPRC	Output and Performance-based Road Contract
PDO	Project Development Objective
POM	Project Operations Manual
PPSD	Project Procurement Strategy for Development
PSI	Project Safety Impact
RAP	Resettlement Action Plan
RD	Roads Department of Georgia
SEAH	Sexual Exploitation, Abuse, and Harassment
SEP	Stakeholder Engagement Plan
SOE	Statement of Expenditures
SRAMP	Secondary Road Asset Management Project
STEP	Systematic Tracking of Exchanges in Procurement
TA	Technical Assistance
TEM	Trans-European Motorway
ToR	Terms of Reference
VOC	Vehicle Operating Cost
WB	World Bank

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DATASHEET

BASIC INFORMATION

Country(ies)	Project Name	
Georgia	Kakheti Connectivity Improvement Project	
Project ID	Financing Instrument	Environmental and Social Risk Classification
P173782	Investment Project Financing	Substantial

Financing & Implementation Modalities

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

Expected Approval Date	Expected Closing Date
25-Mar-2022	31-Dec-2027

Bank/IFC Collaboration

No

Proposed Development Objective(s)

The Project Development Objective (PDO) is to improve connectivity and safety of road transportation in the Kakheti region along the Sagarejo-Badiauri section of the Tbilisi-Bakurtsikhe-Lagodekhi highway.

Components

Component Name	Cost (US\$, millions)
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Connectivity Improvements on the Eastern Corridor	107.43
Development of a new local Marketplace	0.30
Institutional Strengthening and Implementation Support	1.00

Organizations

Borrower: Ministry of Finance

Implementing Agency: Roads Department of the Ministry of Regional Development and Infrastructure

PROJECT FINANCING DATA (US\$, Millions)**SUMMARY**

Total Project Cost	109.00
Total Financing	109.00
of which IBRD/IDA	109.00
Financing Gap	0.00

DETAILS**World Bank Group Financing**

International Bank for Reconstruction and Development (IBRD)	109.00
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Expected Disbursements (in US\$, Millions)

WB Fiscal Year	2022	2023	2024	2025	2026	2027	2028
Annual	0.00	20.00	20.00	20.00	20.00	29.00	0.00
Cumulative	0.00	20.00	40.00	60.00	80.00	109.00	109.00

INSTITUTIONAL DATA**Practice Area (Lead)**

Transport

Contributing Practice Areas

Agriculture and Food, Gender, Jobs, Social Sustainability and Inclusion



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	● Moderate
2. Macroeconomic	● Moderate
3. Sector Strategies and Policies	● Moderate
4. Technical Design of Project or Program	● Moderate
5. Institutional Capacity for Implementation and Sustainability	● Moderate
6. Fiduciary	● Moderate
7. Environment and Social	● Substantial
8. Stakeholders	● Moderate
9. Other	● Low
10. Overall	● Moderate

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	Not Currently Relevant
Cultural Heritage	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**

LA Schedule 2, Section I, A4 - To facilitate the carrying out of Component 2 of the Project, the Borrower shall, no later than 6 months after the Effective Date, unless otherwise agreed between the Bank and Borrower, through RD enter into appropriate institutional arrangements with relevant public entities or other entities, under terms and conditions satisfactory to the Bank.

Sections and Description

LA Schedule 2, Section I, B1 -The Borrower shall no later than 30 days after the Effective Date, unless otherwise agreed between the Bank and Borrower: (a) through RD adopt the Operational Manual (which includes the Financial Management Manual); and (b) ensure that ETCIC adopts the applicable sections of the Operational Manual (which includes the Financial Management Manual).



Conditions

Type	Financing source	Description
Effectiveness	IBRD/IDA	LA Article IV - The Additional Condition of Effectiveness consists of the following, namely that an Implementation Agreement has been executed by RD and ETCIC, in form and substance satisfactory to the Bank.



I. STRATEGIC CONTEXT

A. Country Context

1. **Georgia is an upper-middle-income country of 3.7 million people with a solid track record of economic growth and poverty reduction.** During the 10 years following the global economic crisis of 2009, through the end of 2019, economic growth averaged 5.3 percent per year in real terms. This was higher than that of any other upper-middle-income country in Europe¹ during the same period, except for Turkey (5.8 percent). In the process, aided by economic reforms and a system of targeted social transfers, the percentage of the Georgian population living with less than US\$3.2 per day in purchasing power parity terms fell by half, from 28.9 percent in 2009 to 14.9 percent in 2019. In 2019, growth accelerated to 5.0 percent—Georgia’s highest annual rate of economic growth since 2012—driven by domestic consumption, a reduced current account deficit with increased tourism revenues, and fiscal reforms. The unemployment rate at the end of 2019 reached 17.6 percent, its lowest level since 2007 and a marked improvement compared to rates above 27 percent in the early part of the decade. By the end of 2019, Georgia’s economy was considered to have one of the most favorable business climates globally, reflected in a 2010–2019 average annual rate of foreign direct investment (FDI) as a percentage of gross domestic product (GDP) of 8.9 percent, the second highest in upper-middle-income Europe over the same period, after Montenegro (11.7 percent).

2. **In 2020, the coronavirus disease 2019 (COVID-19) pandemic interrupted Georgia’s 10 consecutive years of economic growth and took a heavy toll, but a V-shaped recovery is under way.** The pandemic and associated disruptions in economic activity led to economic contraction of 6.8 percent in real terms in 2020, as the COVID-19 crisis added to an already challenging external environment. Meanwhile, the percentage of the population living with less than US\$3.2 per day in purchasing power parity terms increased for the first time since 2010 to 17 percent. The Government of Georgia (GoG) faced the crisis by providing, among other measures, substantial fiscal support—worth 7 percent of GDP in 2020–2021—to vulnerable households and businesses. While urgently needed, this increase in public spending nonetheless contributed to a deterioration of the fiscal deficit and level of public debt, which reached 9.7² and 62.5³ percent of GDP, respectively, in 2020. As part of this effort, the GoG borrowed approximately US\$1.5 billion from international financial institutions (IFIs) to help address the immediate health and social impacts of COVID-19 and support post-crisis recovery measures and broader development needs.⁴ Fiscal consolidation helped reduce the deficit in 2021, though it remains elevated at around 7.0 percent of GDP. Going forward, the fiscal gap is expected to narrow to an estimated 3.0 percent of GDP in 2023, roughly its 2019 pre-pandemic level and in line with the established fiscal rule. With stronger economic activity, growth rebounded to 10.6 percent in 2021 and is projected to stabilize at an average annual rate of 5.0 percent over 2022–2026. By year-end 2022, the US\$3.2-per-day poverty

¹ By the World Bank’s Country and Lending Groups classification.

<https://datahelpdesk.worldbank.org/knowledgebase/articles/906519>.

² Revenues exclude a decrease in non-financial assets, as per IMF Government Financial Statistics Manual (2014). Per government statistics, the deficit is 9.3 percent of GDP and proceeds from non-financial assets are above the line.

³ Public debt, including National Bank of Georgia’s (NBG) external debt (IMF financing). Government debt excluding NBG’s debt is 60.2 percent of GDP. In addition, for the purposes of the fiscal rule, public debt includes contingent liabilities from PPPs which were estimated at 0.8 percent of GDP in 2020 resulting in a total government debt of 61 percent of GDP.

⁴ About 60 percent of this reflects borrowing for infrastructure projects, with majority allocations to the roads sector (39 percent) and municipal infrastructure (19 percent).



rate is expected to fall to 12.2 percent—below pre-crisis levels—and to continue to fall in 2023 to 10.7 percent which, if achieved, would be the lowest rate since independence. Slow progress on vaccinations, a potential reintroduction of pandemic-related mobility restrictions, and renewed political tensions are the key downside risks to this outlook.⁵

3. **Georgia is increasingly exposed to the risks of climate change.** According to the 2021 Climate Risk Country Profile for Georgia,⁶ the country is expected to experience a greater incidence of floods and droughts. Specifically, large increases in the duration and magnitude of droughts are expected, with the likelihood of a 1-in-100-year drought projected to become between 5 and 10 times more common under a range of likely global warming trajectories. Similarly, while Georgia is already exposed to flooding risk (for example, a severe flooding event in Tbilisi in 2015 caused 19 fatalities and damages worth US\$29 million), floods are expected to generate average annual losses of US\$45 million in the future, with increased frequency primarily due to recession of the country's glaciers. It is estimated that riverine and coastal floods with a 1-in-10-year return period can potentially affect 5 percent of Georgia's GDP and 10 percent of Tbilisi's GDP. The level of the Black Sea on the Georgian coast rose by 0.7 m between 1956 and 2007, and the frequency of coastal storms increased by 50 percent over this period. Future sea level rise threatens the economically vital port cities of Batumi and Poti. These cities, which are already exposed to flooding, are expected to be affected by more frequent coastal storms in the future.

4. **Before the pandemic, Georgia faced the challenge of translating its successful adoption of business climate, fiscal, and other economic reforms into improved performance in long-term prosperity drivers like productivity growth, and the urgency of meeting this challenge will be even higher post-pandemic.** Few productivity-inducing sectors highlight Georgia's 'reformer versus performer' divide in starker terms than transport and logistics. International experience shows that improvements in transport and logistics, including connectivity improvements, facilitate export and productivity growth and help raise standards of living through enhanced access to markets and more equitable access to opportunities.⁷ Yet, Georgia's logistics performance is poor in both relative and absolute terms. Specifically, Georgia ranks 119 out of 160 countries—that is, within the bottom 26 percent—in the World Bank's Logistics Performance Index (LPI) standard. This is the lowest LPI rank of all European upper-middle-income countries. Domestically, rural areas continue to lag leading, largely urban, regions in terms of well-being outcomes like income and poverty rates, in part due to inadequate transportation infrastructure and services connections between leading and lagging regions. As a result, while Georgia has been successful in sustaining high levels of FDI compared to most of Europe, this has led over time neither to meaningful gains in export performance—Georgia runs a sizable current account deficit, which averaged 9.4 percent of GDP annually during 2010–2019—nor to productivity growth, as the contribution of productivity gains to Georgia's economic growth has reduced or even been negative in recent years compared to the late 1990s and mid-2000s. As the World Bank's 2018 Systematic Country Diagnostic points out, "[Georgia] has not fully leveraged significant [FDI] to grow its export capacity. It has yet to make the most of its business environment, partly due to a lack of complementary connectivity . . .

⁵ World Bank. 2021. *Europe and Central Asia Economic Update: Competition and Firm Recovery Post-COVID-19*, Fall 2021; IMF. 2021. *Article IV Consultation Staff Report for Georgia*.

⁶ World Bank Group and Asian Development Bank. 2021. *Climate Risk Country Profile: Georgia*.

⁷ Hausman, W., et al. 2005. "Global Logistics Indicators, Supply Chain Metrics, and Bilateral Trade Patterns." World Bank Policy Research Working Paper No. 3773; Tang, C. F., and S. Abosedra. 2019. "Logistics Performance, Exports, and Growth: Evidence from Asian Economies." *Research in Transportation Economics* 78. December 2019; Nadiri, M. Ishaq, and Theofanis P. Mamuneas. 1996. *Contribution of Highway Capital to Industry and National Productivity Growth*. U.S. Federal Highway Administration Office of Policy Development.



strengthening connectivity to further open up the country to trade, international competition, and FDI will be the single most critical driver of efficiency gains [for Georgia going forward].”⁸ Pursuing well-targeted investments in transportation connectivity infrastructure, particularly between leading and lagging regions and along the country’s trunk highway network, is at the core of attaining this goal.

5. **The GoG has identified infrastructure development as a driver of economic recovery from the pandemic and as a long-term means to sustain gains in living standards.** To mitigate the social and economic impacts of COVID-19, the Government intends to expand employment creation in the post-crisis period by supporting development of infrastructure. Such a stance is consistent with Pillar 3 of the World Bank Group’s COVID-19 Crisis Response Approach Paper. As part of its post-pandemic recovery plan, which prioritizes increased employment opportunities, the Government intends to support, in addition to its health and education systems, the transport-dependent tourism and agriculture sectors.

6. **Agriculture and tourism—which in Georgia often overlap, such as in its wine-producing regions—are vital to the country’s employment and economic growth yet suffer from persistent connectivity bottlenecks.** Agriculture accounts for 6.3 percent of Georgia’s GDP yet employs half of the country’s labor force. Most farm workers are considered self-employed and engaged in subsistence farming, a result of policy neglect over the past decade⁹ and the pursuit of interventions that reinforced fragmentation rather than integration in production, storage, and market distribution. Through its recent adoption of the Socio-economic Development Strategy Georgia 2020, the GoG has refocused its policy efforts toward modernization of the agriculture sector and improvement of competitiveness and access to markets, which, in turn, will lead to job creation and increased rural incomes. Tourism accounts for 7.6 percent of Georgia’s GDP, 72 percent of its services exports, and 5 percent of employment. Despite its large relative size as a share of services exports, tourism is also Georgia’s fastest-growing services export category. Still, opportunities for capturing greater economic value from tourism are significant and remain largely untapped. For example, Georgia’s tourism industry continues to primarily rely on the traditional tour operator model of travel intermediation, which is generally associated with lower value added and lower expenditures per visit than that of independent travelers. Yet, promoting independent traveler tourism requires, among others, transport infrastructure investments to improve connectivity, facilitate personal mobility, and promote the emergence of scheduled transportation services. As recent World Bank research found,¹⁰ to cite one example, “regular bus services along wine trails are rare,” despite Georgia being one of the oldest winemaking countries in the world. One important root cause for this gap is the lack of modern, safe, high-capacity highway connectivity to/from key tourism-oriented regions.

7. **Sustaining Georgia’s growth will depend, to a meaningful degree, on the extent to which its goods and services can reach international markets cost effectively and its ability to continue to serve as a transit gateway and regional hub for the movement and handling of goods to and from other countries.** Since Georgia does not have substantial natural resources or a large domestic market, future GDP growth and job creation will hinge on its ability to produce and sell goods and services, including tourism, competitively in global markets. As a result, Georgia has signed several international trade agreements with major trading partners, including the European Union (EU), Commonwealth of Independent State countries, China, and Turkey. However, realizing the full economic potential of these

⁸ World Bank Group. 2018. *Georgia: From Reformer to Performer, A Systematic Country Diagnostic*.

⁹ Social-economic Development Strategy of Georgia: Georgia 2020, Government of Georgia.

¹⁰ World Bank. 2019. *Beyond Arrivals: Emerging Opportunities for Georgian Firms in Tourism Value Chains*. Washington, DC: World Bank.



agreements will require, among others, improved transport connectivity as a facilitator of trade. Such investments can also facilitate other countries' trade and bring greater transport and logistics demand to Georgia's network, by taking advantage of its geographic position between Asia and the rest of Europe, as well as its position as regional gateway to the South Caucasus. Specifically, Georgia's land bridge status between the Black and Caspian seas presents an opportunity for transport infrastructure investment to create new corridors and enhance the efficiency and operational resilience of regional and intercontinental freight itineraries via Georgia along the Trans-Caucasus Transit Corridor (CTC). The urgency of meeting this opportunity is likely to only increase in the future, as connectivity elsewhere in the South Caucasus may improve if links between countries that have remained closed for decades were to reopen. Targeted investments in infrastructure, particularly highway infrastructure, can help Georgia maintain and solidify its position as the preeminent gateway, distribution hub, and transit corridor in the region.

8. **In 2021, Georgia submitted an updated Nationally Determined Contribution (NDC) to the United Nations Framework Convention on Climate Change to fulfill its commitments under the Paris Agreement.**¹¹ Georgia ratified the Paris Agreement in May 2017. Its updated NDC calls for a voluntary nonconditional target of 35 percent reduction in total domestic greenhouse gas (GHG) emissions by 2030 compared to 1990 levels. It further calls for a 50–57 percent reduction in GHG emissions by 2030 relative to 1990, conditional upon the country receiving sufficient international support in the form of concessional financing and technology and knowledge transfers. In all, Georgia's updated NDC goals exceed the previous unconditional target by 7 percent and the previous conditional target by 10–17 percent. At the sectoral level, Georgia's NDC proposes a 15 percent reduction in transport sector GHG emissions by 2030 relative to the 1990 baseline. With regard to adaptation to climate change, Georgia's NDC sets forth, among others, the goal of pursuing facilitating measures to reduce losses and damages caused by extreme weather events.

B. Sectoral and Institutional Context

9. **Roads and highways are the backbone of freight and passenger transport in Georgia, but the national highway network remains incomplete.** In particular, it is yet to reach the agriculture- and tourism-intense Kakheti region in the eastern part of the country, neighboring Azerbaijan. An estimated 96 percent of Georgia's passenger transport demand and 66 percent of freight transport demand take place over its roads and highways.¹² Since 2004, the main IFIs active in Georgia¹³ have jointly extended their assistance in rehabilitating and upgrading Georgia's East-West Highway (EWH), consisting of the E-60 and E-70 East-West corridor and North-South links, connecting Georgia with Azerbaijan, Armenia, Russia, and Turkey as well as developing domestic and regional connectivity to the main Georgian Black Sea maritime ports of Poti and Batumi (see figure 1). The core portion of this highway network, about 270 km, is expected to be completed by 2024, at an overall cost of US\$2.2 billion. However, while the E-60 and E-70 highways account for around 60 percent of Georgia's cross-border freight movements, the eastern part of Georgia has not benefited from this initiative. Most notably, these developments are yet to be extended to the easternmost region of Kakheti, and over time local supply chain bottlenecks in this region have emerged due to gaps in road infrastructure quality and capacity. This is even more relevant considering that extending Georgia's highway network to Kakheti will eventually, at full buildout, enable

¹¹ GoG. 2021. *Georgia's Updated Nationally Determined Contribution*.

¹² Day, Thomas, et al. 2021. *Decarbonization Scenarios for the Transport Sector in Georgia*. New Climate Institute, January 2021.

¹³ The World Bank, European Investment Bank, Asian Development Bank, and Japan International Cooperation Agency.



an alternative high-capacity cross-border trunk road and border crossing point to/from Azerbaijan, at Lagodekhi, along the CTC—sharing the burden with the current, and often congested, main Georgia-Azerbaijan CTC border crossing point at the Red Bridge on the E-60 highway. This would enhance operational resilience by expanding routing options and ease of access for shippers and travelers, with built-in network redundancy as a climate change adaptation measure and higher levels of network capacity to match expected traffic demand increases over time.

Figure 1. Highway Network of Georgia



10. **Georgia's Roads Department (RD) under the Ministry of Regional Development and Infrastructure (MRDI) is its lead agency for roads.** In addition to executing the portion of the national budget devoted to capital and operating expenditures in roads and highways, RD led the implementation of US\$1.7 billion IFI-financed road network infrastructure investments during 2010–2019 alone. RD has made continued efforts to improve road maintenance planning, budgeting, and efficiency through the development of a road asset management system to manage 5,300 km of secondary roads, 66 percent of which are in a good or fair condition. In 2016, RD launched and successfully implemented its first pilot Output and Performance-Based Road Contract (OPRC) for rehabilitation and maintenance, in Kakheti, with support of the World Bank. While most of the road rehabilitation and maintenance activities at the national level are conducted through traditional input-based contracts, RD is considering expanding innovative approaches, such as OPRCs, more broadly, with a focus on long-term asset preservation. With increased focus on integrating technology in asset management and ensuring sustainability of the highway network, RD has developed an Intelligent Transport Systems (ITS) strategy and a tolling strategy for the highway network, with the intention of implementing them over the medium term.



11. **The physical and operational complexity of Georgia's highway network is increasing, creating new institutional challenges for RD.** Considering the significant increase in the length of the national highway network over the past 10–12 years, and the further expansion that is still needed, a sixfold increase in the number of tunnels is expected by 2024. The operation of these structures requires real-time monitoring, availability of breakdown recovery facilities and emergency services, and regular inspections and maintenance. These tasks require technical capacity and skills that are new to RD. Furthermore, 92 percent of the contracts procured by RD are construction works. This level of effort will test RD's contract management capacity, particularly given the higher incidence of complex substructures, like bridges and tunnels, embedded in these contracts. Strengthening capacity to meet RD's operational challenges has become critical for institutional sustainability. RD seeks to increase staff productivity and skills through technical assistance (TA), on-the-job learning, training, mentoring, and the streamlining of existing systems and procedures.

12. **Georgia's road safety performance has improved in recent years, but much remains to be done to sustain it.** The national road accident fatality rate dropped from 15.4 fatalities per 100,000 people in 2010 to 12.1 fatalities per 100,000 people in 2020. In 2020, Georgia registered a decrease in the number of road crashes (16.8 percent), road crash fatalities (6.9 percent), and road crash injuries (19.3 percent) compared to 2019.¹⁴ Despite positive developments over the last decade, road safety in Georgia remains a concern, with considerably higher death and injury rates than in EU countries.¹⁵ Being a national priority, road safety challenges are addressed through combined efforts of key government agencies. In 2016, the Government approved a National Road Safety Strategy, and an interagency Road Safety Commission was subsequently established. A new Road Safety Strategy and Action Plan for Georgia for 2021–2025 has been prepared and awaits government approval. The Government is taking active steps toward improving road safety outcomes, including conducting regular road safety audits, treating accident blackspots, and coupling engineering and infrastructure measures with improved enforcement of traffic laws and education campaigns (for example, the social campaign 'For More Life' launched by the Ministry of Internal Affairs in 2019). International Road Assessment Program (iRAP) approaches and methodologies have been recently mainstreamed into RD's road safety practices.

13. **The transport sector—and above all, road transport—will play a disproportionate role in mitigating climate change toward meeting Georgia's NDC targets.** With a share of 42 percent, transport is—by a wide margin—the largest sectoral contributor to Georgia's energy-related GHG emissions. In 2017,¹⁶ energy-related emissions totaled 8.7 million tons of CO₂—more than twice as much as in 2005, with most of this increase attributable to transportation. A 2016 World Bank study¹⁷ estimated that 96 percent of Georgia's transport emissions are accounted for by the roads sector alone. Of all road sector emissions, slightly less than half (47 percent) are accounted for by freight transport (that is, trucking activity). Beyond GHGs, Georgia has Europe's highest age-standardized mortality rate attributed to household and ambient air pollution per 100,000 population (102, compared to as low as 7 in Northern Europe, 47 in Turkey, and 64 in Azerbaijan).¹⁸ This highlights the critical importance of promoting road

¹⁴ Eastern Partnership (EaP) Road Safety Country Profile 2021, Georgia.

¹⁵ According to the Eastern Partnership (EaP) Road Safety Country Profile 2021, Georgia recorded the highest road crash fatality rate—12.11 fatalities per 100,000 inhabitants—registered in the EaP region and in the EU-27 in 2020. The fatality rate in Georgia is higher than the EaP and EU-27 average fatality rates by 31.6 percent and 65.3 percent, respectively.

¹⁶ Latest year for which data are available. International Energy Agency. 2020. *Georgia 2020 Energy Policy Review*.

¹⁷ World Bank. 2016. *Greening the Freight Transport and Logistics Sector in Georgia: Assessment of Current Performance, Market Dynamics, and Investment Opportunities*.

¹⁸ World Health Organization. 2018. *World Health Statistics 2018*.



transport efficiency to reduce GHG and pollutant emissions at scale. Specifically, the provision of modern highway connectivity, especially in areas of the country that remain disconnected from leading regions, can reduce operating costs in both passenger and freight transport, including the cost of environmental externalities, by (a) reducing congestion, (b) enabling optimal cruising speeds, and (c) reducing road roughness, which in turn reduces vehicle maintenance and operating costs and promotes the use of newer, more fuel-efficient vehicles. It can also contribute to the long-term decarbonization of road transport by enabling the future deployment of direct current fast charging stations for long-distance travel, minimizing range anxiety as an impediment to electric vehicle (EV) adoption. International experience shows that the provision of controlled-access, high-capacity, reliable highway connectivity facilitates trucking sector efficiency by reducing operating costs and promoting better levels of service, including refrigerated and other value-added services, due to more predictable, faster, lower-cost-to-serve freight transport itineraries.

Kakheti Region

14. **Kakheti is Georgia's largest grape growing and winemaking region by volume and an important export-oriented agricultural production center that remains underserved.** Kakheti comprises 38 percent of Georgia's agricultural land and is a leading region in the production of cereals and livestock. Among all Georgian regions, Kakheti has the highest incidence of sown areas of annual crops per square kilometer. Most notably, Kakheti is a unique ancient grape growing and wine producing region with significant export and tourism potential. In 2018, Kakheti accounted for 72 percent of all grapes grown in Georgia and 80 percent of all wine produced and all wine exported.¹⁹ Georgia has 18 wines with a protected designation of origin, 14 of which located in Kakheti. Beyond wine, Kakheti accounts for most—approximately 95 percent—of Georgia's exports of fresh peaches, nectarines, cherries, plums, and melons as well as 30 percent of exports of cucumbers and tomatoes. These are all highly perishable products whose ability to compete in domestic and international markets in terms of both price and quality depends on access to efficient road transport infrastructure and cold-chain custody from origin to destination. None of these requirements are available to Kakheti-based shippers—farmers and distributors—at present. It is estimated that about 20 percent of Kakheti-originated produce is lost post-harvest due to, *inter alia*, lack of proper road transportation infrastructure and the constraining impact that this has on the ability of logistics service providers to cater to Kakheti-based shippers.²⁰

15. **Kakheti has the potential to generate more significant value added in its tourism industry.** The Kakheti region, together with its capital, Telavi, hosts several tourist attractions, including cultural and historical heritage sites as well as wineries that attempt to provide an experience consistent with increasing the level of spending by tourists with longer stays. Despite the attractiveness of Kakheti as a tourist destination, only 6.5 percent of Georgia's 5.1 million tourists in 2019 visited Kakheti.

16. **Kakheti's regional economy suffers from poor access.** The only direct road access link between central Kakheti and Tbilisi (and, through Tbilisi, Georgia's main international gateways) is a single carriageway international road—the S5 road—with no equivalent alternative access route. The S5 is expected to reach its limited capacity over the short to medium term (before 2030). If unaddressed, this would result in rapidly deteriorating service levels for S5 long distance end users across the board—

¹⁹ According to the Georgian National Wine Agency, in 2019 Georgia exported 94 million bottles of wine to 53 countries, the highest export volume in the history of independent Georgia and an 8 percent volume growth compared to 2018.

²⁰ World Bank. 2020. *Understanding Agriculture Logistics Challenges in Kakheti*. Internal report.



shippers, tourists, and commuters—due to congestion, longer and less predictable travel times, and higher levels of GHG and local pollutant emissions from road transport. Moreover, the physical and roughness conditions of the S5 road are not well suited for the transportation of perishable agricultural products that, in addition to being time sensitive, are highly sensitive to vibration and incompatible with travel disruptions en route. Tourism trips, particularly the kind of scheduled road-based services that remain underdeveloped in Georgia and which require reliable road transport conditions, are sub-optimally served at present by the S5. Commuters, who rely on the S5 for access to jobs, health and education facilities, and other services in Tbilisi, will continue to require travel time as short and reliable as possible as well as improved levels of road safety. The S5's performance can be improved on all three of these fronts. The lack of an alternative road access to/from central Kakheti leaves the region vulnerable should the S5 be disrupted due to climate and other disaster risks.

17. **Kakheti's economic development is central to the GoG's regional development agenda.** Kakheti is a rural region with 80 percent of its population living in villages and one of the highest poverty levels nationally (25.5 percent).²¹ A majority of Kakheti's working-age adults depend on subsistence farming. The 2006 Russian embargo on Georgian wines allowed diversification of export markets, with a large quantity of wine now sold to the EU, China, and North America. While 6 percent of Georgia's export revenues are derived from wine, forecasts indicate²² potential for growth in local consumption as well. It is the GoG's assessment that realizing Kakheti's potential as a source of exports of both goods and services (i.e., tourism) and as a supply source for domestic consumption cannot be attained without better connecting Kakheti with Tbilisi and the rest of the region by linking central Kakheti to Georgia's highway network.

18. **Women in rural Georgia, including Kakheti, play an important role in agriculture, but they are constrained by several gender gaps.** These gaps include unequal access to land, financing, and agricultural training; attitudes and assumptions about women's and men's respective roles in households and the labor market; and women's time poverty, which is a result of the disproportionate amount of time women spend on unpaid housework and childcare compared to men.²³ Distance to markets and lack of adequate local marketplaces are some other barriers affecting rural women's income-generating opportunities in Georgia,²⁴ which are exacerbated by lack of transportation. Women do not usually have their own vehicles to move products. Interestingly, some studies²⁵ explain men's association with wholesale trade and women's with retail trade, in part due to gender inequalities in access to transportation. When crops are sold near the household (at the doorsteps or in nearby markets), the number of women participating appears to be higher than that of men. However, when transportation is required, it is mainly men participating, and women are often excluded from this income-generating stage of the value chain.

²¹ MRDI, Regional Development Program of Georgia for 2018–2021.

²² Galt and Taggart Research - Industry Overview, July 2019.

²³ Regional Development Program of Georgia for 2018–2021; World Bank. 2020 and 2021. *Socio-Economic Study and Improving Local Market Development Opportunities for the Sagarejo - Badiauri Road Section of the Kakheti Highway Corridor*. Internal report.

²⁴ World Bank. 2020. *Socio-Economic Study and Improving Local Market Development Opportunities for the Sagarejo - Badiauri Road Section of the Kakheti Highway Corridor*. Internal report.

²⁵ FAO (Food and Agriculture Organization). 2018. *Gender, Agriculture and Rural Development in Georgia*.



C. Relevance to Higher Level Objectives

19. **The Kakheti Connectivity Improvement Project (KCIP) is closely aligned with the World Bank's twin goals of ending extreme poverty and boosting shared prosperity as well as with the overarching goals of decarbonization and climate change adaptation.** Under the Georgia Country Partnership Framework (CPF)²⁶ 2019–2022, the World Bank identified three focus areas of engagement: (1) enhancing inclusive growth and competitiveness, (2) investing in human capital, and (3) building resilience. The engagement principles to guide the selection of interventions across the identified focus areas include, among others, (a) spatial equity, as a means to redress current regional imbalances within the country, and (b) innovation, given the rapid pace of technological change and digitization and its effect on productivity and competitiveness. The project is expected to contribute to the CPF focus areas and engagement principles as follows:

- The project will contribute to **focus area 1: Enhancing inclusive growth and competitiveness**, as it aims to (a) improve connectivity between a leading region (Tbilisi) and a relatively lagging one (Kakheti), through modern highway infrastructure conceptualized as a corridor that will eventually be extended to an additional Georgia-Azerbaijan border crossing point at Lagodekhi, thus with long-term implications for cross-border trade, regional integration, network operational resilience, tourism, and growth; (b) support primary sector economic activity in Kakheti through better access to markets in Tbilisi and beyond, thus contributing to higher-quality products that can better compete domestically and internationally, with the potential to increase employment and incomes for underserved groups, including women, young people, and minority groups; and (c) elevate the standard of national-level highway infrastructure. By championing engineering designs and infrastructure construction methods that are resilient to extreme weather and other climate risks, as well as aligning with European best practices and standards that consider climate adaptation, the project will also contribute to **focus area 3: Building resilience**.
- The project will embrace key CPF engagement principles, by (a) promoting spatial economic equity by connecting Kakheti, where economic outcomes have lagged those of the nation as a whole, with Tbilisi,²⁷ and (b) facilitating innovation by supporting the development of a modern highway corridor that can attract further investments in innovative subsectors, such as ITS and the promotion of EV adoption. Finally, the project responds to the World Bank's Gender Strategy and its Europe and Central Asia Region Gender Action Plan by supporting female farmers and agricultural entrepreneurs.

20. **The project will contribute to Georgia's short- and long-term economic recovery from the COVID-19 crisis.** It will lead to short-term job creation in civil works construction activities. In the longer term, it will lead to (a) improved employment and business prospects for Kakheti-based firms, particularly those active in import-export markets, through enhanced connectivity between Kakheti and the leading regions and gateways of Georgia, as well as international markets; (b) more sustainable jobs and incomes in the tourism sector across Kakheti, by facilitating access to the region for domestic and international tourists, particularly higher-spending independent travelers; and (c) access to jobs and income

²⁶ Report No-121853-GE, discussed by the Executive Directors on May 22, 2018.

²⁷ Connecting regions in this manner has proven successful as a driver of special economic equity and regional economic development, as suggested by the World Bank's 2009 World Development Report 'Reshaping Economic Geography'.



opportunities, as well as more sustainable, equitable, and safe working conditions for local marketplace traders and small and micro entrepreneurs within the catchment area of the project-financed highway section, through the project's investment in local marketplace infrastructure and business advisory support of local entrepreneurs, particularly female entrepreneurs. By better connecting Kakheti with Tbilisi, the project will also contribute to reducing regional economic disparities in Georgia.

21. **The project will reduce GHG emissions from road transport in the target area, and it will make transportation to/from Kakheti safer and more resilient to climate-related disruption.** Road traffic counts and volume projections for the project area indicate that, without additional investment in road infrastructure capacity, the existing road linking Tbilisi and Kakheti will soon be saturated. If this saturation is allowed to take place, the associated vehicle engine idling and suboptimal travel speeds it implies would lead to accelerating increases in GHG and local pollutant emissions. Traffic assessments also indicate that the composition of Tbilisi-Kakheti flows, which include freight shipments of highly perishable agricultural products, economically impactful flows of domestic and international tourists, and business and personal commuters, increasingly requires the higher standards of safety, connectivity, traffic flow, and traffic management of a highway compared to the existing single carriageway, limited-capacity road. Furthermore, Kakheti's exposure to flooding and other climate risks suggests that providing redundancy in access to the region through a greenfield highway investment will increase network and community resilience to these risks. The project-financed highway will address these challenges by deploying climate-resilient highway infrastructure consistent with international standards that are more demanding than national construction standards, particularly regarding climate resilience. This will avoid costly and polluting congestion over time and provide a higher service level alternative to the single existing, and thus vulnerable, road access.

II. PROJECT DESCRIPTION

A. Project Development Objective

PDO Statement

22. The Project Development Objective (PDO) is to improve connectivity and safety of road transportation in the Kakheti region along the Sagarejo-Badiauri section of the Tbilisi-Bakurtsikhe-Lagodekhi highway.

PDO-Level Indicators

23. The PDO will be measured through the following outcome indicators:

Improved Connectivity

- (a) Travel time along the target section of the highway corridor (Minutes)
- (b) Average Annual Daily Traffic (AADT) of freight vehicles on the corridor (Number of vehicles)

Improved Safety

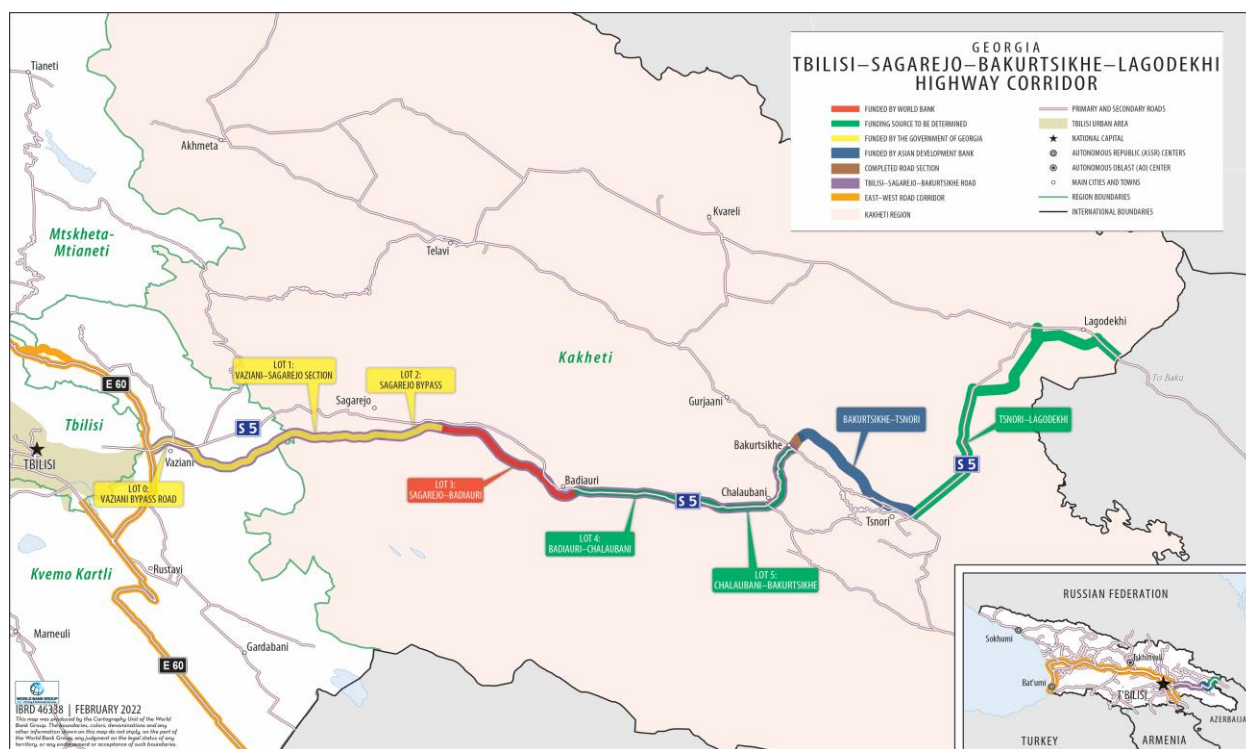
- (c) Number of fatal accidents per 100 million vehicle-km traveled along the target section of the highway corridor.

B. Project Components

Component 1: Connectivity Improvements on the Eastern Corridor (US\$107.43 million)

24. This component will finance the civil works and construction supervision consulting services for the greenfield development of the 17 km section between Sagarejo and Badiauri, referred to as ‘Lot 3’, of the Tbilisi-Sagarejo-Bakurtsikhe-Lagodekhi highway (the ‘Kakheti highway’; see figure 2, with breakdown by sections and lots). Lot 3 will be directly connected to the Kakheti highway’s initial three sections, from Tbilisi to Sagarejo, referred to as Lots 0, 1, and 2 (35.2 km), with civil works contracts already awarded and financed by the state budget. Taken together, these initial four sections, from Lot 0 to Lot 3, will comprise a 52.2 km four-lane, access-controlled highway from Tbilisi to Badiauri with an overall estimated cost of US\$275 million. While the GoG has no immediate plans to develop Lots 4 and 5²⁸ and the Tsnori-Lagodekhi section of this highway, the Bakurtsikhe-Tsnori section is under construction with Asian Development Bank financing. Construction of Lots 0–3 of the Kakheti highway will provide an alternative to the existing limited-capacity S5 road and will better connect Kakheti with Tbilisi.

Figure 2. Tbilisi-Sagarejo-Bakurtsikhe-Lagodekhi Highway



25. Lot 3 will have a design speed of 120 km per hour, traverse an alignment slightly to the south of the existing S5 road, and comprise flexible pavement to accommodate eventual settlements. It will be constructed to a total width of 28 m with hard shoulders and separated by a median. The section’s design includes the construction of median-separated carriageways in each direction, comprising two lanes (7.5 m wide) and a paved hard shoulder (2.5 m), for a total width of 28 m. The design further includes construction of one grade-separated interchange, located southeast of Badiauri. As flood risk mitigation

²⁸ AADT of approximately 10,000 vehicles.



and climate change adaptation measures, Lot 3 will comprise four bridges (two highway bridges and two overpass bridges); approximately 94 box culverts; side drainage; elevated embankments, up to 8 m in height, across most of its alignment; and flexible pavement to accommodate soil settlement. Lot 3 civil works will also include development of access roads that will connect the highway section to the existing road and local communities. The highway, structures, and all access roads will be constructed to climate-resilient international standards, including a 1-in-100-year storm standard for bridges and culverts. Lot 3 will have a construction period of 2.5 years and a defects liability period of 2 years and is expected to be operational by 2025.

26. The development of Lots 0–2, with state budget financing, and Lot 3, with World Bank financing, has followed a consistent approach across the corridor, where construction will be carried out to EU standards with particular attention to road safety and climate resilience, with efforts made to standardize implementation by relying on World Bank procurement practices and the use of environmental and social (E&S) instruments. Upon completion, the Kakheti highway’s initial 52.2 km (Lot 0 to Lot 3) will reduce travel times between Tbilisi and Badiauri by 15 minutes. Further reductions in travel time are expected as future sections of the highway are completed.

27. The construction supervision consulting services to be financed under Component 1 will comprise a detailed design review, supervision during construction, and performance monitoring during the defect liability period. The construction supervision consultant (CSC) team, consisting of internationally recruited specialists with the required skills, will help RD supervise and monitor civil works under Components 1 and 2. It will include, among others, geotechnical engineers as well as bridge and structural engineers to ensure compliance with the design’s technical assessments (for example, hydrology study) and the climate-informed engineering design. This will ensure that appropriate measures are adopted in relation to pavement conditions, slope protection and stability, excavations, construction of retaining structures, bridges, culverts, and embankments.

28. Any potential savings in procurement under Component 1 will be used by RD to (a) rehabilitate secondary and/or local roads in the project region to incorporate climate-resilient standards and/or (b) further improve road safety of the network.

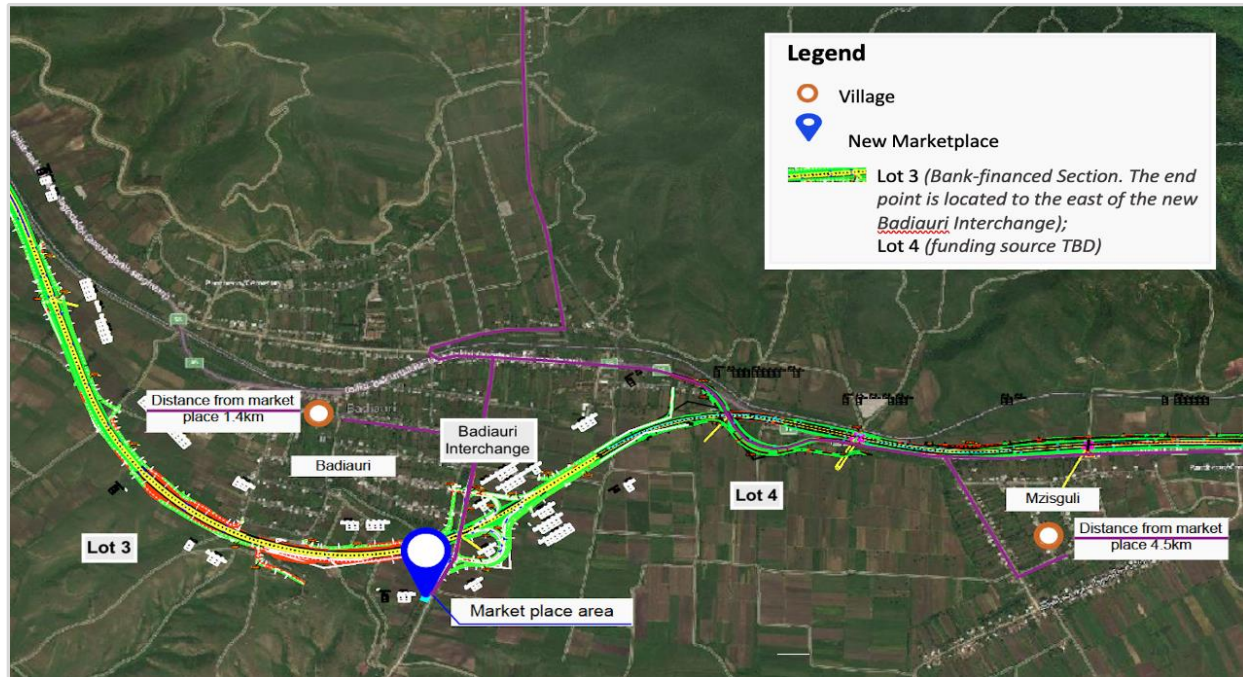
Component 2: Development of a New Local Marketplace (US\$0.30 million)

29. This component will support the construction of a local marketplace adjacent to the Lot 3 Badiauri interchange, to provide opportunities for local traders to start and grow their businesses and create jobs for the local community (see figure 3). While the development of the marketplace supported through this component will be shared between RD and the Sagarejo Municipality, this component will facilitate a sustainable arrangement that will be formalized through a memorandum of understanding (MoU), to be signed for the first time between RD and the Sagarejo Municipality for the construction and maintenance of the marketplace. This initiative is expected to have a demonstrative effect that will allow RD to internalize the lessons learned from this experience and replicate the development of similar



marketplaces in future highway projects, presenting an opportunity to bring highway development closer to the communities that host them.

Figure 3. Location of Marketplace Near the Lot 3 Badiauri Interchange



30. The marketplace is expected to attract micro entrepreneurs and traders currently located in vulnerable areas along the existing S5 road, where they are exposed to road safety, general safety, climate, and commercial risks, especially as they may not have increased opportunities due to diversion of traffic from the existing S5 to the newly constructed highway. Traders from nearby villages in search of increased business and employment opportunities are also expected to be attracted to this marketplace.

31. A socioeconomic study undertaken to support the preparation of this project examined several potential locations for this market, considering various aspects such as proximity to the highway interchange, volume and composition of traffic expected to flow adjacent to potential sites after the new highway is constructed, tourism attractions in the vicinity of the sites, availability of local public transportation services (and/or ease of expansion of same in future), and any market structure already in place. This multicriteria assessment recommended a site near the Badiauri interchange within the Sagarejo Municipality as the optimal location, due to its proximity to the interchange as an opportunity driver for the local population, given increased flows of traffic on the highway and tourism attractions in the vicinity—all having high potential to attract marketplace customers.

32. The MoU between RD and Sagarejo Municipality will define the responsibilities for market infrastructure development and maintenance and set a general framework under which the marketplace will operate. The MoU envisages for RD to finance the preparation of the area for the marketplace (approximately 4,000 sqm), including raising the level of the marketplace above the surrounding terrain and providing relevant drainage, to be able to operate all-year-round and possibly serve a refuge area in case of surrounding high water. It will consist of a concrete surface and provide access to/from the marketplace with appropriate road safety measures and necessary parking. This will allow the Sagarejo



Municipality to construct the marketplace superstructure (for example, buildings and other market facilities) determined through consultations with the community and carry out maintenance of the same. The estimated cost of Component 2 reflects only the cost of civil works to be conducted by RD, that is, toward the development of the marketplace substructure. These works will be carried out through the civil works contract for the construction of the highway under Component 1, ensuring climate resilience in the construction of the substructure. RD, through the MoU, will collaborate with the Sagarejo Municipality in carrying out the development of the superstructure, complementing RD's adoption of climate-resilient practices. Component 2 civil works to be carried out by RD will be supervised by the same CSC that supervises Component 1 civil works.

33. This component will also provide tailored business advice to at least 50 local women to start and/or expand their micro businesses, including in new marketplace as well as in other areas. This effort will further contribute toward improving opportunities for female traders to expand their businesses and increase job opportunities. The business advisory services will be bespoke and cover a wide range of topics, including providing technical knowledge to, for example, set up a website and join e-commerce platforms that have become popular during the pandemic, draw up business proposals to seek funds under grant programs, and/or setting up and choosing the location for micro businesses, including at places like the project-supported marketplace. This will involve working with qualified local consultants for three months and consist of a minimum of 40 hours of advisory work provided to each female beneficiary. These services will be provided by a separate team of the CSC.

Component 3: Institutional Strengthening and Implementation Support (US\$1 million)

34. This component will finance institutional strengthening through TA activities and project implementation support for RD. While the scope of TA activities under Component 3 is intended to be flexible to quickly respond to changes in RD's institutional priorities and emerging challenges, it is expected that it will finance provision of capacity building and knowledge transfer in the areas of tunnel development and management, road safety, and contract management. These areas of technical support were prioritized based on findings from an institutional gap analysis conducted by RD under the World Bank-financed East-West Highway Corridor Improvement Project (EWHCIP).

35. Georgia has seen a marked uptick in the length of tunnels across its road network. This raises additional responsibilities and institutional challenges for RD, particularly in its highway network. Component 3 intends to support RD in building technical expertise in tunnel development and management and in further strengthening the tunnel management unit expected to be established within RD in the near future.

36. With regard to road safety, RD is looking to build capacity to roll out the iRAP across the road network, complementing current iRAP implementation efforts under the World Bank-financed Secondary Road Asset Management Project (SRAMP). RD is also building its internal expertise in identifying and treating blackspots in a mainstreamed manner. This component will assist in contributing to the building blocks of RD's efforts to strengthen road safety practices for improved safety outcomes.

37. Considering the growing complexity in the contracting modalities for large infrastructure projects undertaken by RD, strengthening its contract management capacity is seen as crucial to the long-term sustainability of the highway network. This component will assist RD to gain contract management capacity in divisions responsible for construction, rehabilitation, E&S, legal, and procurement activities.



Furthermore, it will help integrate ITS in the development of its Asset Management System. In addition, this component will also support due diligence and preparatory activities necessary for developing and operating further sections of the highway network.

38. With regard to project implementation support, Component 3 can finance the mobilization of a Project Manager within RD. The Project Manager if mobilized, will monitor progress; ensure timeliness and compliance; and regularly liaise with the CSC, contractors, consultants, the World Bank, and other implementation stakeholders.

C. Project Beneficiaries

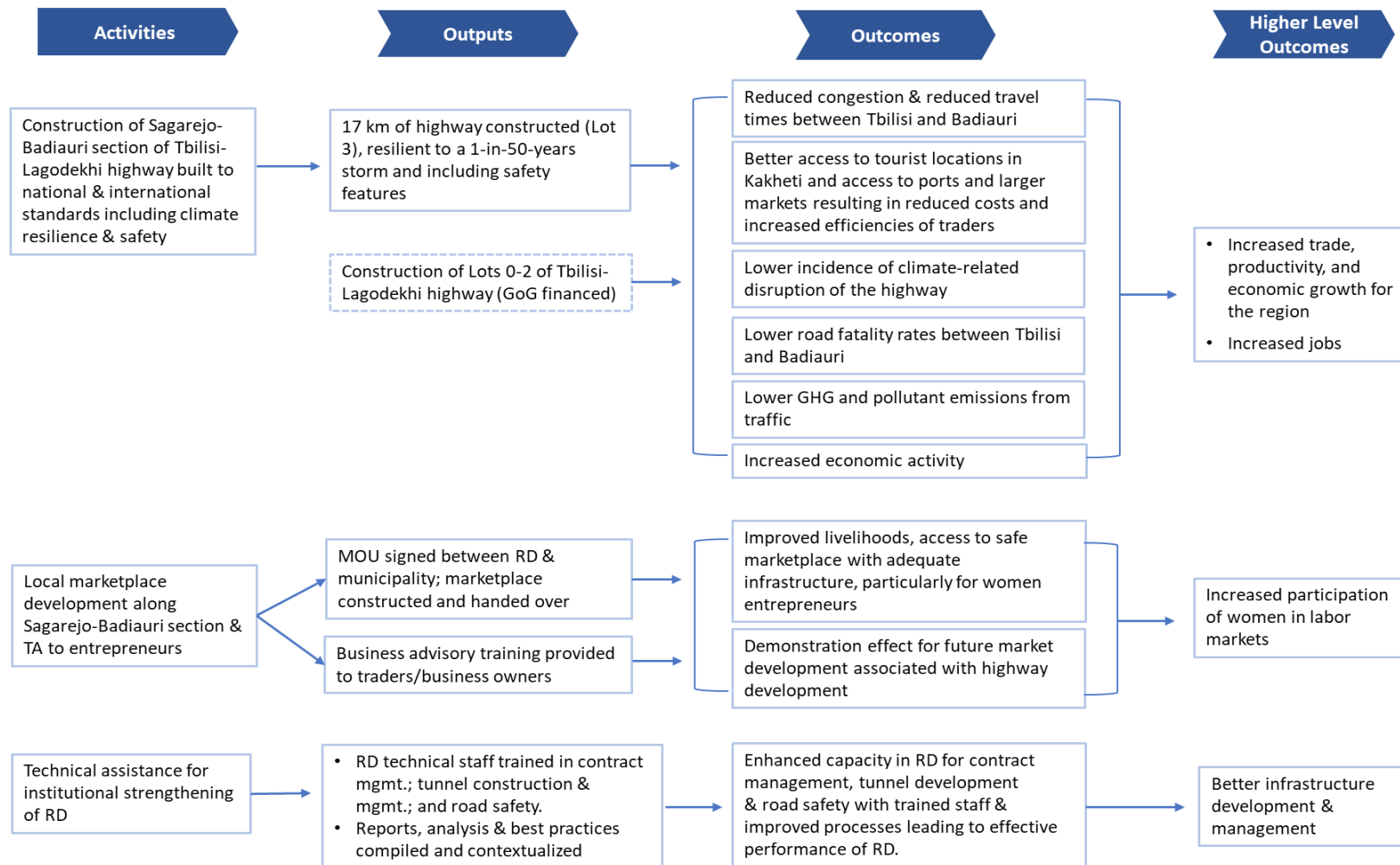
39. The main project beneficiaries are (a) the users of the Sagarejo-Badiauri section of the target Kakheti highway; (b) the communities living in close proximity to and within the connectivity and commercial catchment of the World Bank-financed section of the Kakheti highway, including women traders and other community members whose livelihoods depend, wholly or partially, on road traffic to/from and across the Kakheti region, including tourism; (c) commuters traveling between Kakheti and Tbilisi; (d) Kakheti-based businesses, particularly exporters and importers, who depend on improved connectivity to transport products and raw material to and from ports and border control points with Armenia and Azerbaijan by connecting Kakheti with the existing E-60; and (e) shippers, carriers, and logistics service providers in Tbilisi, across Georgia, and indeed regionally across the South Caucasus, who will have operational resilience with the completion of the Kakheti highway to the border of Azerbaijan.

D. Results Chain

40. The project's Results Chain links a development challenges diagnosis with discrete civil works and consulting services activities, intermediate outputs, intended outcomes, and, ultimately, expected long-term impacts (figure 4).



Figure 4. Georgia: KCIP Theory of Change





E. Rationale for Bank Involvement and Role of Partners

41. **Since 1996, the World Bank has made substantial contributions to the transport sector of Georgia, especially in road infrastructure development, with total financing up to US\$1 billion.** The World Bank stepped in as the first IFI to assist the GoG with the commencement of its highway program, an effort that has continued with the World Bank financing several sections of the E-60. To bring similar development to the Eastern part of Georgia, the GoG has reached out to the World Bank to parallel finance the Kakheti highway. World Bank financing in the currently fiscally constrained environment will be critical in accelerating the development of the Kakheti highway that will allow the GoG to advance the development outcomes and increase job opportunities which will help the recovery from COVID-19. Moreover, this will allow the World Bank to consolidate the overall support to the GoG through the human capital agenda. If the World Bank assistance is not provided through this project, and if such inaction delays the construction of Lot 3 by five years, the discounted value of foregone benefits is estimated to be in the range of US\$39 million.

F. Lessons Learned and Reflected in the Project Design

42. **A corridor and framework approach should continue to be applied in the preparation and implementation of projects for the construction or upgrading of successive sections of the same road.** Following a standardized approach for successive investments in a single highway corridor, RD has seen substantial operational and implementation efficiency benefits. It has therefore carried out a standardized approach in the preparation of sections of the Kakheti highway that are financed by the state budget, following the World Bank's procurement regulations and E&S instruments under the Environmental and Social Framework (ESF).

43. **Implementing projects through existing institutions rather than creating parallel structures has proved to be useful in the case of mature institutions.** Successive World Bank projects have been implemented through relevant RD units, resulting in strong retention of technical capacity, focused expertise, and institutional memory which have proved useful in the successful implementation of projects over time. This is useful in instances where the institution continues to be a specialized agency, designated under the legal framework for the implementation of such projects.

44. **Need for coordination among IFIs regarding institutional strengthening and project implementation flexibility.** With several IFIs involved in supporting RD's capacity building and institutional strengthening efforts, inter-IFI coordination becomes critical. In the past, continuously emerging challenges in the sector had led to changes and modifications in the scoping of World Bank-financed projects, particularly within their institutional strengthening components. In this context, the World Bank has led efforts to establish a sector coordination group, which holds regular meetings. In addition, the design of the project's institutional component is deliberately flexible to respond to changes in its institutional and economic environment. It is expected that this will enhance project implementation efficiency.

45. **Relevance of strong occupational health and safety (OHS) practices within RD.** One notable area of experience-based institutional strengthening attained by RD through its experience of implementing World Bank-financed projects is its enhanced capacity to report and resolve OHS incidents, such as accidents at work sites. This is in part a reflection of RD's proactivity in (a) engaging a seasoned expert to prepare an OHS Process Audit, which produced recommendations to address identified gaps, and (b)



recruiting an in-house OHS specialist responsible for closely monitoring OHS procedures within RD's portfolio of projects. The recommendations of the OHS Process Audit are under implementation by RD in its ongoing World Bank-financed projects. The project will utilize measures already adopted by RD, and therefore proven, to ensure smooth implementation in compliance with best OHS international practice.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

46. **The project will be implemented by RD under the MRDI.** RD has implemented several World Bank-financed projects since 1996 and thus has a sound understanding of World Bank policies and procedures. It is currently the implementing agency of two ongoing World Bank-financed projects: the EWHCIP and SRAMP. RD has vested project management functions with one of its Deputy Chairmen, supported by RD's donor-funded Construction, Modernization, and Reconstruction Projects' Management Division, which is responsible for the daily implementation of the project. RD's International Procurement Division (IPD) will be responsible for procurement and monitoring and reporting of project results. Financial management (FM) of the project will be conducted by the Eurasian Transport Corridor Investment Center (ETCIC), a specific body designated for FM of foreign-funded road projects under the MRDI. Specific units at RD will be in charge of environmental management and monitoring, road safety, and land acquisition and resettlement. As the ongoing World Bank-financed Road projects demonstrate, these implementation arrangements have been generally satisfactory.

47. **Sufficient procurement capacity exists within RD, particularly for large contracts.** To ensure smooth implementation and monitoring of the project, a Project Manager²⁹ if retained by RD will work on the project to help RD with day-to-day management of project implementation and liaise with the CSC who will supervise all aspects of civil works construction. RD will also retain in-house consultants for E&S monitoring as needed.

48. **RD will adopt a Project Operations Manual (POM) that will assist in the successful implementation of the project.** The guidelines and procedures governing such implementation will be set out in the POM. The POM will reflect FM, procurement, ESF management, and the project's grievance redress mechanism, monitoring and evaluation (M&E), and reporting arrangements, as well as details on the implementation and action plans, similar to those in ongoing World Bank-financed projects.

B. Results Monitoring and Evaluation Arrangements

49. RD will oversee data collection and reporting under the project's Results Framework.

50. **KCIP will continue to use agreed M&E arrangements for World Bank-financed projects.** RD, through the IPD, will be responsible for monitoring, evaluating, and reporting on project results. The IPD has a dedicated Reporting Unit with three staff, who have been effectively monitoring projects and preparing reports on time. The division will retain adequate staff (a unit head plus two staff) to continue monitoring results.

²⁹ An individual consultant who would work as part of the RD team and report to the Deputy Chairs responsible for construction and social and environmental safeguards.



51. **A Quarterly Project Monitoring Report will be produced and submitted to the World Bank by RD.** The report will provide key information, such as the progress of civil works, main issues, status of disbursements, compliance with E&S standards, management and resolution of grievances, and compliance with the legal covenants included or referred to in the Legal Agreement for the loan. These reports will be used to assess progress toward the achievement of the PDO and the end targets of the project's results indicators.

52. **A midterm review of the project will take place at the halfway point in the project's implementation period.** Its principal objectives will be to review (a) project implementation progress, (b) the project's Results Framework and make necessary adjustments, and (c) overall progress with the development and management of the Eastern corridor. RD will prepare status reports as appropriate to guide discussions during the midterm review, which will, among others, help inform the discussion between the GoG and World Bank regarding changes to the project design and Results Framework.

C. Sustainability

53. **The sustainability of project-financed highway investments will depend on the continued availability of resources allocated to the road sector and the commitment and ability of RD to effectively use these resources.** RD has extensive experience in budgeting, planning, and managing public resources for road asset maintenance, and the GoG is committed to supporting the long-term sustainability of the Kakheti highway at the same level as that of the main EWH corridor. The development of capacity within RD to manage the increased level of complexities in contract and tunnel management arising as a result of accelerated highway development will strengthen the sustainability of RD and the road network. The project's efforts in integrating climate adaptation measures into the road design to withstand changing climatic conditions will improve resilience of the infrastructure to the impacts of climate change. In addition, the project will also help mitigate risks of accessibility disruptions by creating an alternate route to access Kakheti.

IV. PROJECT APPRAISAL SUMMARY

A. Technical and Economic Analysis

(i) Technical Analysis

54. **Climate change risks and adaptation.** The project-financed highway section is located across an agricultural plain, alongside complex irrigation schemes, and runs along a railway line. The primary climate and disaster risks to which the facility is exposed are higher incidence of rainfall and flooding. The highway section is located on compressible soils, and the embankment is up to 8 m high in places. The high embankments were adopted from the process of design optimization to meet climate resilience, including the adoption of international best practices through compliance with the Trans-European Motorway (TEM) design standards, by choice. The requirements of the TEM standards are well above the national standards of Georgia regarding climate resilience, contributing to sustainable infrastructure for the future. The proposed design choice reduces E&S impacts, and the high embankment will enhance resilience to extreme weather events—a major connectivity improvement feature in the face of climate change risks. The presence of weak soils may lead to differential settlements that will need to be addressed by RD during the maintenance and operation phase. On the other hand, due to its purposely chosen location



and alignment, the target highway section's exposure to disruption from riverbank erosion or landslides has been minimized. The highway section was designed with the aim of addressing climate change-induced risks as a core objective. The engineering design of the roadworks includes a detailed hydrology study and design parameters adopted to ensure high protection against the identified flooding risks. A climate change analysis was conducted under the design's final phase.

55. In addition to provision of high-embankment protection, resilience measures introduced in the highway design that target the primary climate risk—heavy rains—include (a) improving bridges and other road structures to adapt to the changing hydrology and projected high-water levels in the area, to withstand rainstorm surges; (b) improving the drainage system with additional and larger culverts, appropriate inlet-outlet of culverts, and side ditches; and (c) introducing bioengineering solutions as much as possible for slope protection.

56. **ITS.** Under a 2016 World Bank-funded TA project, RD prepared a comprehensive ITS strategy and action plan, with the aim of identifying suitable systems, prioritizing road sections for implementation, and ensuring compatibility of ITS technology with the national highway network. The rollout of RD's ITS strategy, which is expected to prioritize the EWH, is planned to cover the Kakheti highway in due course.

57. **Maintenance and operations** of the Kakheti highway, including Lot 3, will be tendered out to private sector contractors through renewable maintenance service contracts for two or three years, financed through the state budget. Likewise, RD is reaching out to the private sector for the development and operation of service/rest areas along the highway. Operators of the service areas will be encouraged to deploy fast-charging stations for EVs as part of the typical services offered at these areas.

58. **Road safety.** The Road Safety Screening and Appraisal Tool was applied to assess the road safety impact of the proposed project. The Project Safety Impact (PSI) score³⁰ for the highway indicates a positive road safety impact of the project, with an overall PSI score of 0.437. While the project will improve driving conditions and reduce travel time, it will also improve road safety due to separated carriageways, absence of at-grade intersections, and the application of a variety of safety measures included under the project design.

59. Road infrastructure has direct and indirect impacts on crash risk, injuries, and deaths. As a key element of the Safe System, modern road infrastructure is designed to meet the equitable and safe mobility needs of all road users. High quality technical standards for design and construction are key components for safe road infrastructure that is intuitive to use (to minimize human error) as well as forgiving (to compensate for human error). Such standards have been applied in the design of the new highway, as a part of the World Bank's ongoing commitment to meeting several global road safety performance targets, including building all new roads according to high-quality technical and safety standards considering the needs and uses of different road users.

60. The design of Lot 3 meets this target. It includes two carriageways separated by a concrete barrier and median, a grade separated interchange, wide paved shoulders, extensive use of steel safety barriers, high quality reflective signs and delineation, and clearly identifiable speed restrictions. The motorway will not have pedestrians or bus stops, and a proposed new marketplace will be accessible, positioned off the

³⁰ PSI is one of the outcome metrics calculated by the Road Safety Screening and Appraisal Tool software, representing the ratio of expected crash fatalities with project design over current fatalities on the road segment. For instance, a PSI score of 0.8 indicates that the project's design will have an expected 20 percent decrease in fatalities compared to the current situation.



motorway via the grade-separated interchange and a low-speed local road. It will offer a safe combination of convenience and accessibility.

61. The proposed project uses a comprehensive approach to road safety. Experience from other projects indicates that road safety measures are more effective when they cover both physical and social evidence-based measures. The project will support safety measures such as wide paved shoulders and improved signage and marking.

62. Two road safety audits have been carried out by RD on this section. In addition, the proposed design has been reviewed by an independent road safety consultant, and the agreed recommendations from all three of these audits have been incorporated in the design.

63. **Implementation readiness.** RD has finalized the engineering design for Component 1 and is preparing procurement documents to invite bids by March 2022, which would allow commencement of construction on Lot 3 by November 2022. The invitation of proposals for the procurement of the CSC is expected by March 2022. Having carried out the first round of consultations on the Resettlement Action Plan (RAP), RD is expected to commence land acquisition in March 2022. It is expected that 50 percent of the construction area will be handed over to the civil works contractor at contract commencement. The design and the layout of the area for marketplace development has been prepared by RD and the road safety arrangements will be shared with the World Bank in due course.

(ii) Economic Analysis

64. **The project is expected to generate a range of economic benefits.** It will improve access to (a) domestic and international markets for Kakheti-based businesses, (b) jobs and services for the population of Kakheti communities, and (c) the Kakheti region for domestic and international tourists. Concerning the conditions of the existing S5 road, the project is expected to improve road safety outcomes, reduce vehicle operating costs (VOCs), reduce travel time and associated costs for passenger flows (business and leisure) and freight flows (in-transit inventory carrying costs), and reduce GHG and local pollutant emissions from road vehicles. Given that, in the case of road freight transport, reductions in vehicle (that is, trucking) operating costs in competitive trucking markets such as Georgia are expected to lead to reductions in shipper-borne transport costs and reductions in travel times (and variability of travel times) will reduce shippers' cost of holding in-transit inventory (and safety stock inventory), the project-financed highway intervention is expected to reduce shipper-level logistics costs³¹ in Kakheti-based domestic and import-export supply chains. For this outcome, the project has been conceptualized within the overall umbrella of improving the competitiveness of the CTC. It is expected that the project will help Georgia protect its primary transit and land bridge status in the Southern Caucasus based on improvements in connectivity and associated logistics performance, rather than in exogenous factors such as conflict-driven blockades to regional trade. In addition, the project will target social aspects and inclusion, by supporting human capital development and improving access to jobs and input-output markets.

65. **A standard economic analysis of the project-financed investments in the Kakheti highway shows that the economic internal rate of return (EIRR) for the proposed road section from Sagarejo to Badiauri is 16.2 percent (see annex 2 for details).** As this is well above Georgia's economic cost of capital of 8 percent, this subproject is economically viable and therefore desirable for the GoG to pursue. The

³¹ Defined as the summation of transport costs and inventory carrying costs.



economic analysis also shows that the economic returns of building this highway section are robust to capital cost increases of 20 percent, reductions in road user cost savings of 30 percent, and a combination of the latter two effects simultaneously.

66. **The proposed highway section and, more broadly, the Kakheti highway corridor it enables are expected to play a larger socioeconomic role by providing improved access to jobs.** Improvements in transport connectivity reduce travel costs and travel time to urban centers with jobs and markets, which can improve employment in two directions. First, it improves access to the labor market and different types of jobs through reduced commuting time and costs.³² It also improves labor market outcomes by providing greater employment opportunities to households in newly or better-connected areas. Benefits tend to be greater for women.³³ Second, better transport infrastructure improves accessibility to inputs³⁴ and outputs markets. Improved transport connectivity to markets tends to increase agricultural productivity and the amount and types of goods sold. Accessibility to inputs markets is essential for increasing agricultural productivity, in which Georgia performs poorly.³⁵ Improved access to output markets increases transportation quality and speed, reduces produce waste, and increases monetary returns. The combination of the two tends to lead to structural transformation; improved roads increase agricultural productivity and catalyze the shift toward more productive sectors.³⁶ The proposed highway is expected to contribute to higher productivity in agriculture and increase nonagricultural employment, through tourism and other sectors.

67. **The role of improved connectivity is even more important given the emerging global job crisis due to the COVID-19 pandemic.** The project aligns with the Jobs and Economic Transformation agenda underlined in the World Bank's COVID-19 Crisis Response Approach Paper. The project will help by creating jobs through short-term employment for infrastructure construction in the very short term, as well as through long-term employment by increasing labor market participation opportunities, and providing skills training to agricultural workers, including vulnerable workers and women traders. At full buildout, the highway construction is expected to generate 400–500 full-time positions.

GHG Emissions Accounting

68. A GHG emissions accounting assessment was conducted as part of the economic analysis of project investments under Component 1 (see annex 2 for details). The project's highway investment is expected to result in a net reduction of GHG emissions over its operational lifetime compared to a

³² Commuting costs can often be prohibitive to labor market opportunities. For example, Phillips (2014) shows that subsidized urban transportation costs in the United States increased job search intensity. The beneficiaries with subsidies applied and interviewed for 19 percent more jobs. Source: Phillips, D. C. 2014. "Getting to Work: Experimental Evidence on Job Search and Transportation Costs." *Labor Economics* 29.

³³ For example, Aggarwal (2018) shows that improved roads increased labor force participation in rural India by 25 percent. Women with access to better roads 9 percentage points more likely to start working than the ones without. The impacts were not statistically significant for men. Source: Aggarwal, S. 2018. "Do Rural Roads Create Pathways Out of Poverty? Evidence from India." *Journal of Development Economics*.

³⁴ Source: Ibid.

³⁵ Crop productivity is shown to be two to four times lower than the world average. Source: "Analysis of the Agricultural Sector in Georgia: Value Chain and Export Potential," PMC Research Center and People in Need.

³⁶ For example, Aggarwal (2018) and Asher and Novosad (2018) show that improved road connectivity in India contributed in increased employment in the nonagricultural sector. Source: Aggarwal, S. 2018. "Do Rural Roads Create Pathways out of Poverty? Evidence from India." *Journal of Development Economics*.

Asher, S., and P. Novosad. 2018. "Rural Roads and Local Economic Development." Forthcoming: American Economic Review. Policy Research Working Papers.



without-project baseline. Specifically, the project is expected to result in the cumulative avoidance of 36,075 tons of CO₂ over 2025–2044, with a net present economic value of between US\$322,363 and US\$644,726, depending on the parameters used for the economic value of carbon.³⁷

B. Fiduciary

(i) Financial Management

69. The overall residual FM risk for the project is Moderate. ETCIC under the MRDI will be responsible for the project's FM arrangements. ETCIC has extensive experience in the implementation of the projects funded by the World Bank and other IFIs. The FM arrangements at ETCIC, including budgeting, accounting, financial reporting, auditing, and internal controls, were reviewed and found to be satisfactory and acceptable for the implementation of the project.

70. ETCIC's FM responsibilities will include submission of biannual unaudited interim financial reports (IFRs) and audited annual project financial statements to the World Bank. ETCIC will produce a full set of IFRs every calendar semester and submit biannual IFRs to the World Bank within 45 days after the end of each calendar semester. The format of IFRs has been agreed during the assessment and includes (a) project sources and uses of funds, (b) uses of funds by project activities, (c) Designated Account (DA) statements, (d) disbursement summary, and (e) a Statement of Expenditure (SOE) withdrawal schedule. The first semester IFRs will be submitted after the end of the first full semester following the initial disbursement.

71. The annual audited project financial statements together with the auditor's opinion and the management letter will be provided to the World Bank within six months after the end of each fiscal year and at the closing of the project. The audit of the project's financial statements will be conducted (a) by an independent private auditor acceptable to the World Bank in accordance with terms of reference (ToR) acceptable to the World Bank and (b) according to the International Standards on Auditing issued by the International Auditing and Assurance Standards Board of the International Federation of Accountants. ETCIC will be assisted by RD for the selection and appointment of the project auditor and the financial audit may be financed from the loan proceeds.

72. ETCIC will open a Project DA in loan commitment currency and maintain it until project completion. The DA will be opened as a Treasury's foreign currency account at the National Bank of Georgia (NBG), where almost all DAs for ongoing World Bank-financed projects in Georgia are held, and on terms and conditions acceptable to the Bank. The DA will be drawn upon to meet payments to contractors, suppliers, and consultants under the project. The loan will be disbursed through the World Bank's standard disbursement methods, which include: (a) advances to the DA using SOEs; (b) payments against Special Commitments; (c) reimbursement of eligible expenditures; and (d) direct payments. The project will be required to adopt e-disbursements, and the minimum value of applications as well the frequency of the reporting of the SOEs will be specified in the Disbursement and Financial Information Letter.

³⁷ The two net present value figures shown here result, respectively, from utilizing the World Bank-recommended low and high case for the social value of carbon over the period of analysis, as shown in World Bank. 2017. *Shadow Price of Carbon in Economic Analysis Guidance Note*.



(ii) Procurement

73. **Procurement under the project will be carried out in accordance with the World Bank's 'Procurement Regulations for Investment Project Financing (IPF) Borrowers for Goods, Works, Non-Consulting and Consulting Services'**, dated November 2020, Fourth Edition (Procurement Regulations). The project will be subject to the World Bank's Anti-Corruption Guidelines, dated October 15, 2006 (revised in January 2011 and as of July 1, 2016).

74. **Procurement implementation arrangements** for the project will be conducted by RD's IPD. The Project Procurement Strategy for Development (PPSD) and Procurement Plan (PP) for the first 18 months were discussed and agreed during negotiations. The core IPD staff has adequate experience to conduct procurement and contract management activities and are supported by local consultants with adequate project and contract management capacity. RD procurement professionals are familiar with the Procurement Framework following Procurement Regulations for IPF Borrowers, using the Systematic Tracking of Exchanges in Procurement (STEP) and Georgian electronic Government Procurement (Ge-GP) system.

75. **Major procurement categories under RD's responsibility.** Of the total project value of US\$109.00 million, (a) US\$100.73 million will finance, under Component 1, a civil works contract for construction of the 17-km Sagarejo-Badiauri section of the Kakheti highway, including the development of the Badiauri interchange and required area for market structures under Component 2, while US\$7.00 million will finance procurement of consultancy services for supervision of highway construction works; and (b) US\$1.00 million will support, under Component 3, TA consultancy services for capacity building and institutional strengthening.

76. **Retroactive financing** will be considered under the project subject to the conditions defined in 5.1 and 5.2 of the Procurement Regulations. The borrower undertakes such advance procurement at its own risk, and any concurrence by the World Bank on the procedures, documentation, or proposal for award of contract does not commit the World Bank to finance the project. Expenditures incurred until the date of signing the Loan Agreement may be eligible for retroactive financing, provided that the procurement procedures and other World Bank policies are complied with.

77. **Procurement risk.** The overall procurement risk for the project is assessed as Moderate (see annex 1 for more details).

C. Legal Operational Policies

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

78. Project activities do not fall under the application of OP 7.50. Localized, temporary pollution and change in turbidity of international waterways caused by road and bridge construction will be mitigated in accordance with ESF requirements and will not cause transboundary impact.



D. Environmental and Social

79. **The project's E&S risk is assessed as Substantial.** This is the first World Bank-financed operation to be implemented by RD under the ESF. The project will have a physical footprint caused by construction of a four-lane highway section along a new alignment. Environmental risks include vegetation clearing, large-scale earth works, generation of excess material and other construction waste, river crossings, dust and noise, vibration, extraction of natural construction materials, transportation of construction materials and waste, and operation of work camps. Negative impacts may include pollution of air, soil, surface water, and ground water; damage to habitats and disturbance of fauna; erosion of slopes; improper handling of chance finds; work site and road accidents, as well as OHS and community nuisance, disturbance, and safety concerns. Impact on critical habitats is not expected, while impact on small areas of natural habitats will be low to moderate. The most significant and likely environmental risks are those associated with the disposal of excess materials and sourcing of natural construction materials. Timely selection and formal approval of sites for temporary and final disposal of spoil according to national regulations and project-specific E&S instruments will be sufficient for limiting the environmental footprint of materials disposal. This will ensure moderate residual impact. Informal sourcing of natural construction materials is unlikely. Still, the project will observe good environmental practices for extraction and timely reinstatement of sites, with close oversight by RD and attention from the Bank's implementation support. Social risks include economic and livelihoods impacts on households that will be affected by land acquisition, as well as the risk of inequitable development benefits from the project for local communities—especially poor, vulnerable, and potentially disadvantaged groups. The project entails land acquisition of agricultural lands and related losses of annual and perennial crops, as well as physical displacement of two households. Project activities will entail labor influx of skilled and unskilled labor, of Georgian and foreign workers, and labor, OHS, and community health and safety risks. These risks, including those of sexual exploitation, abuse, and harassment (SEAH), will be prevented and mitigated through a set of measures described in the project's Labor Management Procedures (LMP) and Environmental and Social Impact Assessment (ESIA).

80. **RD has extensive experience with mitigation of E&S impacts in projects of similar scale, yet the need for strengthening capacity in certain aspects has also been identified by RD and the World Bank.** These aspects include occupational and community health and safety, grievance redress and stakeholder engagement, and SEAH. To manage E&S risks in a manner consistent with ESF requirements, RD has prepared, disclosed, and discussed with stakeholders an ESIA, RAP, Stakeholder Engagement Plan (SEP), and LMP for the project. The first draft Environment Impact Assessment (EIA) report prepared under national legislation requirements was disclosed on May 5, 2021 and underwent public consultations in six communities between June 14 and 16, 2021. The report was later updated as an ESIA³⁸ in line with the ESF and disclosed on February 22, 2022. RD intends to conduct a second round of consultations in project affected communities prior to finalizing the document. The final ESIA report will be redisclosed after the second round of stakeholder consultations, no later than 30 days after the project becomes effective. The draft RAP and SEP were disclosed in-country on December 27, 2021, while the draft LMP was disclosed in-country on January 25, 2022. All ESF documents will be updated to incorporate feedback received during consultations and will be redisclosed in final form to meet the covenants set out in the Environmental and Social Commitment Plan (ESCP).

³⁸ The EIA was updated to address requirements under the ESF and disclosed as the ESIA.



81. **Informed by the interim and final outputs of the ESIA process, the road design has been adjusted to minimize the need for land acquisition and increase climate resilience.** Expected land acquisition for Lot 3 comprises 626 land plots at an estimated cost of US\$4.3 million, to be financed by the state budget. Physical relocation will affect only two residential houses in Badiauri village. Overall, the number of affected households is 329, of which 18 will lose minor structures, like ancillary buildings and sheds. Construction of the project-financed highway section will not affect formal or informal businesses and employment. The vineyards owned by households under the impact of resettlement are for family use. RD held consultations on the RAP on February 4, 2022, and RAP implementation is expected to commence in March 2022.

82. RD will assign dedicated specialists within the project implementation team responsible for implementing and monitoring compliance with the project's ESF instruments. The specialists will be assisted by the services of the relevant experts in the technical supervision consultant's team. Consistent with the borrower's ESCP, the organizational structure within RD's project implementation team will include at least one environmental specialist (responsible for overseeing all aspects of the ESIA), one occupational and community health and safety specialist (responsible for all aspects of LMP implementation and relevant aspects of the ESIA), one resettlement specialist (responsible for overseeing RAP implementation, together with the broader resettlement unit of RD), and one gender and community liaison specialist (responsible for SEP implementation). Ongoing TA and assessments by the World Bank and RD on health and safety, guidelines on valuation and compensations, and strengthening of grievance mechanisms are also expected to enhance RD's capacity in the medium term for E&S risk mitigation.

E. Climate Change and Disaster Screening and Climate Co-Benefits

83. **Climate change and disaster screening.** The project was screened for climate change and disaster risks using the World Bank Climate and Disaster Risk Screening Tool. The screening shows that Kakheti is highly exposed to flooding and landslide risks, more so than other regions of Georgia. Kakheti is also exposed to wildfires at high risk and to extreme heat at medium risk. Kakheti is expected to see increases in mean temperatures and greater variance in rainfall over time, both of which will amplify the current risks of flooding, landslides, wildfires, and extreme heat. According to the Global Facility for Disaster Reduction and Recovery's *ThinkHazard!* assessment, "potentially damaging and life-threatening river floods are expected to occur [in Kakheti] at least once in the next 10 years" and therefore "project planning decisions, project design, and construction methods must take into account the [region's High] level of river flood hazard."³⁹ Accordingly, these findings have informed project design. Specifically, the chosen alignment of the Kakheti highway, including the project-financed Lot 3, was optimized to reduce both travel distances (thus contributing to transportation efficiency, including reduction of GHGs and local pollutants) and exposure to flooding risks (thus contributing to climate change adaptation). Furthermore, the technical specifications of the project-financed highway section strengthen adaptation by including several measures to mitigate flooding risk, including high embankments and ample use of drainage facilities, as well as to withstand extreme temperatures.

84. **Climate co-benefits.** The project will contribute to both mitigating climate change risks and enhancing adaptation to current and future climate risks, particularly flooding and extreme temperature risks. With regard to mitigation, the project-financed section of the Kakheti highway is expected to reduce GHG and local pollutant emissions relative to a without-project baseline. This will be attained by (a)

³⁹ <https://thinkhazard.org/en/report/1300-georgia-kakheti>. Accessed February 11, 2022.



preventing traffic congestion that would have materialized in the existing limited-capacity road—the S5 road, (b) facilitating cruising speeds that result in a more efficient use of vehicle (internal combustion) engines compared to the existing road, and (c) promoting EV adoption through corridor-wide deployment of fast charging access points and deploying ITS in the operation of the highway. With regard to climate change adaptation, the project will champion resilient infrastructure by adopting EU-wide design and construction standards that comply with and go beyond the requirements of the national law, to deliver a modern highway facility with, among others, (a) bridges and culverts expected to withstand the impact of a 1-in-100-year storm, (b) raised embankments to prevent flooding, and (c) bioengineering approaches to reduce soil instability and protect embankment erosion (annex 3 presents a detailed list of the engineering design and construction approaches to be implemented at Lot 3 to make the project-financed highway section resilient to climate change-induced extreme weather). Furthermore, by virtue of this being a greenfield investment, the project-financed highway section, as part of the overall Kakheti highway corridor which it comprises, will enable an alternative access to Kakheti, thus creating network redundancy and reducing vulnerability should the current and only access route to/from central Kakheti—the existing S5 road—be impaired due to extreme weather. In addition, at full buildout, the Kakheti highway, including the project-financed section, is expected to provide an alternative international route and border crossing point between Georgia and Azerbaijan (at Lagodekhi), thus delivering resilience through redundancy should the current main route and border crossing point between Georgia and Azerbaijan (via the Red Bridge), which are exposed to climate-related events, be compromised due to extreme weather. On this basis, the project is expected to reduce operational disruption in the face of climate change risks compared to a without-project scenario.

F. Gender

85. **Georgian labor market exhibits significant gender gaps.** In the last decade, the share of women in the labor force ranged between 40 and 46 percent compared to 62–67 percent for men.⁴⁰ In 2020, only 33.9 percent of women aged 15 years and above were employed compared to 49.5 percent of men. The Georgian labor market is characterized by a high level of gender-based horizontal segregation where only 10 percent of all employed in transport and storage sector are women.⁴¹ Vertical segregation also remains a challenge. According to the World Bank's 2019–2020 Enterprise Surveys,⁴² only 16.5 percent of the 581 surveyed firms had a woman in top management and 11.5 percent of them had majority female ownership. According to Geostat,⁴³ the number of men founding businesses in 2020 was almost twice as high as the number of women, with certain sectors such as transport and storage, industry, construction, and agriculture exhibiting one of the highest gender disparities in firm ownership. These gaps contribute to the gender pay gap: in 2020, women on average earned 33 percent less than men when their monthly income was compared.

86. **Women in rural areas face particular challenges compared to men.** The gender assessment conducted in the project-affected areas⁴⁴ in Kakheti confirmed a range of barriers that inhibit both women and men but particularly women. Some of these barriers include lack of local marketplaces to sell their

⁴⁰ Geostat (National Statistics Office of Georgia). 2021. *Women and Men in Georgia*.

⁴¹ Ibid.

⁴² World Bank Enterprise Surveys. <https://www.enterprisesurveys.org/en/enterprisesurveys>. The interviewed firms represent manufacturing, retail, and other services sectors.

⁴³ Geostat. 2021. *Women and Men in Georgia*.

⁴⁴ World Bank. 2021. *Socio-Economic Study and Improving Local Market Development Opportunities for the Sagarejo - Badiauri Road Section of the Kakheti Highway Corridor*. Internal (unpublished) report.



produce and lack of business skills to start and/or improve their entrepreneurial activities as well as poor roads and transportation to access markets.⁴⁵ Focus group discussions held with the project-affected communities found that women often sell their products at their doorsteps often at a lower cost than at markets and that some women would welcome opportunities to sell their products at local markets at a more competitive price.⁴⁶ They also named access to business advisory services needed to establish and run their agricultural businesses which are confirmed by various other studies.⁴⁷

87. **The project aims to enhance rural women’s economic opportunities in Kakheti by addressing the two identified gender gaps: lack of local marketplace and lack of business advisory services for women.** To address these gender gaps, the project will construct a marketplace with appropriate facilities that are conducive for both men and women and reserve half of the market stalls to women traders (see detailed description in Component 2). The project will also provide tailored business advice to at least 50 local women to start and/or expand their micro businesses at the premises of the new market as well as other locations in the project-affected areas. The advisory support will be provided to women throughout the third year of the project before launching the new marketplace. While this target of 50 women may seem modest, it represents a significant effort in this context where the project-affected communities are small. In particular, the proposed business advisory support package is significant, covering a larger number of beneficiaries who will be identified with the help of local governmental and nongovernmental organizations including the Gender Adviser⁴⁸ of the Sagarejo municipality. These concerted efforts (a local market with reserved market stalls and tailored business advisory services for women) are expected to create a conducive trading environment for local women, encouraging them to venture into the new market and enhance their income-generating opportunities.

G. Citizen Engagement

88. The project aims to employ a combination of face-to-face and virtual consultations and digital tools to engage with local communities, project beneficiaries, project-affected parties, other interested stakeholders, and the public. Consultations in project communities have been undertaken during project preparation to understand the needs and concerns of local communities regarding the project and potential ways in which benefits to them may be maximized through project activities. Consultations during project implementation will also explore preferred forms of engagement during project implementation. The project will enhance its citizen engagement channels through a variety of mechanisms, as described in the project’s SEP. These include the establishment of local-level information desks; social media engagement offering opportunity for two-way communication with project-affected citizens, other interested stakeholders (for example, businesses and civil society organizations), and the general public; and a digital platform for managing and systematizing feedback and grievances. A survey will be applied at the first year of implementation and at project closing to assess, among others, the effectiveness of consultations and citizen engagement measures to raise awareness and address concerns of the population. The development of local marketplace under Component 2 will benefit from inputs from local population collected through public consultations and focus group discussions at the design,

⁴⁵ Ibid.

⁴⁶ World Bank. 2020. *Understanding Agriculture Logistics Challenges in Kakheti*.

⁴⁷ FAO. 2018. *Gender, Agriculture and Rural Development in Georgia*.

⁴⁸ Georgian municipalities offer a municipal service called ‘women’s room’ which is a free information consultation space for rural women and children who visit the municipal building. The rooms’ managers (Gender Advisers) are responsible for facilitating the access of women to local decision-making processes in tandem with mainstreaming national gender policy requirements into the local government. <https://alcp.ge/pdfs/2d834dd8330b2f0968d8a80f8b7b3905.pdf>.



and prior to operation, stage to ensure that convenience, safety, and accessibility among other features of the marketplace infrastructure are aligned with the needs of potential users. Consultations will be gender balanced considering that at least half of the vendors at the marketplace are expected to be female. The project will adopt a beneficiary indicator—share of citizens who assess the information and consultation measures under the project as effective—to measure the quality of the citizen engagement activities.

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 project's overall risk is rated Moderate.** Residual risks in terms of macroeconomics, political and governance, technical design, sector strategies, fiduciary, and stakeholders have all been rated Moderate. The E&S risk is rated Substantial. Outside of these risk categories, the project may also be exposed to implementation disruptions due to the COVID-19 pandemic. But this will depend on the evolution of the pandemic. While the risk (captured under the 'Other risks' category) is low, the possibility of future COVID waves requires close monitoring. This risk will be mitigated through best practices in OHS, including World Bank-endorsed guidance to protect project workers, in addition to the strict observance of national and local public health regulations and guidance.

91. **The project's E&S risks are rated Substantial.** The main environmental risks include vegetation clearing, earth works producing large volumes of excess material, generation of other construction waste, river crossings, dust and noise, vibration, extraction of natural construction materials, and operation of work camps. Social risks include economic and livelihoods impacts on households that will be affected by land acquisition, as well as the risk of inequitable development benefits from the project for local communities. The project's detailed and comprehensive E&S management instruments, coupled with RD's binding commitment to further enhance its institutional capacity for E&S management, will allow effective mitigation of the identified E&S risks. On this basis, the project is not expected to cause significant negative environmental or social impacts. This will be the first ESF project to be implemented by RD, building on its long-term experience implementing E&S safeguard policies of the World Bank and other IFIs.



VII. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY: Georgia

Kakheti Connectivity Improvement Project

Project Development Objectives(s)

The Project Development Objective (PDO) is to improve connectivity and safety of road transportation in the Kakheti region along the Sagarejo-Badiauri section of the Tbilisi-Bakurtsikhe-Lagodekhi highway.

Project Development Objective Indicators

Indicator Name	PBC	Baseline	Intermediate Targets				End Target
			1	2	3	4	
Improved Connectivity							
Travel time along the target section of the highway corridor (Minutes)		17.00	17.00	17.00	17.00	17.00	11.30
Average Annual Daily Traffic of freight vehicles on the corridor (Number)		1,013.00	1,059.00	1,106.00	1,162.00	1,217.00	1,275.00
Improved Safety							
Number of fatal accidents per 100 million vehicle-km traveled along the target section of the highway corridor (Number)		4.70	4.70	4.70	4.70	4.70	3.76



Intermediate Results Indicators by Components

Indicator Name	PBC	Baseline	Intermediate Targets				End Target
			1	2	3	4	
Component 1. Connectivity Improvements on the Eastern Corridor							
Roads constructed (CRI, Kilometers)		0.00	0.00	0.00	0.00	17.00	17.00
Roads constructed - rural (CRI, Kilometers)		0.00					0.00
Roads constructed - non-rural (CRI, Kilometers)		0.00					17.00
Number of km built to climate resilient standards (designed to 100-year climate events for bridges and culverts) (Kilometers)		0.00	0.00	0.00	0.00	17.00	17.00
Satisfaction of road users at target highway corridor (Percentage) (Text)		To be determined the first year					20% increase from the baseline
Number of accidents involving pedestrians per 100 million vehicle-km travelled on the target section (Number)		2.40	2.40	2.40	2.40	2.40	1.92
Share of citizens who assess the information and consultation measures under the project as effective (Percentage)		0.00	70.00				70.00
Component 2. Development of a new local Marketplace							
Market stalls in the new Badiauri marketplace reserved to women traders (Percentage)		0.00	0.00	0.00	0.00	50.00	50.00



Indicator Name	PBC	Baseline	Intermediate Targets				End Target
			1	2	3	4	
At least 50 women receiving tailored business advisory services on how to start and/or expand their entrepreneurial activities (Number)		0.00	0.00	0.00	50.00	0.00	50.00
Component 3. Institutional Strengthening and Implementation Support							
Percentage of staff at RD receiving training in contract management (Percentage)		0.00					70.00

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Travel time along the target section of the highway corridor	Baseline value represents mean Travel Time on existing two-lane road. Target value represents mean travel time on newly constructed section of the highway.	Will be collected at the project completion	Borrower's Implementation Completion Report	Baseline mean travel time is measured by Averaging one-hour interval travel time values of one full week 24/7 based on values extracted from Google Big Data. Target travel time has been defined by expected mean speed of vehicles (90km/h) on 17km highway section. The	RD



				actual travel time will be measured at the end of the project using the same methodology as for measuring the baseline.	
Average Annual Daily Traffic of freight vehicles on the corridor	Baseline value represents Annual Average Daily volume of freight vehicles (trailers) based on available traffic count data. Target value is the number based on traffic projection assumptions as part of economic analysis. Indicator will enable monitoring of actual growth of freight vehicles and enable comparison with projected traffic volume.	Annual	Quarterly progress report	Automatic traffic counters based on vehicle composition.	RD
Number of fatal accidents per 100 million vehicle-km traveled along the target section of the highway corridor	Rate of fatal accidents represents the number of accidents with fatalities per 100 mln. vehicle-km traveled represented by the last five-year average.	Annual	Quarterly progress report	Rate of fatal accidents is measured by multiplying total number of fatal accidents by 100 mln. divided by annual vehicle-km traveled (length of the section multiplied by AADT and multiplied by 365). Target value has been	RD



				defined as 20% reduction of the baseline. Data on fatal accidents is reported to the RD annually by Patrol Police of the Ministry of Internal Affairs.	
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Monitoring & Evaluation Plan: Intermediate Results Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Roads constructed		Annual	Quarterly progress report / Progress reports of the Supervision Consultant	Project supervision	RD
Roads constructed - rural					
Roads constructed - non-rural					
Number of km built to climate resilient standards (designed to 100-year climate events for bridges and culverts)	Measures the length of road constructed integrating climate change and adapted to higher intensity and frequency of extreme	Annual	Quarterly progress report and Completion Report of	Implementation of road works, including climate resilient design elements will be assessed and reported	RD



	rainfall events.		Supervision Consultant	regularly by the supervision engineer during the construction phase.	
Satisfaction of road users at target highway corridor (Percentage)	Percentage of respondents who are satisfied with the quality of the target highway section and services provided. The level of satisfaction of road users will be assessed through road users' satisfaction survey (in a gender disaggregated manner). The survey will capture public opinion on quality, safety and reliability of (i) highway road sections and (ii) services provided along the highway. The baseline indicator will be obtained from the road users' satisfaction survey to be completed during the first year of implementation.	A survey will be applied at the first and last year of the project implementation	Road users' satisfaction survey report from the Supervision Consultant	Road users' satisfaction survey	RD
Number of accidents involving pedestrians per 100 million vehicle-km travelled on the target section	Rate represents the number of accidents with pedestrians per 100 mln. vehicle-km traveled represented by the last five-year average. Vehicle to	Annual	Quarterly progress report	Rate for baseline value is calculated for the existing section of S5 international road. Target value to be achieved represents	RD



	pedestrian accidents reduction is expected as the new road will divert majority of traffic from densely populated area.			the rate for combined traffic flow of the existing S5 section and newly constructed highway section. Rate is measured by multiplying total number of vehicle to pedestrian accidents by 100 mln. divided by annual VKT (length of the section multiplied by AADT and multiplied by 365). Target value has been defined as 20% reduction of the baseline. Data on accidents is reported to the RD annually by Patrol Police of the Ministry of Internal Affairs.	
Share of citizens who assess the information and consultation measures under the project as effective	Percentage of citizens satisfied with the effectiveness of consultations and citizen engagement measures applied under the project. The quality of citizen engagement activities will be measured through above	A survey will be applied at the first year of project implementation and project	Road users' satisfaction survey report from the Supervision Consultant	Road users' satisfaction survey	RD



	mentioned Road users' satisfaction survey.	closing			
Market stalls in the new Badiauri marketplace reserved to women traders	The project will ensure that at least half of the market stalls in the new local marketplace are reserved to women traders. Given that the market will become operational at the time the highway is completed and open for traffic, the indicator only has the end target.	Will be collected at the project completion	Borrower's Implementation Completion Report	Confirmation through a formal letter by the RD	RD
At least 50 women receiving tailored business advisory services on how to start and/or expand their entrepreneurial activities	The project will provide tailored business advice to at least 50 local women covering a range of topics including providing technical knowledge. The support will be provided for the duration of three months and will consist of minimum one week hours for each women. The advisory will take place throughout the third year of the project prior to launching the new marketplace.	Annual	Progress report of the Supervision Consultant	Project supervision	RD
Percentage of staff at RD receiving training in contract management	Measures percentage of staff at RD's divisions responsible for Construction, Rehabilitation,	Quarterly	Borrower's Implementation Completion	Data will be collected by the RD's Human Resources Management Division	RD



	Environmental and Social, Legal and Procurement issues who receive training in contract management. Total number of relevant staff is estimated to be 40.		Report	throughout the life of the project and reported at the project completion.	
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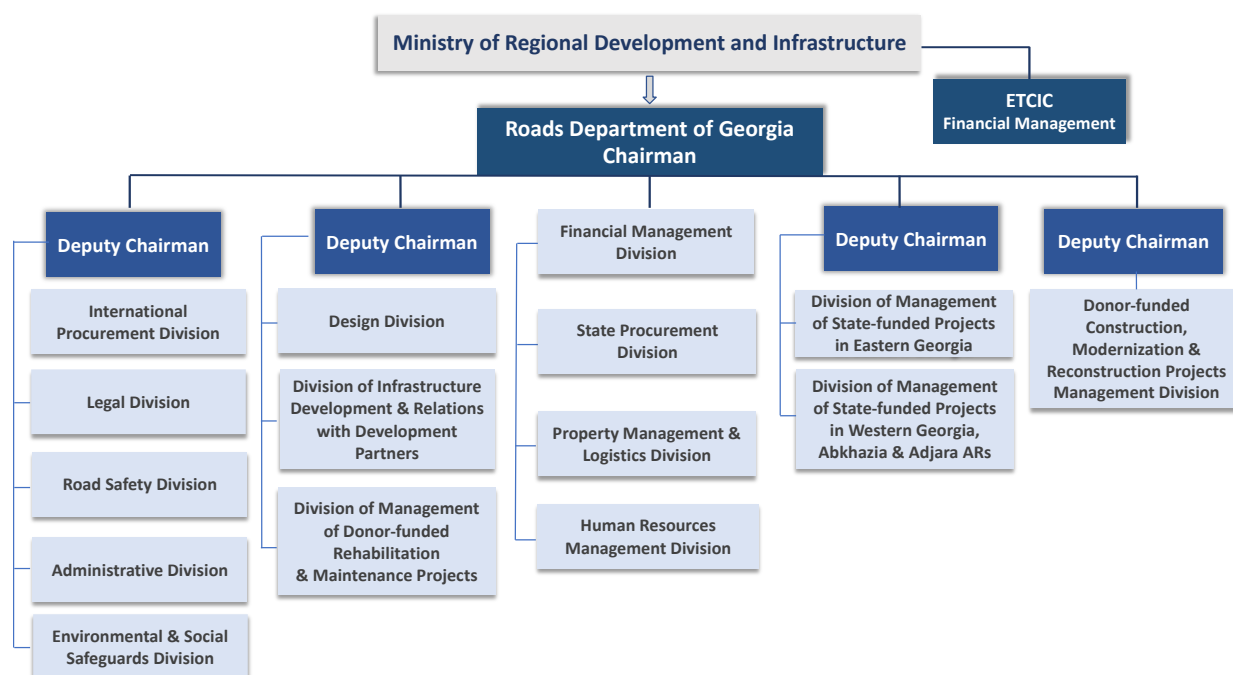


ANNEX 1: Implementation Arrangements and Support Plan

Implementation Arrangements

1. All the components of the proposed project will be implemented by the MRDI's RD, which has been implementing several World Bank-funded projects since 1996. RD has vested project management functions with one of its Deputy Chairmen, supported by the donor-funded Construction, Modernization and Reconstruction Projects' Management Division, which is responsible for the implementation of the project. The IPD will be responsible for procurement and monitoring and reporting of project results. FM will be provided by ETCIC, a specific body designated for FM of foreign-funded road projects under the MRDI. Specific units in RD will be in charge of environmental management and monitoring, road safety, and land acquisition and resettlement.⁴⁹ As the ongoing EWHCIP and SRAMP demonstrate, these implementation arrangements have been generally satisfactory. The application of environmental and social safeguards remains dependent to a large extent on consultant services being procured to supplement RD's in-house capacity.

Figure 1.1. Organization Structure of the Implementing Agency for the Project



2. The IPD, ETCIC, and the E&S units of RD have adequate capacity, as they are currently implementing construction of the EWH financed by multiple donors, including the World Bank. An internationally recruited CSC will be engaged to carry out supervision activities, and an externally recruited Project Manager will be retained to supplement the capacity of RD in managing the entire project.

⁴⁹ The Project management process within RD is assisted by the individual consultants hired under IFI-financed projects.



Financial Management, Disbursements, and Procurement

Financial Management

3. The project's FM arrangements will be handled by ETCIC under the MRDI. ETCIC will be responsible for the flow of funds, accounting, planning, and budgeting, financial reporting, internal controls, and auditing. ETCIC has been involved in implementation of several World Bank-financed transport or transport-related projects. ETCIC will work with the Ministry of Finance and the Treasury Service in the administration of the project DA and with RD for implementation of the project. RD and ETCIC will sign an implementation agreement spelling out their respective responsibilities under the project. The World Bank will monitor any changes to the structure in the implementing agency that will require agreement with the World Bank.

4. The FM arrangements of ETCIC have been reviewed periodically as part of the ongoing projects' implementation support, as well as during the FM assessment for KCIP (October 2021) and have been found to be satisfactory. The same FM arrangements as in the case of other World Bank-financed projects, including the Kakheti Regional Roads Improvement Project, the Third and Fourth East-West Highway Improvement Projects (EWHIP-3 and EWHIP-4), EWHCIP, and SRAMP (all projects being implemented/implemented by ETCIC), will be deployed for KCIP. It has been agreed that ETCIC will update the ongoing projects' FM Manual, which will then be part of KCIP's POM to reflect the specific activities and arrangements of this project.

5. The overall FM risk for the project after mitigation measures is Moderate, with inherent and control risks of the project, after mitigation measures, also rated Moderate.

6. Overall, the implementing agency has acceptable planning and budgeting capacity in place. Project budgets are prepared by RD's Financial Management Division based on draft information prepared by ETCIC (based in turn on the approved procurement plan for the project). The budgets form the basis for allocating funds to project activities, for requesting funds from the Government for counterpart contributions and payments through the Treasury system as appropriate.

7. ETCIC has overall adequate FM staffing capacity. The FM staff comprises a financial manager, a financial specialist, an accountant, a small-value contracts manager, and a disbursement specialist.

8. ETCIC utilizes the Oris accounting software, which is used by most of the World Bank-financed projects in Georgia and was found to be adequate for accounting and reporting under KCIP. The software automatically generates IFRs, which are finalized in Excel spreadsheets. The budget data are entered into the accounting software. The accounting books and records of ETCIC will be maintained on a cash basis adjusted for the project, and project financial statements, including IFRs, will be presented in the loan commitment currency. For reporting on a cash basis, International Public Sector Accounting Standards will be used. The FM Manual will be updated to reflect the new activities of the project.

9. Generally, there are adequate internal control procedures established over FM and disbursement arrangements at ETCIC. There are neither petty cash nor specific director's expenses at ETCIC. All the payments are made through Treasury transfer. The fixed assets register is maintained in Excel spreadsheets. The stocktaking is conducted annually. The inventory cards are properly maintained. Each fixed asset item is assigned to the relevant staff who signs the relevant inventory card. The fixed assets



have inventory tags attached. Monthly backups of the accounting data are made on two external backup drives and a streamer (at the IT office). The financial manager keeps one copy of the external drive at the office and the other one at home. ETCIC has no internal audit function, and none is considered necessary given the small size of the organization.

10. Project management oriented unaudited IFRs will be used for project monitoring and implementation support, and the indicative formats of these are included in the ETCIC FM Manual.

11. The annual audited project financial statements together with the auditor's opinion and the management letter will be provided to the World Bank within six months after the end of each fiscal year and at the closing of the project.

Table 1.1. Timeline for submission of Audit Reports

Audit Report	Due Date
The project financial statements include project balance sheet, sources and uses of funds, uses of funds by project activities, SOE withdrawal schedule, DA statement, notes to the financial statements, and reconciliation statement	Within 6 months of the end of each fiscal year and at the closing of the project

12. The borrower has agreed to disclose through the MRDI/RD the audit reports for the project within one month of their receipt from the auditors, by posting the reports on the website of RD (www.georoad.ge) or ETCIC (www.trrc.ge) or publishing them in a national newspaper. Following the World Bank's formal receipt of these reports from the recipient/borrower, the World Bank will make them publicly available according to World Bank Policy on Access to Information. The contract for the audit awarded during the first year of project implementation may be extended from year to year with the same auditor, subject to satisfactory performance. The cost of the audit will be financed from the proceeds of the credit/loan.

Disbursements

13. ETCIC will open a DA in loan commitment currency and maintain it until project completion. The DA will be opened as a Treasury's foreign currency account at the NBG, where almost all DAs for ongoing World Bank-financed projects in Georgia are held, and on terms and conditions acceptable to the World Bank. The DA will be drawn upon to meet payments to contractors, suppliers, and consultants under the project.



14. The loan will be disbursed through the World Bank's standard disbursement methods, which include (a) advances to the DA using SOEs, (b) payments against special commitments, (c) reimbursement of eligible expenditures, and (d) direct payments. The project will be required to adopt e-disbursements, and the minimum value of applications as well the frequency of the reporting of the SOEs will be specified in the Disbursement and Financial Information Letter.

Procurement

15. **Use of STEP.** All procurement transactions for post and prior contract review under the project must be recorded in or processed through the World Bank's planning and tracking system, STEP. This ensures that comprehensive information on procurement and implementation of all contracts for goods, works, non-consulting services, and consulting services awarded under the whole project are automatically available. This tool will be used to manage the exchange of information (such as procurement documents, bid evaluation reports, 'no objections', and so on) between the implementing agency and the World Bank.

16. **Procurement method of selection.** The procurements will be conducted using the Standard Procurement Documents uploaded on the official World Bank website (<https://www.worldbank.org/en/projects-operations/products-and-services/brief/procurement-new-framework>), considering the procurement risk assigned to the project and in accordance with the World Bank's approved selection methods for the following:

(a) Goods, Works, and Non-consulting Services:

- Request for Proposals (RFP)
- Request for Bids (RFB)
- Request for Quotations (RFQ)
- Direct Selection

(b) Consulting Services:

- Quality and Cost Based Selection (QCBS)
- Fixed Budget Based Selection (FBS)
- Least Cost Based Selection (LCS)
- Quality Based Selection (QBS)
- Consultant's Qualifications Based Selection (CQS)
- Direct Selection

17. **Project Procurement Strategy for Development (PPSD) and Procurement Plan.** As required by the Procurement Regulations, short versions of the PSD and Procurement Plan were discussed and agreed during negotiations. These set out the selection methods to be followed by the borrower during implementation in the procurement of goods, works, and non-consulting and consulting services financed by the World Bank. The documents will be continuously updated to reflect evolving needs during implementation.



18. **POM.** RD shall prepare a POM which shall be provided for the World Bank's review and approval before adoption.

- **Procurement risk.** The overall procurement risk is assessed as Moderate. The current IPD staff and procurement consultants of the IPD are familiar with World Bank procurement guidelines and procedures as they have been involved in similar completed and ongoing projects and gained substantial knowledge and experience during the implementation of those projects.
- Need to enhance RD's contract management capacity to improve project contract management.
- Need further and continuous capacity building of the relevant contract management staff.

19. **Prior and post review.** The World Bank carries out prior reviews of procurement activities that are of high value and/or high risk to determine whether the procurement is carried out in accordance with the requirements of the Legal Agreement. The World Bank also carries out post reviews of procurement activities undertaken by the borrower to determine whether they comply with the requirements of the Legal Agreement. The World Bank may use a third party such as a supreme audit institution, acceptable to the World Bank, to carry out post reviews. Any such third party shall carry out the reviews in accordance with the ToR provided to it by the World Bank. Whether a procurement is subject to prior or post review is determined on the basis of the project and contract-specific procurement risks. These risks are assessed by the World Bank during project preparation and reassessed and updated during project implementation.

20. The requirement for a prior or post review shall be specified in the Procurement Plan. During project implementation, the World Bank monitors and reassesses the risks and mitigation measures. If necessary and appropriate, as determined by the World Bank, the World Bank may require the borrower to revise the prior and/or post review requirements in the Procurement Plan.

Environmental and Social

21. RD will be responsible for monitoring and mitigation of E&S risks and impacts under the project. RD's Environment and Social Division has extensive experience in managing E&S impacts under World Bank-financed projects following safeguard policies of the World Bank. This experience has evolved over time, including gaining more knowledge on (i) health and safety, including through a recent portfolio audit; (ii) gender and SEAH issues, through dedicated training and measures implemented under prior projects; and (iii) land acquisition and resettlement. Still, RD's expertise needs to be expanded in new areas introduced by the World Bank's ESF, as well as in keeping with evolving national legislation.

22. In terms of staffing, RD maintains a full-time E&S consultant working on World Bank-financed projects. The in-house expertise of RD will be supplemented by a dedicated occupational and community health and safety specialist who will be primarily responsible for implementation of the project's LMP, as well as a gender and community liaison specialist who will be primarily responsible for implementation of the SEP and management of the project grievance mechanism. Implementation of the LMP, with regard to RD's team of staff and consultants, will also be managed by the Human Resource Manager at RD. This includes, among others, ensuring equity and nondiscrimination in hiring procedures and termination as well as adherence to national labor requirements. The occupational and community health and safety



specialist will ensure that labor and OHS practices consistent with the LMP and national legislation are deployed in the activities of all contractors, subcontractors, and consultants engaged under the project. All project workers—direct and contracted—will be trained on, acknowledge, and sign a code of conduct and attend awareness-raising sessions on prevention and mitigation of SEAH in their activities and on the project’s SEAH-sensitive grievance mechanism. RD will designate a gender focal point for the implementation of all SEAH prevention and mitigation measures, though specific roles in the SEAH mitigation process may be allocated to other parties, such as the Human Resources Manager, Project Manager, or Social Specialist of the contractor.

23. RD will outsource certain E&S functions to specialized consultants. The ESIA and RAP for the project-financed highway section have been prepared by consulting teams, reviewed, disclosed, and consulted by RD. Additionally, public hearings on the ESIA (‘EIA’ under national legislation) have been conducted by the Ministry of Environmental Protection and Agriculture. The valuation of compensation for land acquisition and resettlement impacts has been (and will be in the event of future impacts, if any) outsourced to licensed and independent valuator. After completion of RAP implementation, RD will ensure the preparation of the RAP completion report by an independent consultant to ascertain adequate completion of RAP activities and ability of affected persons to improve or at minimum restore their assets and livelihoods affected by the project.

24. Monitoring and reporting of E&S aspects will be submitted to the World Bank every six months, along with full project progress reports. Additionally, RD will submit to the World Bank the contractor’s Environmental and Social Management Plan and related management plans (on, inter alia, OHS, traffic management, community health and safety, waste management, COVID-19 prevention and mitigation, code of conduct, and protocols of SEAH awareness sessions with workers) for review and approval once these have been submitted by the contractor and before the start of any physical activities on site that would necessitate management under the said plans. Project progress reports will include at minimum a summary of E&S performance to date, trainings completed, status of grievances, presence or absence of incidents or accidents, status of RAP implementation, and status of stakeholder engagement activities, among other key issues.

M&E of the Project

25. RD will be responsible for monitoring of the results achieved under the project. The monitoring of the project will be carried out by the reporting unit within the IPD, which is discharging responsibilities for ongoing World Bank-supported projects. The reporting unit will collect data from the appropriate units responsible for data collection within RD and from the CSC, in compiling the Quarterly Project Monitoring Report. In the case of road safety data, necessary information will be collected by the Road Safety Division of RD in coordination with the Ministry of Internal Affairs.

Implementation Support Plan

26. The World Bank team expects to work closely with the implementing agency throughout the implementation of the project, with at least two supervision missions per year (onsite or virtual, depending on travel restrictions due to COVID-19) to review the progress of the project and address any deviations from expected implementation levels. The missions will include technical, fiduciary, and safeguards team members, who will provide input into infrastructure design and implementation, carry



out post reviews on contract management, review safeguards compliance, and provide formal training where required.

27. The following implementation support plan is proposed for the project (all components) (see table 1.2):

- **Technical support.** The World Bank implementation support will include two transport specialists at the World Bank headquarters and one based in the Tbilisi country office to support the overall project implementation.
- **FM.** The World Bank team will supervise FM arrangements through the review of quarterly unaudited IFRs and annual audited project financial statements as well as implementation support missions.
- **Procurement.** The World Bank team will use the STEP system to track all procurement transactions. A World Bank procurement specialist based in Tbilisi will support project implementation.
- **ESF.** Implementation support will be provided as needed by the team's E&S specialists, based in Tbilisi, the region, or Washington, DC.

Table 1.2. Implementation Support Resources by Project Year

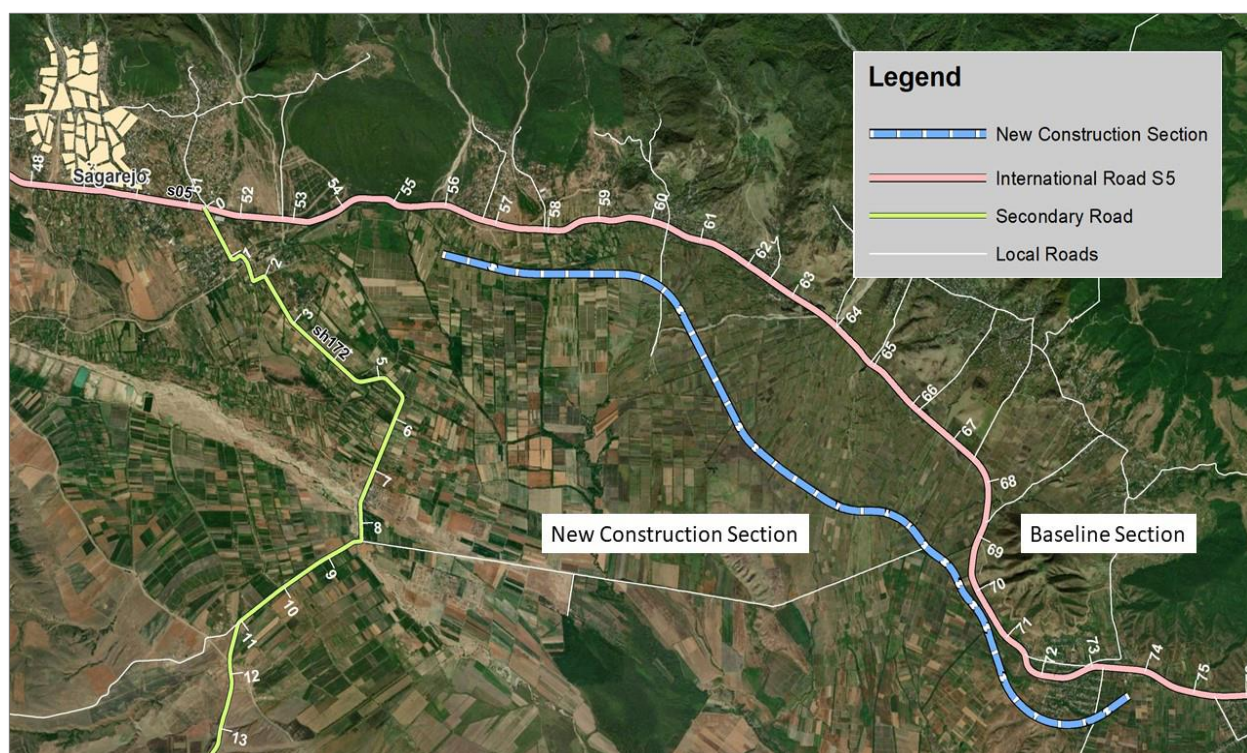
Period	Focus	Skills Needed	Resource Estimate (Staff Weeks)
Year 1	Project management	Task team leader	8
	Technical review	Sr. engineer	5
	Procurement supervision	Sr. procurement specialist	3
	Environmental supervision	Sr. environmental specialist	3
	Social supervision	Sr. social specialist	3
	FM and disbursements	Sr. FM specialist	3
	Road safety content	Road safety specialist	2
	Project implementation monitoring	Operations officer	6
	Communication	Communications specialist	2
Years 2–5	Project management	Task team leader	24
	Technical supervision of civil works	Road engineer	24
	Environmental supervision (monitoring of works and review of environmental studies)	Sr. environmental specialist	16
	Social supervision	Sr. social development specialist	16
	Support with project supervision coordination	Operations analyst	10
	FM and disbursements	Sr. FM specialist	6
	Procurement supervision	Sr. procurement specialist	8



ANNEX 2: Economic Analysis

1. A standard discounted economic resource flow analysis was conducted to assess the economic viability of the proposed highway investment under Component 1. The investment involves new construction of a 17 km section of the broader Tbilisi-Bakurtiskhe-Lagodekhi highway (the 'Kakheti highway'), a greenfield investment being implemented in phases by RD. This will be a four-lane, modern standard highway with a design speed of 120 km per hour. The existing parallel road S5 between chainage of km56-km74 is a two-lane inter-urban road (figure 2.1). The intended objective of this investment is to improve connectivity to/from Kakheti, particularly between Kakheti and Tbilisi, compared to the existing S5 road. At full buildout, the Kakheti highway will eventually reach the Azerbaijan border, thus providing an alternative route for cross-border trade along the CTC. This will increase operational resilience for Georgia's highway network and trade logistics. Therefore, the KCIP-financed investment is expected to improve connectivity in the short term and contribute to improved cross-border trade logistics in the long run.

Figure 2.1. Component 1 Section of the Kakheti Highway and Existing S5 Road



Source: RD.

2. The economic evaluation compares a 'with-project' scenario to a 'without-project' baseline and calculates incremental changes to costs and benefits during the life cycle of the project. The analysis used the Highway Development and Management Model (HDM-4) to compare the costs (capital and recurrent) of the road investment with the monetized benefits to road users. These benefits comprise VOC reductions, travel time savings, safety improvements, and GHG emission reductions. The appraisal period covers construction followed by a 20-year operating life of the asset. The discount rate used is 8 percent, which matches the standard discount rate used by the GoG in economic appraisals of this kind. The



discount rate in the economic analysis of investment projects is the social discount rate; it reflects the socioeconomic adjustment as to how future economic benefits and costs should be valued against present ones.

HDM-4 Input Data

3. For analytical purposes, the existing road was divided into two homogeneous sections, as shown in table 2.1.

Table 2.1. Baseline Sections

Section Name	Length (km)	Roughness (m/km)	Mean Speed (km/h)	AADT (2020)
S1 Sagarejo - Manavi km56.0-km63.0	7.0	4.0	61	11,693
S2 Manavi - Badiauri: km63.0-km73.8	10.8	4.7	67	11,693

Source: RD, World Bank analysis.

4. International Roughness Index (m/km) values were used as the primary measure of road surface condition and ride quality. Roughness values were measured along the existing road by RD as part of its annual survey and represent the most recent condition for 2021. Mean speeds were determined based on Google big data by extracting full one-week travel times for each one-hour interval separately for Section 1 and Section 2. As expected, Section 1, which traverses more urbanized areas, has a relatively lower speed value than Section 2.

5. Baseline traffic data were obtained from the latest available traffic counts. RD conducts radar-based, 48-hour continuous counts three times per year (in April, July, and October) at fixed locations on the highway network. These counts are averaged to give an annual figure. Vehicles are classified according to their length. The most relevant for the project road are traffic measurements on the S5 international road at km30 and km92.

6. VOC input data for appropriate vehicle models within the observed vehicle classes were obtained through a combination of RD data inputs and observations from similar past projects in Georgia. The resulting values, which were used as input into HDM-4, are summarized in table 2.2. Monetary values have been converted from Georgian lari to US dollars at the exchange rate of US\$1 = GEL 3.10.

7. Goods in transit are unproductive—they represent inventory carrying costs. Thus, there is a value in reducing travel time not only for passenger trips but also for freight trips. This latter value can be substantial for the portion of goods that are time sensitive, that is, where the shipper or recipient bears substantial costs arising from late collection or delivery or for which time savings make an additional trip possible in a working day. A US\$0.10 value for each hour of cargo delay was adopted for the analysis.

8. Work and business time have been valued at the full economic travel time rate and nonwork (that is, leisure) travel time at a default value of 30 percent of the full rate. As part of the modeling of road deterioration, HDM-4 requires a small set of climatic data to reflect the prevailing conditions in the study area. The data shown in table 2.3 were assigned to represent the climate zone for the project area.



Table 2.2. Vehicle Fleet Data and Economic Unit Costs, 2021 US\$

Item	Cars	Minibus	Bus	Truck	Trailer
Vehicle characteristics					
Axles	2	2	2	3	4
PCSE	1.0	1.3	1.5	2.0	2.5
Km per year	23,000	40,000	80,000	80,000	120,000
Working time per year (hours)	2,000	2,200	2,000	2,000	2,500
Service life (years)	10	8	12	12	14
No. of passengers	2.35	8	20	0	0
Operating weight (tons)	1.2	2	10	20	30
VEF (ESAL)	0.02	0.02	1.5	2.5	3.5
Economic costs					
Vehicle cost (US\$)	16,149	19,354	48,387	29,032	80,645
Tire cost (US\$)	38.7	64.5	241.9	193.5	258.0
Maintenance labor (US\$/h)	1.8	1.8	1.8	1.8	1.8
Crew (US\$/h)	0	2.7	2.7	2.7	2.7
Passenger working time (US\$/h)	3.87	2.0	2.0	0	0
Passenger nonworking time (US\$/h)	1.16	0.6	0.6	0	0
% of work-related trips	75	75	20	0	0
Value of cargo delay (US\$/t/h)	0.0	0.0	0.0	0.1	0.1

Source: RD, HDM-4, World Bank analysis.

Note: ESAL = Equivalent single axle load; PCSE = Passenger car space equivalent; VEF = Vehicle equivalence factors.

Table 2.3. Climatic Conditions Data Inputs for the Project Area

Moisture class	Semiarid
Moisture Index	-40
Duration of dry season (months)	9.0
Mean monthly precipitation (mm)	50
Temperature class	Temperate
Mean temperature (°C)	25
Average temperature range (°C)	15
Days higher than 32°C	70
Freeze index	20
Days road snow covered (%)	0
Days road water covered (%)	5

Source: RD, HDM-4, World Bank analysis.

Traffic Projections

9. A strong relationship between economic growth and traffic growth is widely recognized in the international experience. In particular, in Georgia's position in its development trajectory, cars and other passenger traffic are generally considered to grow slightly faster than GDP, while goods vehicle traffic, being driven directly by the economy, is commonly in line with GDP growth. Over time, the elasticity for passenger vehicles reduces and their growth rate approximates GDP growth rates.

10. Table 2.4 shows the rates used for traffic growth projection during the analysis period for passenger and freight vehicles. These growth rates were applied to baseline traffic counts to obtain traffic



projections without the project on the existing two-lane inter-urban road (table 2.5). For reporting, AADT values after project completion year (2025) are shown in five-year intervals.

Table 2.4. Traffic Growth Projection Inputs (% per year)

Year	Cars	Minibus	Bus	Truck	Trailer	Year	Cars	Minibus	Bus	Truck	Trailer
2021	4.0	4.0	4.0	3.5	3.5	2033	2.9	2.9	2.9	2.7	2.7
2022	5.0	5.0	5.0	4.5	4.5	2034	2.9	2.9	2.9	2.7	2.7
2023	5.0	5.0	5.0	4.5	4.5	2035	2.9	2.9	2.9	2.7	2.7
2024	6.0	6.0	6.0	5.0	5.0	2036	2.9	2.9	2.9	2.7	2.7
2025	5.5	5.5	5.5	4.8	4.8	2037	2.3	2.3	2.3	2.2	2.2
2026	5.5	5.5	5.5	4.8	4.8	2038	2.3	2.3	2.3	2.2	2.2
2027	4.4	4.4	4.4	4.0	4.0	2039	2.3	2.3	2.3	2.2	2.2
2028	4.4	4.4	4.4	4.0	4.0	2040	2.3	2.3	2.3	2.2	2.2
2029	4.4	4.4	4.4	4.0	4.0	2041	2.3	2.3	2.3	2.2	2.2
2030	3.2	3.2	3.2	2.9	2.9	2042	2.3	2.3	2.3	2.2	2.2
2031	3.2	3.2	3.2	2.9	2.9	2043	2.0	2.0	2.0	2.0	2.0
2032	3.2	3.2	3.2	2.9	2.9	2044	2.0	2.0	2.0	2.0	2.0

Source: World Bank analysis.

Table 2.5. Projected Traffic Volumes on Existing Road Section, AADT

Year	Cars	Minibus	Bus	Truck	Trailer	Total
2021	8,166	1,760	365	848	1,013	12,152
2022	8,574	1,848	383	886	1,059	12,750
2023	9,003	1,940	403	926	1,106	13,378
2024	9,543	2,056	427	972	1,162	14,160
2025	10,068	2,170	450	1,019	1,217	14,924
2030	12,473	2,688	558	1,236	1,477	18,432
2035	14,474	3,119	647	1,418	1,694	21,352
2040	16,312	3,515	729	1,588	1,898	24,042
2044	17,761	3,827	794	1,726	2,062	26,170

Source: World Bank analysis and estimates.

11. The 'with-project' scenario will provide a high-capacity four-lane highway as an alternative to the existing inter-urban road. This is expected to divert the majority of the existing section traffic to the new alignment. To estimate the magnitude of this diversion, RD's traffic count data at the S5 km92 location were used. Considering that it is located after the new construction section, the comparison of traffic between the baseline section and the km92 location is a good indication of traffic diversion potential. Table 2.6 shows the estimated traffic diversion volumes by vehicle type.

Table 2.6. Traffic Diversion from Baseline to New Construction Section, AADT

Vehicle Class	Traffic on Existing Section	Traffic at km92 location	Diversion (%)
Car	7,852	6,791	86.5
Minibus	1,692	1,414	83.6
Bus/truck	1,170	927	79.2
Trailer	979	671	68.5
Total	11,693	9,803	83.8

Source: World Bank analysis and estimates.



12. By applying the above diversion percentages, the expected traffic at the new highway's opening year can be estimated for modeling. Tables 2.7 and 2.8 provide traffic projections for the 'with-project' scenario for the new and existing road sections.

Table 2.7. Traffic Projections on New Section, AADT

Year	Cars	Minibus	Bus	Truck	Trailer	Total
2021	0	0	0	0	0	0
2022	0	0	0	0	0	0
2023	0	0	0	0	0	0
2024	0	0	0	0	0	0
2025	8,708	1,814	357	807	834	12,520
2030	10,788	2,247	442	979	1,012	15,468
2035	12,518	2,607	513	1,123	1,161	17,922
2040	14,108	2,938	578	1,258	1,300	20,183
2044	15,360	3,199	629	1,368	1,413	21,970

Source: World Bank analysis and estimates.

Table 2.8. Traffic Projection on Existing Road under the With-Project Scenario, AADT

Year	Cars	Minibus	Bus	Truck	Trailer	Total
2021	8,166	1,760	365	848	1,013	12,152
2022	8,574	1,848	383	886	1,059	12,750
2023	9,003	1,940	403	926	1,106	13,378
2024	9,543	2,056	427	972	1,162	14,160
2025	1,361	356	94	212	383	2,405
2030	1,686	441	116	257	465	2,964
2035	1,956	512	134	294	533	3,430
2040	2,204	577	151	330	597	3,860
2044	2,400	628	165	358	649	4,200

Source: World Bank analysis and estimates.

Road Safety Parameters

13. Accident costs were calculated in relation to Georgia's GDP per capita. International research (iRAP) suggests that the recommended value of life is equivalent to 70 times GDP per capita and the value of serious injury equivalent to 25 percent of the value of a statistical life. These parameters are shown in table 2.9.

Table 2.9. Accident Cost Assumptions, US\$ 2021

Accident Category	Cost
Fatal accident	96,000
Injury accident	24,000

Source: World Bank analysis and estimates.

14. Experience from the recently upgraded sections of Georgia's EWH indicates that dual carriageway sections with a median, such as the one envisaged under Component 1, considerably reduce fatal accident rates as well as serious injury. This analysis conservatively concentrates on the benefits of the potential reduction in fatal accidents, while not claiming reductions in injury accidents. Data on the number of fatal



accidents for the existing/baseline section were obtained from RD for 2015–2021. The unit rate of accidents per 100 million vehicle-km traveled was determined according to table 2.10.

Table 2.10. Accident Rates per 100 Million Vehicle-Kilometers Traveled

Year	Number of Fatal Accidents	AADT	Annual VKT	Fatal Accidents per 100 million VKT	Rate per 5-year Average
2021	6	12,152	78,951,187	7.6	4.7
2020	3	11,693	75,970,770	3.9	5.0
2019	4	10,472	68,033,985	5.9	6.6
2018	1	11,218	72,880,098	1.4	n.a.
2017	3	10,258	66,642,978	4.5	n.a.
2016	6	9,794	63,629,994	9.4	n.a.
2015	6	7,664	49,794,091	12.0	n.a.

Source: RD, World Bank analysis.

Note: VKT = Vehicle-km traveled.

Emissions

15. HDM-4 was used to calculate vehicle emissions during the analysis period for both the ‘with-project’ and ‘without-project’ scenarios. Changes in pavement quality affect engine performance, which in turn affects tailpipe GHG emissions. In general, a greenfield highway project such as this may lead to increased emissions as vehicle operating speeds increase above the optimal speed of 60–70 km per hour compared to the existing road. This effect may be partially or fully offset by eventual congestion-causing traffic increases on the existing road in the ‘without-project’ baseline. In the case of the proposed KCIP-financed highway section, the overall volume of emissions is expected to decrease in the ‘with-project’ scenario, as the investment results in a net reduction of emissions compared to what can be expected from the existing road over time.

16. Table 2.11 shows GHG accounting for the ‘with-project’ and ‘without-project’ scenarios. Negative operational emissions benefits are projected from 2025 to 2032. This arises from the sharp increase in vehicle speeds on the new four lane section. However, as the existing two-lane road capacity in the ‘without-project’ scenario reaches its limit, vehicle speeds are reduced far beyond optimal operational speeds, leading to emissions increases. Overall, across the analysis period, CO₂ emissions are reduced in the ‘with-project’ scenario, with a total cumulative avoidance of 36,075 tons of CO₂ over 20 years due to the project.



Table 2.11. GHG Accounting for the Project Investment,^a tons of CO₂

	Net CO₂ emissions	Gross CO₂ emissions		Net CO₂ emissions	Gross CO₂ emissions
2025	(3,011)	41,714			
2026	(2,948)	43,903	2036	2,693	60,579
2027	(2,879)	45,789	2037	2,473	61,930
2028	(2,083)	47,748	2038	2,539	63,328
2029	(1,121)	49,801	2039	3,383	64,770
2030	(1,047)	51,290	2040	5,155	66,233
2031	(469)	52,873	2041	6,756	67,726
2032	(420)	54,488	2042	6,780	69,160
2033	1,101	55,957	2043	6,785	70,528
2034	2,600	57,371	2044	7,000	71,901
2035	2,788	59,051	Cumulative	36,075	1,156,142

Source: World Bank analysis and estimates.

Note: a. Net CO₂ emissions are those expected to be avoided due to the project; gross CO₂ emissions are expected emissions in the with-project scenario.

Costs

17. Capital and recurrent costs used in the evaluation include the construction cost of the new highway and the recurrent costs for the maintenance of both the existing and new sections. These cost inputs are shown in tables 2.12 and 2.13.

Table 2.12. Construction Costs of New Highway Section, 2021 US\$ millions

Cost Category	Financial Cost
Civil works	100.43
Supervision of construction works	7.00
Total	107.43

Source: RD.

Table 2.13. Recurrent Costs of Routine and Periodic Maintenance, 2021 US\$

Cost Category	Economic Cost
Patching (per m ²)	9.38
Crack sealing (per m ²)	1.26
Winter/scheduled (per km)	2,580
Periodic maintenance (per m ²)	12.93

Source: RD, World Bank analysis and estimates.

Benefits

18. Project benefits represent a combination of monetized values for VOCs, travel time costs (for passengers and freight), accident costs, and GHG emissions costs. Vehicle operation and travel time costs were generated by HDM-4 based on input values as shown above. To monetize project safety benefits, it was assumed that fatalities will be reduced by 20 percent as a result of the new four-lane infrastructure. To monetize emissions, a value of US\$41 per ton for the shadow price of carbon was used, with an annual increase of 2.26 percent.



19. Based on the input data and assumptions for fatality and emission monetary values, a cost-benefit stream was obtained from HDM-4. The economic indicators provided are the EIRR and the economic net present value (ENPV). These are shown in table 2.14.

20. The analysis shows that the proposed investment is economically viable, with an EIRR of 16.2 percent, well above the estimated economic cost of capita, and an ENPV of US\$74.7 million. The investment is therefore desirable, as it is expected to generate net economic value for Georgia.

Table 2.14. Cost-Benefit Streams, 2021 US\$ millions

Year	Costs		Benefits				CB Stream
	Capital	Recurrent	VOC	TTC	Accidents	Emission	
2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2022	-26.16	0.00	0.00	0.00	0.00	0.00	-26.16
2023	-26.16	0.00	0.00	0.00	0.00	0.00	-26.16
2024	-34.88	0.00	0.00	0.00	0.00	0.00	-34.88
2025	0.00	-0.04	3.05	7.99	0.10	-0.13	10.96
2026	0.00	-0.04	3.49	8.62	0.10	-0.13	12.03
2027	0.00	-0.04	3.92	9.16	0.11	-0.13	13.01
2028	0.00	-0.04	4.58	9.76	0.11	-0.10	14.31
2029	0.00	-0.04	5.36	10.50	0.12	-0.05	15.88
2030	0.00	-0.04	4.53	11.11	0.12	-0.05	15.66
2031	0.00	-0.04	5.08	12.08	0.12	-0.02	17.21
2032	0.00	-0.04	5.52	13.13	0.13	-0.02	18.72
2033	0.00	-0.04	6.31	14.19	0.13	0.06	20.65
2034	-4.62	-0.04	7.01	14.94	0.13	0.14	17.57
2035	0.00	-0.04	8.58	15.59	0.14	0.16	24.42
2036	0.00	-0.04	7.57	16.33	0.14	0.15	24.16
2037	0.00	-0.04	8.11	17.09	0.15	0.14	25.44
2038	0.00	-0.04	8.79	18.06	0.15	0.15	27.11
2039	0.00	-0.04	9.73	19.20	0.15	0.21	29.24
2040	0.00	-0.04	11.01	20.57	0.16	0.32	32.01
2041	0.00	-0.04	12.15	21.50	0.16	0.43	34.19
2042	0.00	-0.04	10.77	22.03	0.16	0.44	33.36
2043	0.00	-0.04	11.27	22.48	0.17	0.45	34.32
2044	21.80	-0.04	11.83	22.95	0.17	0.48	57.18
EIRR							16.2%
ENPV (8.0% discount)							US\$74.96

Source: World Bank analysis.

Sensitivity Analysis

21. Project benefits are spread over time. Costs and benefits are subject to uncertainty and may vary from the base case assumptions. Sensitivity analysis was used as an analytical framework for assessing this uncertainty. In addition to base case assumptions, the sensitivity scenarios shown in table 2.15 were modeled. The investment's viability is found to be robust to changes in key benefit and cost assumptions.



Table 2.15. Sensitivity Analysis Scenarios

Sensitivity Scenario	EIRR (%)	ENPV (2021 US\$ million)
Base sensitivity scenario	16.2	74.96
Capital costs increased by 20%	13.9	61.19
Road user cost savings reduced by 30%	12.0	32.65
Capital costs increased by 20%/RUC savings reduced by 30%	10.0	18.88

Source: World Bank analysis.



ANNEX 3: Climate Change and Climate Co-Benefits

Climate Change Vulnerability

1. Climate change impacts and natural hazards are expected in the project area. The project was screened for short- and long-term climate change and disaster risks using the World Bank Climate and Disaster Risk Screening Tool. The primary risks for the project road are associated with higher and more extreme daily precipitation patterns. In the project region of Kakheti, the projected increases in precipitation, and more predominantly the spring snowmelt in mountains, are likely to exacerbate sudden high-water levels and flash-flood risks during spring and early summer (March–June). In Kakheti, the average number of days with thunder and lightning varies from 30 to 59 per year. Thunder and lightning are frequently followed by hail. Among the regions of East Georgia, Kakheti is distinguished not for more frequent hail events, but for a larger size of hail grains. In both Georgia and the project region, earthquake hazard is classified as high, with the two last significant events in 2002 and 2009. There is more than a 20 percent chance of a potentially damaging earthquake in the project area in the next 50 years.

2. The target highway corridor, of which the project is a part, reaches from Tbilisi to Bakurtsikhe on a total length of 84 km. The road is of international importance as it connects the capital of Tbilisi to the border of Azerbaijan. It is also of intrastate importance since it enhances accessibility between Tbilisi and other major urban centers like Sagarejo and Bakurtsikhe. The corridor runs parallel to or in close proximity to the existing national S5 road. Without construction of the proposed highway, the national S5 road will remain the only access to central Kakheti. The proposed new route will provide redundancy of access to the Kakheti, continuing to the border with Azerbaijan. Lot 3, as proposed for financing under the project, starts at km 35+500 and ends at km 52+540. The start at km 35+500 is located to the east of the new Tokhliauri interchange and the end at km 52+540 is located to the east of the new Badiauri interchange. The whole section is located across an agricultural plain, alongside complex irrigation schemes, on mostly compressible soils and generally high ground water level. Irrigation is controlled by the Sioni dam on the Iori River, built and operating since 1964.

3. Leading from Tokhliauri interchange, 13 major structures will be constructed; from those, four will cross major streams. At km 40+764, the highway crosses the stream with a 61 m three-span bridge, followed by a hydraulic culvert at km 40+993 with 31 m length. The third and fourth major hydraulic crossings are located at km 45+298 and km 46+945, with, respectively, 32 m and 40 m long box culverts. Because of the soaked weak soils in the whole plain, all of the crossings, including culverts, have to be constructed on piles, to transfer the loads to stronger layers at greater depth.

4. Following the requirements of the TEM standards, which are more demanding regarding climate adaptation than the Georgian national standards, all of Lot 3 was designed on embankments of at least 1 m above the irrigation plain, ensuring that the whole carriageway is located well above the expected high-water levels. At six locations, and over a total length of about 7.3 km, the embankments are higher than 5 m and even up to 10 m. High embankments are found between km 37+660 – 39+000 (5.8 m), km 40+400 – 41+500 (9 m), km 42+320 – km 43+980 75 (8.4 m), km 44+400 – 45+740 86 (8.2 m), km 46+100 – 47+600 (9.8 m), and on the local road LR03 km 0+000 – 0+600 (10.6 m). To limit the possible deterioration of the carriageway caused by differential settlements, an asphalt pavement, placed on a frost protection layer, has been chosen for this highway section.



5. The section ends at the Badiauri interchange, giving access to the agricultural production area and tourist sites of the Kakheti region. In this location, the development of the local marketplace is planned, promoting agricultural products from the region to transit travelers and tourists.

6. The engineering design of Lot 3 provides for the restoration of the existing local road network, which will be disrupted by the new highway. Several new side roads to the highway are envisaged, to restore access to the land properties. In the new side roads, crossings to the natural streams will be provided, either through culverts and pipes or through drifts, making the access to properties and land plots possible year-round. In total, 63 structures have been designed to be placed on the improved local roads.

7. With respect to climate change impacts, the most salient climate risks along the proposed project corridor are related to increased precipitations, leading to higher water levels and flooding events. Climatic events can accelerate road deterioration and negatively affect mobility, connectivity, and accessibility. Potential impacts include the following:

- Changes in precipitation and raising of ground water levels may affect road and structure foundations.
- Changes in temperature—both gradual increases in temperatures as well as increases in extreme temperatures—may affect road pavements (with distresses such as rutting and deformation).
- Extreme weather events, such as stronger and/or more frequent storms, may affect the capacity of drainage and overflow systems to deal with stronger or faster velocity of water flows.
- Stronger or faster velocity of water flows would also affect bridge foundations and outlets of culverts.
- High levels of precipitation may threaten embankment stability.
- Increase in scouring of roads, bridges, and support structures may result from increased precipitation levels.

8. Among the major climate change risks facing the project is the vulnerability of the compressible subsoil to heavy rainfall and snowmelt, leading to even higher ground water tables. This has implications for planning, design, construction, and maintenance of road infrastructure. Poor maintenance may further aggravate the problem. More intense rains lead to the road substructures becoming saturated and losing strength and to structures requiring deeper foundations to reach the stable geological layers. Heavy rain can also trigger slope failures, embankment erosion, destabilization of culverts and bridge supports (piers and abutments), and washout roads. Intense heat following rainy periods can lead to differential soil settlements along the roads and structures, and high temperatures frequently lead to deformation of bituminous pavement surfaces. High ultraviolet solar intensity will also accelerate deterioration of the bituminous surface courses.

Specific Project Activities to Address the Impacts of Climate Change

9. Several measures have been reflected in the design of the KCIP-financed highway section to address the project's vulnerability to climate change. These include the following:



(a) Resilience to Flooding through Culverts and Bridges

10. The design provides for drainage along the alignment to ensure that the road does not create a barrier to the movement of water, thereby preventing climate change-induced flooding of adjacent lands and washout of the road itself. This is done through the following measures:

- To ensure safe and functional works, the new structures, bridges, and culverts are designed to resist seismic solicitations, for the life expectancy of 100 years and hydraulic capacity for 100-year return rainfall.
- Four bridges across natural streams and rivers and 94 box culverts will be designed and constructed for 100-year return rainfall to ensure smooth transfer of water across the highway. This entails the construction of longer bridges, with wider spans, as well as higher piers, to increase their hydraulic capacity. Furthermore, piers and abutments will be protected against erosion resulting from high water or rapid flows, with scour protection works (for example, gabions, riprap, or stone pitching). At the project's location, the bridges and large culverts have to be constructed with deep foundations reaching through the upper layers of weak and soaked soils, down to the strong soil layers able to take the structural loads.
- The main hydraulic structures are located at km 39+402, km 40+674 (length of 61 m), km 40+993 (length 35 m), km 45+298 (length of 32 m), and km 46+956 (length of 40 m). The height of piers is on average 5 m, and all foundations will be constructed on piles of 35 m into the ground.
- The culverts are of a minimum dimension of 1.5 × 1.5 m up to 5 × 3 m, with 22 structures exceeding the standard size of 2 × 2 m. The culverts are located all along the section, but the largest structures are found at km 42+497, km 45+292, km 46+446, and km 47+758, toward the central part of the section. As an exceptional measure, not only the bridges mentioned above but also the culverts are constructed on piles, reaching 25 m into the ground.
- A total of 28 km of pipe culverts will be installed to reinforce the cross-drainage on the motorway and the side roads for the minor streams and provide continuity of local irrigation schemes.
- All pipe and box culverts will benefit from strengthened inlets and outlets to protect from scouring and erosion.
- A total of 24 km of lined ditches and 88 units of chutes will be constructed to collect the runoff water from the carriageway and direct the water to safe discharge points, to prevent embankment erosion and runoff water from affecting surrounding land plots.
- Slope protection will be further ensured by vegetation of the slopes using bioengineering solutions.

(b) Resilience to Flooding through Elevated Formation Levels

11. An elevated road formation is being used, leading to enhanced resilience to extreme rainfall events. All of Lot 3 has been designed on embankment at least 1 m above the irrigation plain, ensuring that the whole carriageway is located well above the expected high-water levels. Similarly, the marketplace under Component 2, located at the Badiauri interchange, will similarly be raised above the



level of the surrounding terrain and equipped with relevant drainage, to be able to operate all-year-round, and possibly serve as a refuge area in case of surrounding high water.

(c) Resilience to Temperature Differentials

12. To mitigate the risk of settlements due to compressible soils and high groundwater tables with frequently saturated soils during rainy periods, structures, including box culverts, will be built on deep foundations (piles); soil pre-consolidation will be applied during construction of the embankments; and a flexible carriageway, designed to be able to adapt to possible differential settlements, will be constructed.

(d) Resilience to Extreme High Temperatures

13. Polymer modified bitumen has been chosen for the asphalt surface layers to provide higher resistance to thermal plastic deformation (rutting) during the high summer temperatures, which are expected to increase with climate change.

(e) Resilience to Extreme Low Temperatures

14. German Standards have been applied, by choice, for the design of the pavement to protect the carriageway from the effect of repeating sequences of frost and thaw. Specifically, the asphalt layers will be placed on gravel frost protection layers, with a thickness of between 45 and 55 cm, to guarantee that freezing temperatures will not reach the subgrade and embankment, thus protecting the pavement from frost swelling.

(f) Resilience to Hail

15. With a construction of high embankment, and clear from surrounding obstacles, the design aims to minimize hazards to road users from hailstorms.

(g) Resilience through Warning Systems

16. Under a 2016 World Bank-funded TA project, RD prepared a comprehensive ITS strategy and action plan, with the aim of identifying suitable systems, prioritizing road sections for implementation, and ensuring compatibility of ITS technology with the national highway network. The rollout of RD's ITS strategy, which is expected to prioritize the EWH, is planned to cover the Kakheti highway after it is rolled out into service.

(h) Resilience through Mitigation

17. The target highway corridor, including Lot 3, will relieve congestion on the existing S5 national road, thus reducing overall emissions of GHGs and local pollutants and contributing to improved transport efficiency for freight and passenger flows.

(i) Resilience through Redundancy

18. The target highway corridor, including Lot 3, will provide redundancy to the road network serving central Kakheti, by providing an alternative road to existing national S5 road. It is expected that, after the project, the main access route to/from the Kakheti region, and leading further on to the border with Azerbaijan, will be the new Kakheti highway, whereas the existing S5 road will continue to provide local access. In emergency situations, either route may be used for diverted through traffic.



(j) Resilience for Local Access

19. As part of the project, 30 km of local access roads in the vicinity of the new motorway will be rehabilitated, from a total affected network of 150 km to be partially improved. The local network serves the settlements and the agricultural production areas. The construction of culverts and drifts, as well as rehabilitation of the carriageway in deteriorated or relocated sections, will ensure year-round accessibility.

(k) Other Simple Measures for Resilience

20. In addition to the above, several simple measures are being considered to ensure that in the short term extreme precipitation events do not result in significant impacts to the project's highway section. These include

- Maintaining a positive cross slope to facilitate flow of water from surface into the drainage system,
- Protecting the carriageway from water through paved shoulders,
- Increasing resistance to rutting,
- General use of elevated pavement sections to protect the pavement against ingress of water from the ground and ensure that the upper pavement layers are permanently above the water level,
- Improving visibility and pavement marking demarcation, and
- Ensuring that embankments are seeded to help increase stability (using bioengineering solutions).

21. **Based on the detailed engineering design of Lot 3, the overall cost of the abovementioned measures (paragraphs 10 to 20 of this annex) amounts to 51.0 percent of the highway section's investment costs and 45.1 percent of the total project cost.** The cost of Lot 3 civil works is estimated at US\$100.43 million, accounting for 92 percent of the total project cost of US\$109.0 million. The costs related to climate adaptation of Lot 3—US\$49.2 million (see table 3.1)—were estimated by selecting the relevant works from the detailed design's bill of quantities and adding their estimated cost. Table 3.1 shows only items where costs are related to climate change adaptation measures specifically.

Table 3.1. Total Cost of Lot 3 Civil Works Contributing to Climate Adaptation

Description	% of Total Works Costs Resulting from Climate Adaptation	Works Cost (US\$) Contributing to Climate Adaptation (exchange rate GEL 1 = US\$0.34)	Main Actions and Works Linked to Climate Adaptation
General and preparatory works	9.27	269,606.40	Maintenance of the road, including winter maintenance and geotechnical surveys, monitoring, and analysis
Earthworks	70.05	28,526,578.23	Raising of the embankment above the highwater level to protect the pavement against ingress of water as well as frost-thaw phenomena (pavement layers to be



Description	% of Total Works Costs Resulting from Climate Adaptation	Works Cost (US\$) Contributing to Climate Adaptation (exchange rate GEL 1 = US\$0.34)	Main Actions and Works Linked to Climate Adaptation
			permanently above the water level) and ensure stability of compressible soils under high-water levels
Pavement	6.83	1,596,941.25	Use of polymer additives in the asphalt surface materials to increase rutting resistance at high temperatures
Drainage system, culverts, and underpasses	79.40	14,104,520.56	Design of structures for 100-year return rainfall and side drains to protect pavement and embankment from runoff. This requires larger and longer culverts to increase the hydraulic capacity, additional protection of the inlets and outlets. Without the climate adaptation, only little drainage would be required on a road constructed on embankment
Bridgeworks	72.39	4,436,135.39	Design of structures for 100-year return rainfall requires longer slabs to ensure higher hydraulic capacity. Construction of bridges on deep foundation (piles) to reach the bedrock below the soaked upper soils layers. Additional structures are required to ensure resilience of cross-drainage for increased rainfalls
Ancillary works	2.86	136,909.50	Raising of the marketplace level above the irrigation plain and high water, providing drainage for runoff water
Provisional sums	2.50	118,000.00	Installation of dynamic rockfall catch fences, if needed
Total	51.00	49,188,691.33	

Source: RD, World Bank analysis.

Note: a. The costs listed in this table are related to climate change adaptation in the overall construction cost. The table excludes costs associated with other non-climate and geological hazards.

22. As shown in table 3.1, the cost of climate adaptation in the design and construction of Lot 3 is driven by three major items:

- The earthworks, for the contraction of embankments to protect the road against water level surges
- The drainage system, required for higher intensity of rainfalls
- The structures, such as bridges, with increased dimensions and with more protection works at foundations, inlets, and outlets.