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Report No: PAD1206

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED LOAN

IN THE AMOUNT OF US$560 MILLION

TO

UKRAINE

FOR A

ROAD SECTOR DEVELOPMENT PROJECT

OCTOBER 13, 2015

Transport and ICT Global Practice
Europe and Central Asia

CURRENCY EQUIVALENTS
(Exchange Rate Effective as of July 14, 2015)

Currency Unit	=	Ukrainian Hryvnia (UAH)
UAH 22.2	=	US$1

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

CoST	Construction Sector Transparency Initiative
DA	Designated Account
DAK	"Roads of Ukraine"
EBRD	European Bank for Reconstruction and Development
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EIRR	Economic Internal Rate of Return
EMP	Environmental Management Plan
ESMF	Environmental and Social Management Framework
EU	European Union
FM	Financial Management
GDP	Gross Domestic Product
GRS	Grievance Redress Service
GRSF	Global Road Safety Fund
ICB	International Competitive Bidding
IFI	International Financial Institution
IFR	Interim Financial Reports
IMF	International Monetary Fund
IPF	Investment Project Financing
MOF	Ministry of Finance
MoI	Ministry of Infrastructure
MoIA	Ministry of Internal Affairs
MoRD	Ministry of Regional Development
NPV	Net Present Value
PDO	Project Development Objective
PIU	Project Implementation Unit
POM	Project Operational Manual
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
RSDP	Road Sector Development Project
RSIP	Roads and Safety Improvement Project
RSIP2	Second Road and Safety Improvement Project
SBD	Standard Bidding Document
SOE	Statement Of Expenditure
ToR	Terms of Reference
UAD	Ukravtodor
VAT	Value Added Tax
VOC	Vehicle Operating Cost

Regional Vice President:	Cyril E Muller
Country Director:	Qimiao Fan
Senior Global Practice Director:	Pierre Guislain
Practice Manager/Manager:	Juan Gaviria
Task Team Leader:	Simon Ellis

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Road Sector Development Project (P149322)

PROJECT APPRAISAL DOCUMENT

EUROPE AND CENTRAL ASIA

GTIDR

Report No.: PAD1206

Basic Information			
Project ID P149322	EA Category B - Partial Assessment		Team Leader(s) Simon David Ellis
Lending Instrument Investment Project Financing	Fragile and/or Capacity Constraints [ ] Financial Intermediaries [ ] Series of Projects [ ]		
Project Implementation Start Date 04-Nov-2015	Project Implementation End Date 31-Dec-2021		
Expected Effectiveness Date 31-Mar-2016	Expected Closing Date 31-Dec-2021		
Joint IFC No			
Practice Manager/Manager Juan Gaviria	Senior Global Practice Director Pierre Guislain	Country Director Qimiao Fan	Regional Vice President Cyril E Muller
Borrower: Ukraine			
Responsible Agency: UKRAVTODOR			
Contact: Ievhenii Barakh Telephone No.: (380-44) 287-2449		Title: Acting Chairman Email: forec@ukravtodor.goc.ua	

Project Financing Data(in US$, millions)					
[X] Loan	[ ] IDA Grant	[ ] Guarantee			
[ ] Credit	[ ] Grant	[ ] Other			
Total Project Cost:	560.0		Total Bank Financing:	560.0	
Financing Gap:	0.00				

Financing Source	Amount
Borrower	0.00
International Bank for Reconstruction and Development	560.00
Total	560.00

Expected Disbursements (in US$, millions)

Fiscal Year	2016	2017	2018	2019	2020	2021	2022	0000	0000	0000
Annual	10.00	70.00	80.00	140.00	150.00	75.00	35.00	0.00	0.00	0.00
Cumulative	10.00	80.00	160.00	300.00	450.00	525.00	560.00	0.00	0.00	0.00

Institutional Data

Practice Area (Lead)

Transport & ICT

Contributing Practice Areas

Cross Cutting Topics

[ ] Climate Change
[ ] Fragile, Conflict & Violence
[ ] Gender
[ ] Jobs
[ ] Public Private Partnership

Sectors / Climate Change

Sector (Maximum 5 and total % must equal 100)

Major Sector	Sector	%	Adaptation Co-benefits %	Mitigation Co-benefits %
Transportation	Rural and Inter-Urban Roads and Highways	95		
Transportation	General transportation sector	5		
Total		100		

☑ I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.

Themes

Theme (Maximum 5 and total % must equal 100)

Major theme	Theme	%
Financial and private sector development	Infrastructure services for private sector development	80
Trade and integration	Trade facilitation and market access	20

Total	100

Proposed Development Objective(s)

The objective of the project is to improve transport connectivity, maintenance operations, and road safety for road users on selected sections of the national roads network and improve road network management in Ukraine.

Components

Component Name	Cost (US$, millions)
Component 1: Road Rehabilitation and Safety Improvement	436.70
Component 2: Maintenance of Core National Road Corridors	102.30
Component 3: Network Management and Development	19.60
Front End Fee	1.40

Systematic Operations Risk- Rating Tool (SORT)

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

Compliance

Policy

Does the project depart from the CAS in content or in other significant respects?	Yes [ ]	No [X]
Does the project require any waivers of Bank policies?	Yes [ ]	No [X]
Have these been approved by Bank management?	Yes [ ]	No [X]
Is approval for any policy waiver sought from the Board?	Yes [ ]	No [X]
Does the project meet the Regional criteria for readiness for implementation?	Yes [X]	No [ ]

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	X	
Natural Habitats OP/BP 4.04		X

Forests OP/BP 4.36		**X**
Pest Management OP 4.09		**X**
Physical Cultural Resources OP/BP 4.11		**X**
Indigenous Peoples OP/BP 4.10		**X**
Involuntary Resettlement OP/BP 4.12	**X**	
Safety of Dams OP/BP 4.37		**X**
Projects on International Waterways OP/BP 7.50		**X**
Projects in Disputed Areas OP/BP 7.60		**X**

Legal Covenants (abbreviated)

Name	**Recurrent**	**Due Date**	**Frequency**
Institutional Arrangements	x		

Description of Covenant

The Borrower shall ensure that the Project Implementing Entity carries out the Project with due diligence and efficiency, and in accordance with the policies and procedures set forth in the Project Operations Manual and shall not alter, amend, suspend, abrogate, repeal, vary or waive any provision of the Project Operations Manual without consultation with, and the prior consent of, the Bank.

Name	**Recurrent**	**Due Date**	**Frequency**
Institutional Arrangements	x		Continuous

Description of Covenant

The Borrower shall cause the Project Implementing Entity to appoint and maintain a PIU throughout the duration of the Project under a contract with terms satisfactory to the Bank, such PIU to be in a form and with functions, adequate staffing (under terms of reference, qualifications and scope of responsibilities) and adequate resources, all satisfactory to the Bank and as further set forth in POM

Name	**Recurrent**	**Due Date**	**Frequency**
Institutional Arrangements	x		Continuous

Description of Covenant

The Borrower shall maintain the Working Group for the coordination of collaboration and roles of various stakeholders for implementation of Part 3.1 of the Project, in accordance with the provisions of the Ministerial Order.

Name	**Recurrent**	**Due Date**	**Frequency**
Subsidiary Agreement	x		Continuous

Description of Covenant

To facilitate the carrying out of the Project Implementing Entity's implementation of the Project, the Borrower, through the MOF, shall make the Loan proceeds available to the Project Implementing Entity under a Subsidiary Agreement between the Borrower, through the MOF, and the Project Implementing Entity, under terms and conditions approved by the Bank.

Name	**Recurrent**	**Due Date**	**Frequency**
Subsidiary Agreement	x		Continuous

Description of Covenant

To facilitate the financing of Land Acquisition and Resettlement Costs, the Borrower, through MOF, shall ensure that the Subsidiary Agreement incorporate terms and conditions acceptable to the Bank. The Project Implementing Entity shall undertake: (i) to ensure that the provisions in subparagraph (a)(i) through (a)(v) above are carried out; and (ii) not to assign, amend, abrogate or waive any of the Rayon Contracts or any of their provisions..

Name	Recurrent	Due Date	Frequency
Subsidiary Agreement	x		Continuous

Description of Covenant

The Borrower, through the MOF, shall exercise its rights under the Subsidiary Agreement and cause the Project Implementing Entity to exercise its rights under each Rayon Contract in such manner as to protect the interests of the Borrower and the Bank and to accomplish the purposes of the Project.

Name	Recurrent	Due Date	Frequency
Environmental Safeguards	x		Continuous

Description of Covenant

The Borrower shall ensure, and cause the Project Implementing Entity to ensure, that the Project is carried out in accordance with the ESMF, RPF and any EMP and RAP and that all measures necessary for the carrying out of said instruments shall be taken in a timely manner.

Name	Recurrent	Due Date	Frequency
Environmental Safeguards	x		Continuous

Description of Covenant

The Borrower shall ensure, and cause the Project Implementing Entity to ensure, that no provision of the ESMF, RPF and any Environmental Management Plan and Resettlement Action Plan is amended, suspended, abrogated, repealed or waived without prior written approval of the Bank.

Name	Recurrent	Due Date	Frequency
Environmental Safeguards	x		Continuous

Description of Covenant

The Borrower shall ensure that the social and environmental safeguards documents and instruments to be prepared under Part 3.3 of the Project comply with the applicable Bank's Safeguards Policies.

Name	Recurrent	Due Date	Frequency
Land Acquisition and Resettlement	x		Continuous

Description of Covenant

In the event that land acquisition or resettlement is required for the purposes of carrying out activities under the Project, the Borrower shall notify the Bank or ensure that the Project Implementing Entity notifies the Bank, of any intended acquisition of land or resettlement, in whole or in part, and of each Resettlement Action Plan (if any) prepared in accordance with the RPF.

Name	Recurrent	Due Date	Frequency
Land Acquisition and Resettlement	x		Continuous

Description of Covenant

In the event that land acquisition or resettlement is required for the purposes of carrying out activities under the Project, the Borrower shall disclose, or ensure that the Project Implementing Entity discloses, the Resettlement Policy Framework and each Resettlement Action Plan (if any) prepared under the Project and all relevant information relating thereto in a manner satisfactory to the Bank

Name	Recurrent	Due Date	Frequency
Land Acquisition and Resettlement	x		Continuous

Description of Covenant

In the event that land acquisition or resettlement is required for the purposes of carrying out activities under the Project, the Borrower shall ensure that the Project Implementing Entity causes all land acquisition and resettlement under the Project to be undertaken in accordance with the provisions and procedures contained in the Resettlement Policy Framework and the respective RAP etc

Conditions

Source Of Fund	Name	Type
IBRD	Subsidiary Agreement	Effectiveness

Description of Condition

The Subsidiary Agreement has been executed on behalf of the Borrower, through the MOF, and the Project Implementing Entity.

Source Of Fund	Name	Type
IBRD	Project Operations Manual	Effectiveness

Description of Condition

The Project Operations Manual, satisfactory to the Bank, has been approved and adopted by the Project Implementing Entity.

Source Of Fund	Name	Type
IBRD	Ministerial Order	Effectiveness

Description of Condition

The Ministerial Order has been issued.

Source Of Fund	Name	Type
IBRD	Project Implementation Unit	Effectiveness

Description of Condition

The Project Implementing Entity's has appointed a PIU under a contract with terms satisfactory to the Bank, with adequate staff, including an additional social and environmental specialist.

Source Of Fund	Name	Type
IBRD	RAP compliance	Disbursement

Description of Condition

No payments made for expenditures under disbursement Category (1) which relate to activities to be carried out on or in relation to any land that is the subject of a Resettlement Action Plan until the Borrower has provided evidence, satisfactory to the Bank, that the Resettlement Action Plan has been satisfactorily carried out.

Source Of Fund	Name	Type
IBRD	Signing of Rayon contracts	Disbursement

Description of Condition

No payments made for expenditures under disbursement Category (2) until the Rayon Contract(s) have been signed between the Project Implementing Entity and the Rayons concerned.

Team Composition

Bank Staff

Name	Role	Title	Specialization	Unit
Simon David Ellis	Team Leader (ADM Responsible)	Lead Transport Specialist	Economics/ Institutional	GTIDR
Yevhen Bulakh	Team Member	Transport Specialist	Engineer	GTIDR
Alexei Slenzak	Safeguards Specialist	Senior Environmental Specialist	Environmental Management	GENDR
Antonio Benigno Nunez	Team Member	Transport Specialist	Economics/ Institutional	GTIDR
Eric R. Lancelot	Team Member	Program Leader	Engineer/Asset Management	AFCF1
Funda Canli	Team Member	Program Assistant	Administration	GTIDR
Irina Babich	Financial Management Specialist	Sr Financial Management Specialist	Financial Management	GGODR
Irina Shmeliova	Procurement Specialist	Procurement Specialist	Procurement	GGODR
Klavdiya Maksymenko	Safeguards Specialist	Social Development Specialist	Social Management	GSURR
Margaret Png	Counsel	Lead Counsel	Legal	LEGLE
Maria Claudia Pachon	Team Member	Sr Transport. Spec.	Institutional	GTIDR
Radoslaw Czapski	Team Member	Senior Infrastructure Specialist	Road Safety	GTIDR
Rodrigo Archondo-Callao	Team Member	Sr Highway Engineer	Economist	GTIDR
Salih Bugra Erdurmus	Procurement Specialist	Procurement Specialist	Procurement	GGODR
Tamar Sulukhia	Team Member	Program Leader	Governance	ECCU2
Wei Wang	Team Member	Transport Specialist	Asset Management	GTIDR

Extended Team			
Name	**Title**	**Office Phone**	**Location**
Alexandra Spernol	Engineering consultant		
David Tindall	ITS consultant		
Marinos Skempas	Transport consultant		Athens

Locations					
Country	**First Administrative Division**	**Location**	**Planned**	**Actual**	**Comments**
Ukraine	Poltava	Poltavs'ka Oblast'	**X**		Start of road section
Ukraine	Kharkiv	Kharkivs'ka Oblast'	**X**		End of road section

Consultants (Will be disclosed in the Monthly Operational Summary)	
Consultants Required?	Consulting services to be determined

I. STRATEGIC CONTEXT

A. Country Context

1. **Ukraine is facing unprecedented political and economic challenges—a major financial crisis compounded by a protracted conflict in the east.** 2014 witnessed the so-called 'Maidan' that ultimately led to the ousting of the previous president, followed by parliamentary elections in October. In March 2014, the Autonomous Republic of Crimea and the city of Sevastopol held referenda to join the Russian Federation which were widely criticized and declared as 'having no validity' in the United Nations General Assembly resolution 68/262. The protracted conflict in the east of the country continues despite the ceasefire agreement concluded in Minsk on February 12, 2015. The new government, which took office last December, came in with a strong mandate for reforms, but it faces a challenging agenda.

2. **Ukraine is in the midst of a deepening economic recession accompanied by a large budget deficit, quickly rising public debt, a plummeting exchange rate, surging inflation, and problems in the banking system.** The current economic crisis has been long in the making. Fundamental governance failures, a state captured by vested interests, deep-rooted corruption, and political instability undermined the investment climate, resulted in wasteful use of resources, and eroded government capacity as well as citizens' trust in public institutions. Poor macroeconomic policies and delayed structural reforms led to widening and unsustainable internal and external imbalances, especially following the global economic crisis of 2008/2009.

3. **In 2014, the government started macroeconomic adjustment but despite efforts to stabilize the economy, the economic performance *was* weak.** Due to the ongoing adjustment and escalating conflict, the gross domestic product (GDP) declined by 6.8 percent in 2014. The currency depreciated by about 50 percent in 2014, which together with increases in utility tariffs, pushed 12-month consumer price inflation to 24.9 percent year on year at the end of 2014.

4. **The ongoing conflict caused significant contraction of the industrial production in the east of Ukraine** as the result of loss of government control of parts of Donetsk and Lugansk regions, broken supply chains, and distorted economic ties with the Russian Federation. The connectivity with the center and west of the country is therefore gaining increased importance for reinvigorating the economic activity in the eastern and southern regions of Ukraine and ensuring greater resilience to the conflict through provision of temporary employment opportunities related to roads rehabilitation and maintenance.

5. **An unfavorable global economic environment and conflict in the east led to a deepening decline in real GDP in the first half of 2015 to present.** Industrial activity contracted 20.5 percent year on year, led by sharp declines in the eastern region. Currency depreciation and a one-off utility-tariff adjustment accelerated inflation, which peaked at 60.9 percent year on year in April and declined to 52.8 percent year on year in August. Meanwhile, fiscal consolidation stabilized the general government headline deficit outperforming the International Monetary Fund (IMF) program target. After a sharp depreciation in early 2015 followed by administrative restrictions on imports, the current account is nearly balanced since April. Net capital outflows persisted, driven mainly by external debt payments in excess of official financing flows. This

helped to rebuild international reserves that cover 3 months of imports as of the beginning of September.

6. **The crisis threatens to reverse some of the gains Ukraine made in earlier years in reducing poverty and boosting shared prosperity.** Against the backdrop of negative growth and high inflation, real wages and pensions have declined, thus reversing gains in income levels that were made earlier, particularly among the less well-off. This decline was only partially offset by social assistance reforms aimed at better targeting existing benefits, while deteriorating labor market conditions aggravated these trends. In the first quarter 2015, the unemployment rate increased to 9.6 percent (from 9 percent a year earlier) and real wages declined by 21 percent. This decline is uneven across sectors, with the lowest nominal-wage growth in the public sector, particularly in health, education, public administration, and defense (which employ approximately 28 percent of those employed among the bottom 40 percent in the income distribution). All these factors combined led to an increase in the moderate poverty rate from 3.2 percent in 2013 to 5 percent in 2014. The moderate poverty rate is expected to double to 10.2 percent in 2015. And even if a modest recovery materializes in 2016 and 2017, it will remain above its 2014 levels.

7. **Despite early signs of stabilization, economic prospects for Ukraine depend on how the conflict in the east unfolds and whether the authorities are able to sustain reforms in an uncertain environment.** Real GDP is projected to contract by 12 percent in 2015, with sharp declines in the metal and mining sectors as they are affected both by the conflict and weakening external demand. However, the currency depreciation will support net exports and a gas tariff increase coupled with improved spending efficiency should create fiscal space to unlock government investment, going forward. In addition, continued resolution of problems in the banking system can permit gradual resumption of lending. These factors, along with a low statistical base, are expected to set the stage for a modest economic recovery, with real GDP growing 1 percent in 2016 and 2 percent in 2017.

B. Sectoral and Institutional Context

8. **Ukraine's economic revival depends on the presence of a high quality transport system acting as the backbone to the economy.** The current crisis is also an opportunity to better align transport infrastructure policies with the freight-intensive needs of the country. An efficient multimodal transport system is a prerequisite for unleashing the full potential of the association agreement with the European Union (EU), the Deep and Comprehensive Free Trade Agreement, and to remove constraints from the development of the domestic agricultural and manufacturing industry. It is this vision which formed the basis for the Ukraine Transport Sector Strategy which was formally approved in 2010. The strategy sought a balanced development of different transport modes, with rail transport retaining its role as the dominant mode for heavy bulk goods and the road network being developed to serve higher-value goods and to support better connection with Ukraine’s neighbors. Increasingly, emphasis is also being given to the waterways sector as a means of relieving some of the harvest-time bottlenecks on the railways but also as a means of getting bulk cargoes off the roads to reduce congestion and road deterioration.

9. **Ukraine is currently ranked 61st from a total of 155 countries in the World Bank’s Logistics Performance Index 2014.** Its ranking has improved over the last decade but it still lags the best performers in the region and all EU member states. There is much to be done to realize

the transport strategy's vision. According to the 2014 Logistics Performance Index, Ukraine still requires substantial reforms to improve customs performance, infrastructure, international shipments, the capacity to track and trace shipments, and the competency of logistic operators. In addition to the overall logistics framework, there is also a need for subsectoral reform, particularly in the rail and road sectors, to increase efficiency and ensure that these key sectors are operating on a sustainable financial basis. The Bank is providing advice in all these areas with trust funded activities in agricultural logistics, railways reform, and road reform. This operation, the Road Sector Development Project (RSDP), will support implementation of some of the key reform issues of the road sector many of which were identified through a recent Bank-funded policy note on quality assurance within the road sector.

10. **The current political unrest has affected international traffic flows and priorities are shifting to domestic movements and maintenance.** There are seven major transport corridors crossing Ukraine's territory, both in east-west and in north-south directions, carrying transit freight for all neighboring countries and serving the key economic, industrial, and agricultural heartlands of the country. The major investment to date has been on the east-west corridor where three main international financial institutions (IFIs) have combined forces with the state. The European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD) have financed the road from Kiev to Ukraine's western border with Poland and the Bank is supporting improvement of the road from Kiev to Kharkiv, Ukraine's second largest city, in the east.

11. **The current financial and institutional arrangements in the road sector in Ukraine have not delivered results and the shortage of maintenance funding, combined with a large share of overweight trucks, has resulted in premature deterioration of the network.** Ukraine has a road network of about 170,000 km, of which 21,000 km are national roads and 149,000 km are regional and local roads. However, it is now estimated that 51 percent of the national network does not meet national road roughness requirements and 39 percent does not meet the strength requirements. With traffic growth, standard two lane roads have begun facing capacity bottlenecks, compounding the road safety issue resulting from the overall poor condition of the network. Ultimately average traffic speeds are affected, with average speeds ranging between one- half and one-third of Ukraine's western European neighbors.

12. **The road sector embarked on a reform in 2011 aimed at substantially changing the management of the sector from being overly centralized and vertically integrated.** Currently road network management is centralized under the State Road Services of Ukraine, Ukravtodor, who control most planning, design, maintenance, and construction activities in the sector. Under Ukravtodor, virtually all road maintenance and much road construction is undertaken by the state joint stock company 'Roads of Ukraine', known as DAK, and design is undertaken by Ukridiprodor. Under the proposed reform, the functions of policy making, program management, and works execution will progressively be separated, with an aim of increasing reliance on commercialization in the interactions between managing and executing entities, including through increased reliance on participation of the private sector. However, since the reform was first approved little progress has been made with its implementation and it is only with the appointment of the new government in January that the process has been re-energized.

13. **A new road map for road sector development in Ukraine for 2015–2017 was published by the Ministry of Infrastructure (MoI) in June 2015**. The strategic objectives of the road map

areas are threefold: (a) the protection of roads from early deterioration, (b) the reform of Ukravtodor and DAK; and (c) a sustainable financial structure and collection of new revenues. The first priority will be dealt with through improved weight control (particularly from overloaded grain trucks), the implementation of a road asset management system and the rolling out of a modern system of maintenance. The second priority area will lead to a more dynamic market, with private sector involvement, in the design and maintenance of roads through performance-based contracts. It will include the liquidation of the DAK and transfer of assets from Ukravtodor to the oblast state administrations and the divestiture of non-key assets of Ukravtodor, including the design institutes. The third priority area aims to secure existing revenues from fuel levies and so on to the road sector and to raise new revenues through the introduction of a truck tolling scheme.

14. **A key element to increasing accountability in the sector is the decentralization of the management of local roads to local administrations, the oblasts, and rayons.** Ukravtodor will focus on the national roads while the responsibility for regional and local roads will be delegated to regional and local governments. The government has already implemented the transfer of financial resources and now locally collected fuel levies go directly to the local governments. The process of transferring the local road networks will go in parallel with the reform of the DAK so that road maintenance capacity is aligned with each of the managing entities. A key question is how to start 'commercializing' the relationships between the clients (national and oblast levels) and the DAKs given that these companies are still the main maintenance providers in the country. Support for the implementation of this reform process will be provided through the institutional component of this project. The decentralization of the local roads management, supported by the project's institutional component, will have a demonstrable effect that is supposed to contribute to rebuilding trust between the citizens and the government.

15. **The new government is acutely aware that corruption has adversely impacted quality and eroded confidence in the sector.** There is now a strong emphasis on increasing accountability, transparency, and disclosure in the sector and with Bank support Ukravtodor has recently become a member of the Construction Sector Transparency Initiative (CoST). As part of CoST, it will form a multi-stakeholder group to oversee transparency in the sector and disclose data in accordance with strict guidelines. Open data is central to the MoI strategy and now all plans, progress reports, financial data, annual road maps, work plans, and current projects are disclosed through a web portal and through mass media. The MoI will also introduce independent technical audits for all internationally and domestically financed work and is looking to adopt International Federation of Consulting Engineers contracts, program wide, to improve procurement and contract management, particularly for domestically financed work.

16. **Ultimately, the overall condition of the road network can only be improved with sufficient resources and this is far from the case at the moment.** Of the UAH 20 billion which was allocated to the road sector in 2014, UAH 17 billion went to service existing loans with just UAH 3 billion going to maintenance and operating costs. At this level of funding, the overall deterioration of the network is inevitable and even the recently rehabilitated major highways are at risk of falling into disrepair. As for most countries, road maintenance is largely financed by fuel levies supplemented by vehicle import duties, vehicles registration fees, and fees for oversized and overloaded vehicles. These revenues were hypothecated and made available to the State Road Fund but in 2015 that linkage was broken and Ukravtodor is now financed from the general fund of the state budget. The impact of this change in budgetary policy is unclear but the

reestablishment of a road fund is a priority for the MoI although the legislative and institutional form that such a fund can take and whether it can be readily implemented in the current constrained fiscal environment is yet to be determined. The proposed project will support the short-term stabilization of the sector through financing maintenance activities.

17. **Addressing the funding shortages in the medium to long term will require improved network management tools both to improve utilization of existing assets and to raise additional revenues.** The government is now finalizing legislation to allow tolling of heavy goods vehicles, better enforcement of weight control, and automation of speed enforcement on the national roads network. With support through the proposed RSDP, the government aims to gradually roll out a system of electronic tolling and other network management tools, including weigh-in-motion and speed cameras. The system will be financed, installed, and operated through a private concession in a similar way to the systems now in operation in neighboring countries. It is hoped that this system of network management tools will both raise additional revenues for the sector and protect the assets through enforcement of weight limits and speed limits. Annex 4 provides a more detailed assessment of the overall financial sustainability of the sector together with some of the measures needed to improve efficiency of expenditure.

18. **Improving road safety is also an overarching objective.** Road traffic fatalities have fallen over the last decade, from around 7,000 deaths per year in 2004 to just under 4,500 deaths in 2014, which has been achieved in an environment of increasing motorization levels. However, improvements have stagnated over the last few years and fatality rates are four times those found in the better-performing European countries. While improved safety conditions and new infrastructure are helping reduce road traffic accidents, Ukraine's road safety management and standards in most national and local roads are still to be improved. The ongoing Bank-financed projects have had a large focus on safety and have or will address several key accident black spots in the country, also piloting innovative road safety improvement approaches. However, there is also a need for better coordination and management of road safety, much stricter traffic enforcement, better awareness from road users, and faster emergency response when accidents do happen. On the Kiev to Kharkiv corridor, improved under Bank-financed projects, it is estimated that 45 percent of accidents can be attributed to overspeeding with the effectiveness of enforcement affected by lack of resources, awareness, and corruption. This project will work with the traffic police to implement improved speed enforcement systems including the provision of automatic speed cameras. Road safety is a major focus for the development partners who support the transport sector and a Global Road Safety Facility (GRSF) grant managed by the Bank is preparing a framework for support so that between the development partners a comprehensive and multi-sectoral approach is taken to road safety.

C. Higher Level Objectives to which the Project Contributes

19. The proposed project is fully consistent with the Country Partnership Strategy for Ukraine for FY12–16. The CPS emphasizes 'Improving policy effectiveness and economic competitiveness' (Pillar 2) with a focus on the transport sector. One of the target results is to improve infrastructure for business activities. The CPS specifically described improved road connectivity and safety. The Bank will continue to support connectivity to key markets through investments in modernization of road networks and management and improving road safety. The proposed project will support both elements of this strategy through continuing the engagement

with the MoI on their structural reforms and supporting the road industry move to more market orientation. The road improvement and maintenance components under the project will support the provision of high quality and efficient public infrastructure. The proposed operation will also continue the dialogue from the recently closed RSIP (Roads and Safety Improvement Project) and the ongoing Second Road and Safety Improvement Project (RSIP2), which have already facilitated the start of the reform process in the transport sector.

20. The project's contribution to reduction of poverty and increase in shared prosperity is expected to be significant and efforts will be made to assess it during implementation. The project's impacts on income will be through: (a) an expected reduction in vehicle operating costs (VOCs), travel times, and accident rates on the roads to be rehabilitated; (b) the envisaged works that will lead to important social and economic outcomes in the regions where project roads are located; and (c) the proposed reform agenda that will create employment through a more vibrant private sector market for consultancy services, construction and maintenance, and transport services. During the implementation phase the project will create significant numbers of temporary jobs and once completed, the project will improve access to markets and generate longer term employment through related services. Given the current regional tensions the investment in a road connecting with the east will also demonstrate the intention to share prosperity and maintain connectivity.

21. In the short term, the project will help stabilize the road sector providing much needed finance for maintenance, given the perilous state of finances in the sector (see annex 4 for details). In the medium to long term the project will support economic growth and competitiveness. The government's recent signing of an association agreement with the EU will also increase the focus on regional connectivity and the transit corridor improvements are expected to facilitate this and increase economic activity by reducing travel time and transport costs between the main centers in Ukraine and with the regional trading partners. Finally, better road infrastructure will ultimately translate into increased productive investments in beneficiary communities and employment opportunities for residents, which will improve household income and consumption and decrease poverty rates.

II. PROJECT DEVELOPMENT OBJECTIVES (PDOs)

A. PDO

22. The objective of the project is to improve transport connectivity, maintenance operations, and road safety for road users on selected sections of the national roads network and improve road network management in Ukraine.

B. Project Beneficiaries

23. The primary beneficiaries of the proposed project are road users and the public at large, in particular the owners, operators, and occupants of motor vehicles, as well as pedestrians and the users of non-motorized transport who use roads. The project will also create substantial short- and long-term employment opportunities for men and women through civil works, maintenance activities, network operations, and consultancy services.

24. For the civil works and maintenance components of the project, road users will benefit from improved road conditions and road capacity which will result in reduced VOC, better

travelling comfort, and much lower risk of injury and death due to traffic accidents. Road user costs will be reduced at least by 5 percent for the different types of vehicles. Head-on collisions cause most fatalities on the Kiev to Kharkiv road section; these will be largely avoided due to the widening from two to four lanes and introduction of central crash barriers. At the national level, road users will benefit from the lower risk of injury and death due to traffic accidents as a result of improved coordination of road safety issues and stricter speed enforcement. Also, at the national level, improved road financing and more effective maintenance will benefit road users in terms of improved road conditions, lower journey times, and a reduced risk of accidents.

25. The secondary beneficiaries of the project are local residents of the settlements along the project roads, due to the reduced risk of traffic crashes (mostly pedestrian fatalities) which will result from the construction of bypasses under Component 1 of the project. The annual number of traffic fatalities per vehicle-kilometer in those settlements (including pedestrians hit by vehicles) are estimated to be reduced by about 20–40 percent. Although there is no hard gender-specific data available on pedestrian traffic and on traffic injuries and deaths in those settlements, it seems likely that women will benefit in particular from the increased pedestrian safety measures, since they tend to walk to access social services and markets (stores). The general public will benefit from the overall improvement in the competitiveness of goods produced in Ukraine through the expected lower transport costs resulting from improved road infrastructure.

26. Both women and men are expected to benefit from the improved mobility and safety along the project roads.[1] In addition, the proposed project will ensure that both genders benefit from improved road safety, access to markets, and social services.

C. PDO Level Results Indicators

27. The achievement of the PDO will be measured with the following key results indicators:

- Reduction in travel time between Poltava and Kharkiv
- Reduction in traffic accidents involving injury and fatalities on the Poltava to Kharkiv road
- Condition in International Roughness Index (IRI) of M-03, M-06 and M-07 corridors sustained at IRI < 2
- Modernized road network management measured by: (a) percentage reduction in accidents caused by overspeeding; and (b) percentage reduction in number of overweight trucks.

III. PROJECT DESCRIPTION

A. Project Components

28. The proposed project will be an investment project financing (IPF) consisting of a loan in the amount of US$560 million to Ukraine. The proposed loan will finance 100 percent of eligible expenditures including value added tax (VAT) and land acquisition costs. This project will be a continuation of RSIP and RSIP2 and will continue the improvement of the main road between

[1] See also, the treatment of gender issues for this project under Section VI.E (Social Assessment).

Kiev and Kharkiv, the largest and second largest cities in Ukraine, strengthening economic and political integration with the east of the country. The project will also have a substantial component on capital repairs and maintenance to reverse the overall decline in the condition of the road network. These elements will be complemented by an institutional program with a strong focus on the implementation of the sector's renewed reform and innovation process, including (a) introduction of modern road safety and network management principles to reduce accident fatalities, protect network assets, and move towards sustainable finance; (b) support in implementation of prioritized maintenance plans and restructuring of the maintenance industry; and (c) the development of a robust pipeline of sustainably financed road investments. The project will include the following components:

Component 1: Road Rehabilitation and Safety Improvement (Total estimated cost US$436.7 million from the IBRD loan)

29. This component will continue financing the improvement of the road between Kiev and Kharkiv to motorway standard. The road will provide a high standard and safe corridor to integrate with the EU extended Trans-European Transport Network and improve the connection of Ukraine's two largest cities. This component will finance the civil works for the improvement of approximately 100 km of selected sections of the M-03 highway, initially between Poltava and Valky. The road will be built to a category 1 standard which is a four-lane divided highway with high safety specifications including central crash barriers and side crash barriers where required. On the entire corridor between Kiev and Kharkiv, stricter speed enforcement will be applied through coordination with the traffic police (see Component 3(i) below). The project will finance all necessary road infrastructure such as bridges, interchanges, and bypasses, site supervision of all civil works, equipment, and the cost of any land acquisition and resettlement necessary for execution of the foregoing works.

Component 2: **Maintenance of Core National Road Corridors (Total estimated cost US$102.3 million from the IBRD loan)**

30. This activity will finance maintenance on approximately 840 km of the country's most strategic road network. This will include the M-06, M-07, and M-03 which are the main international and domestic corridors. These roads have been improved over the last decade and are generally in good or fair condition. Maintenance will be done through 5-year performance-based maintenance contracts. The objective of these contracts is to maintain the roads in good condition through regular routine maintenance, timely periodic maintenance, and necessary road safety improvements. This activity will build on the experience of the ongoing performance-based contract designed under RSIP and implemented using EBRD funds. It will also contribute to the MoI strategic objective of having 5,000 km in the country under performance-based contracts and the divestiture of the DAKs. This component will finance maintenance of core national road corridors, including road infrastructure such as bridges, interchanges, and bypasses, improvements for road safety, and design and site supervision of all civil works.

Component 3: Network Management and Development (Total estimated cost of US$19.6 million from the IBRD loan)

31. This component will finance institutional support to implementation of road management reforms and cover the following areas:

Subcomponent 3(i): Road Safety and Network Management (Total estimated cost of US$4 million)

32. This activity will finance preparation and implementation of an integrated road safety and network management system including a system for tolling, a weigh-in-motion system for axle load control, and automatic speed enforcement cameras. Broader road safety activities will also be supported to improve coordination between key stakeholders and ensure project-financed road corridors have an integrated approach to road safety. The subcomponent will finance specialist support to the government working group, consultancy services, and equipment, if required. The following activities are envisaged:

- Support in the preparation of relevant legislation and implementation of findings from a road safety capacity review which was prepared under a recent GRSF grant
- Support for conducting awareness campaigns and public consultations regarding such system
- Preparation of feasibility studies and functional specifications for the systems including plans for a first phase of system implementation
- The preparation of concession documents for an operator to finance, install, and operate the national tolling system and any procurement documents that may be needed for the initial roll out of the system
- Purchase and installation of required equipment
- Capacity building for key stakeholders in operating and managing the new systems
- Consultants' services for evaluation of procurement processes, supervision of installation, and monitoring of initial stages of operations and results under the system.

Subcomponent 3(ii): Maintenance Management (Total estimated cost of US$1 million).

33. Given the overall underfunding of the sector and in the context of the proposed reform of the maintenance industry and decentralization agenda, this subcomponent will finance the institutional work required to implement key aspects of the reform agenda. It will also finance the necessary work to monitor the maintenance works in Component 2. The following activities will be supported:

- Data collection, planning, design, safety audits, and management support to ensure effective implementation of prioritized maintenance plans and performance-based road contracts. The rollout of the road digital passport will be supported as a framework for the collection of road-specific data and a portal for disclosure of road maintenance plans
- Capacity building to facilitate implementation of reforms in the maintenance industry, improved systems, and monitoring the implementation and impact of reforms.

Subcomponent 3(iii): Preparation of Feasibility Studies and Design (Total estimated cost of US$11 million)

34. This component will finance the preparation of feasibility studies, detailed design, and bidding documents and associated social and environmental safeguards documents and

instruments in compliance with the Bank's Safeguards Policies for selected priority road improvement schemes. The objective of this activity is to prepare a pipeline of quality projects for external financiers and also to support the MoI objective of divestiture of the design capacity from Ukravtodor-controlled entities to the private sector. The road schemes to be supported include sections of the Lviv to Kherson road.

Subcomponent 3(iv): Project Management and Implementation Support (Total estimated cost of US$3.6 million)

35. This subcomponent will finance activities necessary for the effective implementation of the project including technical audits, safety audits, financial audits, design reviews, incremental operating costs (IOC), and consultants' services.

B. Project Financing

36. The Bank will finance the project through an IBRD IPF loan with the total amount of US$560 million.

Project Cost and Financing

37. The total project financing requirements are estimated at US$560 million. All contracts to be financed under the project are eligible for 100 percent reimbursement from the loan including VAT and land acquisition costs.

Project Components	Project Cost (US$, millions)	IBRD Financing (US$, millions)	% Financing
1. Road Rehabilitation and Safety Improvement	436.7	436.7	100
2. Maintenance of Core National Road Corridors	102.3	102.3	100
3. Network Management and Development	19.6	19.6	100
3(i) Road Safety and Network Management	4	4	
3(ii) Maintenance Management	1	1	
3(iii) Preparation of Feasibility Studies and Design	11	11	
3(iv) Project Management and Implementation Support	3.6	3.6	
Total Costs	558.6	558.6	100
Front End Fees	1.4	1.4	
Total Financing Required	**560**	**560**	**100**

38. The project was originally conceived as a US$800 million operation but following a request from the Ministry of Finance (MoF) it was decided to finance the project in two stages. The first stage is described above and is the content of the current project. The second stage is proposed to be provided by an additional financing and subject to the usual Bank policies and procedures regarding additional financing. This additional financing would include support for the extension of the M-03 road corridor to Kharkiv, expanding the use of performance based maintenance contracts on sections of the M-03 currently being completed with Bank financing, and capital repairs and widening on sections of the Kirovograd – Mykolayiv - Kherson road corridor.

C. Lessons Learned and Reflected in the Project Design

39. **Implementation capacity.** Experience from RSIP and RSIP2 has demonstrated that the implementing agency and design institute have good staff capacity to manage the design and implementation process. However, recent events have put significant pressure on the existing staff of the implementing agency and there is a need to strengthen their capacity for this project. There have also been delays in the implementation of the ongoing projects and much more attention will be given in future to the realism of implementation timetables and stricter enforcement of contract management conditions. The project will also include finance for support to the implementing agency to ensure that sufficient staff are available to manage a project of this size.

40. **Availability of counterpart funds.** The recent budget constraints in the country have adversely affected the ability of the government to finance VAT, land acquisition, design work, and the operating expenses of relevant entities associated with the project. This has affected implementation progress of the ongoing projects. This project will finance 100 percent of these expenses to reduce the risks of delays associated with counterpart funds.

41. **Road safety.** The infrastructure provided on the main road corridors in Ukraine now contain many safe-design features including central crash barriers, lighting in key areas, and improved junction design. However, to date little attention has been given to other elements of road safety which are essential for safer roads including improved speed enforcement, increased user awareness, and faster emergency response. This project will include a component supported by traffic police and other relevant stakeholders including civil society organizations to address speed enforcement and overall support in the provision of a more integrated approach to road safety. The role of traffic police in the project will be, in particular, to support the design and implementation of an integrated network management system that will require some elements of automatic enforcement. Traffic police will also be involved in the implementation of an initial stage of the speed enforcement on project corridors.

42. **Maintenance.** Interventions to date from the Bank and other IFIs have largely focused on road improvement works. There has not been sufficient attention on maintenance and ensuring an accurate picture on the overall condition of the entire network. Particularly, given the current budget constraints it is important that this project gives sufficient emphasis to both financing maintenance works and reform of the maintenance industry. The importance of this aspect of the project is reinforced by the most recent Independent Evaluation Group report[2] for the transport sector which concluded that projects are more likely to be sustainable if they directly focus on sustaining transport infrastructure, address issues over the long-term financial viability of the sector, and strengthen institutional capability to sustain outcomes.

43. **Coordination of development partners.** There is a sizeable investment and technical assistance program supported by the main IFIs including the EU, EIB, and EBRD. There are also a number of bilateral partners who are active in the transport sector. Effective coordination of interventions is essential to avoid overlap, maximize the support provided to the transport sector,

[2] Improving Institutional Capability and Financial Viability to Sustain Transport: An Evaluation of World Bank Group Support since 2002, Independent Evaluation Group, March 2013.

and ensure a common voice on key policy issues. There are regular coordination meetings and the Bank is currently co-chair with the EU for the transport sector coordination group.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

44. RSDP will be the third Bank-funded road project executed by Ukravtodor as an implementing agency. Over the past eight years, Ukravtodor and its Project Implementation Unit (PIU) for externally funded projects, Ukrdorinvest, have gained much experience in the execution of large externally funded road projects (mostly by the Bank, EBRD, and EIB). Under this arrangement, Ukravtodor, as the main implementing agency, signs an annual contract with Ukrdorinvest to provide project management services including management of the procurement process, contract management, and monitoring and evaluation. However, all contract signatures, disbursements, and financial management (FM) are directly through Ukravtodor—no funds pass through Ukrdorinvest. For this project, all components will be undertaken on this basis.

45. Broadly, this arrangement has been successful and Ukrdorinvest has good experience with procurement, FM, and safeguards, and has well-trained and experienced staff. However, during peak periods of implementation there may be a need to increase the number of staff and this will be monitored throughout implementation of the project. There is also a need to appoint one additional safeguards staff which will be a condition of effectiveness. The recent events in the country have caused implementation delays, which have been largely outside the control of Ukravtodor, caused by a lack of counterpart funds for VAT and land acquisition payments. To mitigate these risks this project is designed to finance these activities together with other operating costs associated with undertaking effective project management.

46. For undertaking e-tolling, weigh-in-motion, speed enforcement, and other road safety related activities, it has been agreed to set up a working group consisting of the main stakeholders. These stakeholders will include traffic police, respective departments of the MoI and Ministry of Internal Affairs (MoIA), the planned National Agency for Traffic Safety, MOF, Ministry of Regional Development (MoRD), and other relevant government entities. While all procurement will continue to be undertaken by Ukravtodor, a ministerial order will be agreed between the various parties to formalize the roles associated with preparation, implementation, and oversight of inter-institutional components of the loan project, including terms of reference, bid evaluation, and contract execution.

B. Results Monitoring and Evaluation

47. Ukrdorinvest is responsible for the monitoring of results for the RSIP, RSIP2 and other externally funded road projects (for EBRD and EIB); it will also play the same role for the RSDP. As has been the case under the ongoing projects, regular monitoring reports will be prepared by staff of Ukrdorinvest with inputs from all other entities benefitting from the project, both for the Bank and also for other government agencies such as the MoF and the Ministry of Economy. During the regular implementation review visits, Bank staff and Ukrdorinvest staff will continue working together for joint results monitoring.

48. In line with enhanced disclosure requirements as part of the CoST initiative, all key information related to the improvement works, maintenance program, and institutional program will be fully disclosed through an information portal which is currently being developed by Ukravtodor. The information portal will provide a more user friendly way to present progress with procurement, physical implementation, financial implementation, and reports such as those from the independent technical auditors and financial auditors.

49. There will also be a substantial program to monitor the results program as defined in annex 1. The project will help reinforce existing systems of data collection such as the Pavement Management System to measure road condition, road loops/cameras to measure traffic, and police road safety statistics to measure key road safety parameters, including fatalities, injuries, and causes. The monitoring system for the project will also be set up to better measure project beneficiaries, disaggregated by gender, to better understand the short- and long-term impacts of the project.

C. Sustainability

50. The long-term sustainability of the proposed RSDP will be determined by two factors: (a) adequacy of technical capacity to maintain the newly rehabilitated and upgraded road sections; and (b) adequacy of financial resources to be allocated for road maintenance.

51. On the first factor, Ukravtodor has a good track record in managing the construction of good quality roads and maintaining Ukraine's main national highways. The maintenance has been undertaken largely by the DAKs and while there is a need to reform these entities, they do have the expertise and systems to perform the necessary maintenance activities. Ukraine has also recently started its first performance-based maintenance contract to trial modern maintenance techniques and this project will support the long-term reform of the DAKs.

52. For the second factor, there is now a serious concern over the availability of sufficient financial resources to maintain the network. As previously stated the revenues which are allocated to the sector are primarily being used for debt servicing, leaving inadequate finance for, particularly, periodic maintenance works. Some of the key road corridors in the country are now in urgent need of repair; if this is not done Ukraine could see a long-term deterioration of the network. This project will address these concerns in two ways. Firstly, in the short term, funding will be diverted away from new construction in this project to financing priority road maintenance activities. Secondly, in the longer term, the project will support the roll out of an e-tolling system which will bring in valuable additional revenue to the sector.

V. KEY RISKS AND MITIGATION MEASURES

A. Risk Ratings Summary Table

No.	Risk Categories	Rating (H, S, M or L)
1	Political and governance	High
2	Macroeconomic	High
3	Sector strategies and policies	Substantial
4	Technical design of project	Substantial

5	Institutional capacity for implementation and sustainability	Substantial
6	Fiduciary	Substantial
7	Environment and social	Moderate
8	Stakeholders	Substantial
9	Other	
	Overall	High

B. Overall Risk Rating Explanation

53. The overall risk for both the preparation and implementation phases of the project has been rated High. This rating has largely been driven by the high country risks related to the current political instability and government budget deficits. There is already evidence, particularly on the financial side, that these issues are adversely impacting the implementation of the ongoing projects, maintenance of the overall network, and staffing levels in key road sector institutions. Significant exchange rate fluctuations also pose key challenges in accurately estimating the cost of the project. The ongoing reform of Ukravtodor, which is supported by the Bank, is nevertheless creating some short-term uncertainties, particularly related to the high turnover of senior staff. The road from Poltava to Kharkiv remains a government priority and Kharkiv is firmly under the control of the government, but there is a risk of the conflict spreading which may have an impact on Kharkiv in the future. These issues are largely outside the control of the implementing agency, Ukravtodor.

54. The design of the project also has a substantial risk, particularly with regard to a considerable maintenance program using a relatively new approach for Ukraine. The project also supports a significant reform agenda that is strongly supported by the current government but will need continuous and consistent effort to see it implemented in full. There is a high risk that a change of government can lead to a reversal of some parts of the macro and fiscal reform agenda currently being implemented. The network management component of the project is well tested in neighboring countries but again successful implementation will require strong political will and legislative changes.

55. The project will address improved enforcement activities particularly related to weight control of trucks and speed enforcement. Both areas have historically been plagued by corrupt practices both on the part of the police and the transport inspectorate which has limited the effectiveness of these enforcement activities. Recent reforms have seen radical restructuring of the police service which has significantly improved the public's perception of their services and the transport inspectorate is also being reformed. Corruption will remain a risk that can undermine improved enforcement efforts and to mitigate this risk the project will work with the police and transport inspectorate to automate speed enforcement and weight control. Previous attempts at semi-autonomous speed enforcement in Ukraine failed because of privacy concerns and the project will seek to mitigate this risk through technical assistance on the revision of legislation to bring it in line with international best practices.

56. To mitigate some of these risks the project will finance 100 percent of the costs associated with project implementation including studies, design costs, land acquisition, VAT, incremental operating costs, and consultancy support to the PIU. The project design will include flexibility to

allow gradual approaches, if necessary, for implementation of the reform agenda. The Bank will also finance a substantial institutional component which can provide support with the implementation of the ongoing reform process.

VI. APPRAISAL SUMMARY

A. Economic Analysis

57. The project will bring direct benefits to road users arising from a reduction in VOCs, travel time costs, and road safety costs as a consequence of improved ride quality, relief of road congestion, and reduction in road accidents. The project will have a positive impact on communities living in the vicinity of the project roads through the construction of the bypasses that will reduce the long distance traffic passing through the communities. The economic evaluation was done for Component 1, road rehabilitation and safety improvement of the M-03 highway between Poltava to Kharkiv, and for Component 2, maintenance of core national road corridors, accounting for the project's civil works.

58. **Project traffic.** The 2014 average annual daily traffic on the project roads was 8,913 vehicles per day. The average annual daily traffic increased on average by 3.1 percent per year from 2009 to 2014. The normal traffic is estimated to grow at 2.8 percent per year from 2016 to 2017, increasing to 4 percent per year afterwards, based on the IMF estimate that the GDP in Ukraine will grow on average at 2.8 percent per year from 2016 to 2017 and at 4 percent per year from 2018 to 2020 and a conservative elasticity of traffic growth to GDP growth of 1.0.

59. The refined economic evaluation of Component 1 shows that its economic justification is satisfactory with an economic internal rate of return (EIRR) of 15.8 percent, net present value (NPV) of US$113.8 million at a discount rate of 12 percent, and a cost-benefit ratio of 1.4. The switching values analysis shows that construction costs will have to increase by 39 percent for the project EIRR to be reduced to 12 percent. The results of the economic analysis are summarized in table 1. Annex 6 presents the economic evaluation of the project.

Table 1. Economic Evaluation Results for Component 1

Road	Section	EIRR (%)	NPV (US$, millions)	Cost-Benefit Ratio
M03	Bypass of Poltava	13.2	8.6	1.1
	Poltava - Kulikove (with Kopyl Bypass)	16.1	28.8	1.4
	Kulikove – Chutove	19.4	50.9	1.9
	Bypass of Chutove	12.5	1.7	1.0
	Chutove – Valky	16.5	23.9	1.5
Total		15.8	113.8	1.4

60. A sensitivity analysis shows that under a severe worst case scenario with construction costs increased by 15 percent and project benefits decreased by 15 percent, the project shows an acceptable return with an EIRR of 12.8 percent. The case of not accounting for road safety benefits and emission yields an EIRR of 14 percent. Excluding the social costs of CO_2 emissions marginally increases the EIRR of the project to 16 percent. Assuming a lower increase in the economy and a corresponding traffic growth rate of 3 percent per year during the evaluation period, the EIRR of the project reduces to 14.9 percent.

61. A representative simplified economic evaluation of Component 2, which will finance periodic and recurrent maintenance road works on core national corridors, was done with aggregate data and capturing only the benefits of the expected periodic maintenance works, because detailed data regarding condition, traffic, and road work requirements of the corridors is not yet available. The rough economic evaluation shows that this component most likely will have a very high economic justification with EIRR higher than 25 percent as expected for road preservation works on high traffic roads.

B. Technical

62. The project will upgrade sections of the M-03 road between Poltava and Valky to a four-lane motorway category "1a" in accordance with Ukrainian design standards. The typical cross section will provide a total road width of 28.5 m comprising lane widths of 3.75 m, shoulder widths of 3.75 m, and median width of 6 m. The project will also incorporate safety features including improved pedestrian crossings, guardrails, road signs, pavement markings, and lighting at critical intersections, as well as bus stops. The project comprises pavement rehabilitation of the existing four-lane sections (33 km) and pavement rehabilitation of the existing two/three-lane sections plus construction of additional lanes (32 km). In addition, bypasses of settlements or urbanized areas will be constructed.

63. The proposed project will use the same asphalt concrete pavement construction technology and design standards that were already adopted on the RSIP and RSIP2. A representative pavement structure comprises a 50 mm mastic asphalt concrete wearing course, 160 mm open grade asphalt leveling course, 150 mm cement-treated base course, and 240 mm sub-base, which is appropriate for the expected traffic volume and type. The road traverses a flat to slightly rolling terrain. The road sections to be rehabilitated and widened follow the existing alignment and no major bridge works are anticipated, thus, the construction is not expected to be problematic. Independent supervision consultants will be appointed for site supervision and this will be complemented through the use of an independent consultant to undertake technical audits to ensure proper quality of the finished works.

64. The road maintenance component of the project will finance maintenance and capital repair works on the core national roads network. The majority of maintenance will be through long-term performance-based maintenance contracts which will build on the experience in the country to date. That experience suggests some simplification is required in the number of performance criteria used, that rehabilitation works should be split from routine and periodic maintenance activities, and that substantial lengths should be contracted to demonstrate commitment to the approach. Where necessary, the maintenance work may include safety improvements including improved junction design, lighting, crash barriers, pedestrian crossings, and so on. A key institutional focus for this work will be to support the reform of the DAKs, including their commercialization and separation from Ukravtodor.

65. The project will consider adaptation and mitigation measures to climate change. Climate resilient design standards have been taken into account including specific measures for pavement construction to be resilient to the extreme temperature ranges experienced between summer and winter in Ukraine. The performance-based maintenance contracts include routine maintenance to preserve the asset to a defined level of service, and winter maintenance, aimed at providing all

season road access during snowy weather. Emergency works will also be included as part of the contracts to make sure that in case of emergencies, including related to extreme weather events, that the response is quick and service can be reinstated promptly.

66. The project will also finance the tender documents for a range of network management tools which are ultimately designed to make the network safer and more sustainable in terms of long-term maintenance. The network management tools will most likely be delivered as part of a concession and supply, installation, and operations will be through a private operator. The full range of network management tools will be defined through the design process but will include e-tolling (or e-vignette), weigh-in-motion, automatic speed enforcement, traffic counters, and weather stations. The system will also provide a single enforcement infrastructure and back-office processing facility. The tolling (if electronic) will be compliant with the European Electronic Toll Service in that road usage will be declared electronically by means of a single onboard equipment, and will use an allowed technological solution, namely 5.8 GHz microwave and satellite positioning coupled with mobile communications.

C. Financial Management

67. Ukravtodor and its PIU for externally funded projects, Ukrdorinvest, are currently implementing the Bank-financed RSIP and RSIP2 projects, and FM arrangements were confirmed as moderately satisfactory during the June 2015 FM monitoring visit.

68. For the proposed RSDP, Ukravtodor will continue to rely on the FM arrangements that are currently used for the ongoing RSIP and RSIP2. The staffing arrangements continue to be satisfactory and existing financial staff of Ukrdorinvest and Ukravtodor have built substantial capacity during the implementation of previous projects. Unaudited interim financial reports (IFRs) have been submitted in a timely manner and the external auditors issued a clean (unqualified) audit opinion on the project financial statements for 2014. The system of internal controls in Ukravtodor and its PIU was confirmed as satisfactory by Bank staff; also the project auditors did not note any weaknesses in their letter to the management. For the RSDP project, both the Bank and Ukravtodor will continue to publicly disclose the project audit report as required under the Bank's Policy on Access to Information. For keeping the project records, the PIU will continue using the automated accounting system that was put in place during RSIP2. Unaudited IFRs will continue to be submitted quarterly and annual audits of project financial statements will be carried out. Given the overall financial situation in the country, the RSDP project will finance a wider range of activities, thus minimizing the amount of co-financing due to possible risks related to payment of such co-financing.

69. Ukravtodor will also use the same disbursement arrangements as are currently being used for the RSIP and RSIP2. For the purposes of disbursement of the loan, a designated account (DA) will be opened and managed in UKREXIMBANK. Replenishment for the DA will follow the procedures already established under the ongoing RSIP and RSIP2. The account will be opened by the state treasury in the name of Ukravtodor. Additionally, Ukravtodor will open two own transit accounts in the state treasury, one in UAH (state treasury) and one multicurrency account (UKREXIMBANK). All of the above accounts will be used solely for payments related to the implementation of the RSDP and only for payments below the minimum application amount. Disbursements from the IBRD loan account will follow the transaction-based method following

traditional Bank procedures: advances, direct payments, special commitments, and reimbursement (with full documentation and against statements of expenditures [SOEs]). For payments above the minimum application size, as specified in the Disbursement Letter, the borrower will submit withdrawal applications to the Bank for direct payments by the Bank from the loan account to contractors, consultants, and suppliers. The withdrawal applications will be prepared by the PIU, authorized by Ukravtodor and other government beneficiaries as may be relevant, and then submitted to the MOF for final review and authorization.

D. Procurement

70. The overall procurement risk is rated Substantial because of the complexity of the procurement packages and the use of performance-based contracts on which the PIU has little experience. The risk may be lowered to Moderate once the first performance-based contract is signed. The detailed procurement capacity assessment of the PIU is provided in the Procurement Risk Assessment Module.

71. Procurement under the project will be conducted in accordance with the Bank's procurement rules and procedures, "Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers" dated January 2011, revised July 2014; "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers" dated January 2011, revised July 2014; and the provisions stipulated in the legal agreement.

72. The procurement under the project will be conducted by the PIU in accordance with the Bank's procurement rules and procedures described in the updated Project Operational Manual (POM). All procurement activities, and subsequent implementation status, will be duly disclosed on the Ukravtodor website in accordance with guidance from the CoST initiative and Bank requirements on disclosure. The project will also be working with civil society to improve transparency and increase the user focus on project outcomes.

73. The main civil works contracts will be divided into lots of between US$50–100 million which will be bid using the international competitive bidding (ICB) procedure with pre-qualifications. In the previous projects there has been good international competition arising from these tenders. For the maintenance component, performance-based contracts will be used. Before bidding is opened, contractor workshops will be held to assess the interest and capacity to undertake these types of contracts.

E. Social (including Safeguards)

74. *Involuntary resettlement:* It is expected that mainly private farmland will be acquired for the project; however, physical displacement of a few households (3 or 5) may also be caused by construction of bypasses. The designs for most of the road sections have not been completed and are awaiting approval through 'state expertise' thus abbreviated Resettlement Action Plans (RAPs) will be prepared by the borrower in accordance with the Resettlement Policy Framework (RPF) and satisfactory to the Bank, duly disclosed and implemented before starting any construction works. For the sections where the designs have been completed (Chutove to Valky section) there are no land acquisition or resettlement issues and thus no RAP has been prepared. To cover other

design and construction works that may be funded by or result from the project, an RPF was prepared satisfactory to the Bank and disclosed on the website of Ukravtodor, and the Bank's Infoshop on July 16, 2015. Two series of consultations on the project were held with the local communities potentially affected by the project with participation of the land specialists and representatives of Ukravtodor and the design institution. The first round was held in July 2013 and the second round was held in December 2014. In both rounds the project scope and planned footprint were presented to the communities. Equitable participation of women was ensured—in every consultation more than 50 percent of participants were women—and women-leaders were engaged in documenting the consultations. One of the consultations resulted in changes in the design of a section of the road to ensure that the corresponding community maintains connection of the access road to their agricultural land plots with the main road and to locate the bus stop and crossing in a place suitable for the local community. The records of the consultations were made available to the team and have been taken into account during preparation of the current version of the RPF which was consulted on in September 2015 A detailed summary of the design process, state expertise, and safeguard instruments is presented in the safeguards section of annex 3.

75. The PIU has a good track record of working on involuntary resettlement under RSIP2. A staff member is assigned to work on safeguards issues and to monitor implementation of the RPF and subsequent RAPs by the local authorities and the road services of the respective oblasts. The fact that the cost of land acquisition is financed from the project provides the Ukravtodor more control over planning and implementation of resettlement while reducing the risks of delays in land acquisition. The RAPs prepared after finalization of the design will be disclosed and consultations with affected communities will be conducted by the road services of the respective oblasts.

76. *Citizen engagement:* Ukravtodor has a mechanism in place to deal with citizens' concerns and complaints. All the requests are directed to the general director who nominates a person to deal with it. By law, an answer must be provided within five days. If further action is needed, follow-up on the actions taken or explanations are provided to complainants, who, if not satisfied, have recourse to the justice system. In view of the introduction of the new road safety measures, particularly around speed enforcement, targeted communications will be supported by the project to engage road users and beneficiary groups to support effective implementation. Civil society organizations will also be invited to partner in the dissemination of the information. A specific online complaints uptake channel will be created to deal with grievances/inquiries related to new road safety measures and other project interventions. Complaints will be analyzed and a consolidated report on how typical complaints have been or are planned to be addressed will be produced on an annual basis and disclosed to the public.

77. *Social impact:* The maintenance component is expected to rely more on local contractors and thus is expected to support jobs creation for the local population. Commercialization of the maintenance will create an influx of resources to state companies which at the moment are starved of any resources and this project will help provide needed employment. It is also expected that staff from state companies will join private companies. Highway construction will result in the influx of technical workers and may support additional income opportunities in the service sector (catering, laundry, housing, and so on). Although road upgrading is not very labor intensive there will still be provisions in the bidding documents for hiring non-skilled local labor to maximize temporary jobs provision to the local population which was hit by the overall economic crisis in

the country which in turn was further exacerbated by the influx of internally displaced peoples from Donbas.

78. *Gender impact:* The improvement of the pedestrians' safety on the road will benefit the local population alongside the road. Anecdotal evidence suggests that women will benefit more as they are the ones who tend to move more due to their family obligations related to shopping, child care, and care for elderly family members who may reside separately. Improvement of the safety of local transport by equipping the local stops with screens and lighting will also benefit women whose safety while waiting for public transport during the darkness will improve. The expected decrease of traffic fatalities by 40 percent will have a higher effect on men as cargo and public transport drivers are mostly male and men are more often involved in car accidents. This improvement will decrease the number of families losing their bread winner and leaving women with children and no sufficient sources of income. The maintenance component will create local job opportunities for women, although proportionally less than for men, and use of the private sector for design and supervision will create job opportunities for high qualified professionals. However improved connectivity, shortened travel time, and increased safety and comfort of travel will improve mobility and this is expected to allow women to get better access to jobs in the service and retail sectors.

79. *Communication and outreach channels that specifically target women beneficiaries:* Given that the project does not envision a specific quota for women beneficiaries, attention to gender equity in the project will be addressed through the following means: (a) outreach and feedback collection targeted to reach potential women beneficiaries, for example, in collaboration with the women leaders and local authorities, by posting the information in places regularly attended by women (local shops, schools, municipal offices); (b) flexibility on timing and methods of delivering information messages and holding consultations to accommodate women's participation; (c) collection of gender disaggregated data on beneficiaries and other indicators through the course of the project; and (d) including assessment on gender inclusion progress and constraints in project evaluation reports and beneficiary feedback.

80. *Beneficiary feedback:* The borrower will survey the commercial users of the road (cargo operators and passenger transport operators) to get their feedback on road improvement. The result of the survey will be analyzed and included in a report on the complaints analysis. The terms of reference of the resident engineer will contain the provisions for holding consultations with the local communities before the start, during, and after completion of the works. Equal participation of women in these consultations will be ensured by using safe and easily accessible locations, convenient time, and targeted invitation of women leaders by the local authorities. The findings of the consultations will be included in the resident engineer's report and will have to be addressed by the contractor or the PIU. The grievance mechanism established by the Regional Roads Service of Poltava and Kharkiv regions as described in the respective section of the RPF will be used to channel grievances about the project on an ongoing basis.

81. Communities and individuals who believe that they are adversely affected by a Bank-supported project may submit complaints to the existing project-level grievance redress mechanisms or the Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed to address project-related concerns. Project-affected communities and individuals may submit their complaint to the Bank's independent Inspection Panel which

determines whether harm occurred, or could occur, as a result of the Bank's noncompliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the Bank's corporate GRS, visit http://www.worldbank.org/GRS. For information on how to submit complaints to the Bank's Inspection Panel, visit www.inspectionpanel.org.

F. Environment (including Safeguards)

82. Given the scale of impacts and the socioeconomic and environmental profile of the project area (mainly farmland), the project is assigned an Environmental Category B rating. The environmental impacts of road rehabilitation/repairs under RSDP will mainly be caused by road widening and road infrastructure safety improvements and will be located to a large extent within the existing right of way of the road. These general impacts are expected to be similar to those under the ongoing RSIP and RSIP2 and broadly include air pollution and noise from trucks, other construction machinery, and asphalt plants; soil disturbance; tree-cutting (low value species on the roadside); and impacts on surface water networks (siltation, accidental pollution). These environmental impacts will be local and can be mitigated by good construction and general housekeeping practices. All bypasses will go mainly through farmland. A designated Compensating Tree Planting Plan will be developed by the contractors as part of site-specific Environmental Management Plans (EMPs) in coordination with the Poltava Oblast Forestry Department. The requirement for compensation tree planting is mandatory for the contractors and is contained in the Environmental and Social Management Framework (ESMF). No protected areas will be affected by the project. No physical cultural resources will be affected, however, 'chance finds' provisions will be included in the standard bidding contracts.

83. After completion, the project will have positive indirect environmental impacts on human health and safety through reduced accidents and reduced air pollution that will result from more even travel speeds on rehabilitated road sections.

84. Public consultations on the Environmental Impact Assessment (EIA) according to Ukrainian legislation, for a number of sections of the road, were held at various times between April 2009 and December 2014. For the purposes of the road corridor a corridor-wide ESMF, documenting baseline conditions and environmental risks for the road, was prepared and disclosed in Infoshop and on the website of Ukravtodor. For the Chutove to Valky section, a site-specific EIA incorporating the EMP was prepared and disclosed. The disclosure of the above mentioned ESMF and EMPs at Infoshop took place on July 13, 2015, and on the website of Ukravtodor on August 3, 2015. Formal consultations on these documents were organized by Ukrdorinvest in the project region on September 24, 2015. The EIAs incorporating the EMPs for the remaining road sections will be prepared by Ukrdorinvest once the road designs have been finalized and approved by state experts. A detailed summary of the design process, state expertise, and safeguard instruments is presented in the safeguards section of annex 3. Also, as part of the preparation of final designs under the RSDP, public consultations will be organized before works start.

85. Ukrdorinvest has experience of working on environmental safeguards under the ongoing RSIP and RSIP2. A Ukrdorinvest staff member has been assigned to work on environmental issues in close collaboration with the road design institute (Ukrgiprodor), local authorities, and the road

services of Poltava and Kharkiv oblasts. Ukrdorinvest has experience in organizing public consultations and organized such consultations on EIA/OVOS for RSIP and RSIP2 during 2007 and 2011.

G. Other Safeguards Policies Triggered

86. Except OP 4.01 and OP 4.12 no other safeguard policies will be triggered.

Annex 1: Results Framework and Monitoring

UKRAINE: Road Sector Development Project (P149322)

Project Development Objectives

PDO Statement

The objective of the project is to improve transport connectivity, maintenance operations, and road safety for road users on selected sections of the national roads network and improve road network management in Ukraine.

These results are at	Project Level

Project Development Objective Indicators

		Cumulative Target Values					
Indicator Name	**Baseline**	**YR1**	**YR2**	**YR3**	**YR4**	**YR5**	**End Target**
Reduction in travel time between Poltava and Kharkiv (minutes)	140	–	–	120	–	96	96
Reduction in traffic accidents involving injury and fatalities on the Poltava to Kharkiv road (number)	139 (incl. 26 fatalities)	–	–	96 (18)	–	85 (16)	85 (16)
Condition in IRI of M-03, M-06 and M-07 corridors sustained at IRI < 2 (Yes/No)	Yes IRI Range 1.3–1.8	–	–	Yes	–	Yes	Yes
Road network management modernized measured by:							

(a) percentage reduction in accidents caused by overspeeding	39	–	–	30	20	20	20
(b) percentage reduction in number of overweight trucks	30	–	–	30	25	20	15

Intermediate Results Indicators

		Cumulative Target Values					
Indicator Name	**Baseline**	**YR1**	**YR2**	**YR3**	**YR4**	**YR5**	**End Target**
Component 1: Road Rehabilitation and Safety Improvement							
Roads constructed on M-03, non-rural (kilometers) (Core)	0	–	–	26	64	100	100
Component 2: Maintenance of Core National Road Corridors							
Roads maintained using long-term performance-based contracts (number)	0	–	838	–	–	838	838
Component 3: Network Management and Development							
First phase implementation of modern network management tools:							
(a) weigh-in-motion control system (Yes/No)	No	–	–	Yes	Yes	Yes	Yes
(b) national system of automatic speed enforcement (Yes/No)	No	–	–	Yes	Yes	Yes	Yes
Tolling strategy, system specification, and bidding documents prepared and adopted (Yes/No)	No	–	–	Yes	Yes	Yes	Yes

Strategy for maintenance reform prepared and adopted (Yes/No)	No	–	–	Yes	Yes	Yes	Yes
Digital passport implemented on national roads (with up-to-date conditions and traffic data) (kilometers)	0	–	–	5,000	10,000	21,000	21,000
Feasibility and detailed design completed (kilometers)	0	–	200	300	400	500	500
Cross-cutting issues							
Direct project beneficiaries (number), of which female (percentage):							
Short-term construction jobs:	0	–	400 (30%)	1,000 (30%)	2,000 (30%)	2,000 (30%)	2,000 (30%)
Long-term maintenance jobs:	0	–	800 (40%)	1600 (40%)	1600 (40%)	1600 (40%)	1600 (40%)
Direct daily road user beneficiaries:	0	–	–	–	30,000	40,000	40,000
Indirect beneficiaries in Poltava and Kharkiv oblasts:	0	–	–	–	4.4 million	4.4 million	4.4 million
Beneficiaries that feel project investments reflected their needs, gender disaggregated (percentage)	0	–	–	65	–	80	80
Ukravtodor publishes annual report on grievance redress management and how issues were resolved (including resolution rates) (Yes/No)	No	–	Yes	Yes	Yes	Yes	Yes

Indicator Description

Project Development Objective Indicators

Indicator Name	Description (indicator definition and so on)	Frequency	Data Source/Methodology	Responsibility for Data Collection
Reduction in travel time between Poltava and Kharkiv (minutes)	This indicator measures the average travel time reduction along the M-03 corridor between Poltava and Kharkiv. This indicator will be measured at the end of the project and will be monitored annually for the roads improved under the project.	Annual	Project Progress Reports	UAD
Reduction in traffic accidents involving injury and fatalities on the Poltava to Kharkiv road (number)	This indicator will measure the reduction of road crashes, injuries, and fatalities along the M-03 corridor between Poltava and Kharkiv.	Annual	Project Progress Reports	Traffic Police
Condition in IRI of M-03, M-06, and M-07 corridors sustained at IRI < 2 (Yes/No)	This indicator will measure the overall condition of the three main corridors that will be maintained under the project. The corridors are already in good or fair condition and the objective is to sustain this condition at a level of <2 IRI national roads based on the average IRI of the network.	Annual	Project Progress Reports	UAD
Modernization of road network management (a) reduction in accidents caused by overspeeding (%) (b) reduction in number of overweight trucks (%)	This indicator will measure the outcomes of key steps in the provision of a modern system of network management. This will include, in particular, the reduction in accidents caused by overspeeding following the implementation of speed cameras and the reduction in number of overweight trucks following the introduction of weigh-in-motion control. The baseline of this second indicator is the number observed in M-	Annual	Project Progress Reports	MoI/UAD

	06 and may not reflect perfectly the situation on M-03.			

Intermediate Results Indicators

Indicator Name	Description (indicator definition and so on)	Frequency	Data Source/ Methodology	Responsibility for Data Collection
Roads constructed on M-03, non-rural (kilometers) (Core)	This indicator will measure the distance of the M-03 corridor between Poltava and Valky that will be improved under this project. This is a core indicator of the Bank.	Quarterly	Project Progress Reports	UAD
Roads maintained using long-term performance-based contracts (kilometers)	This indicator will measure the number of kilometers maintained under long-term performance-based contracts financed by the operation.	Annual	Project Progress Reports	UAD
First phase implementation of modern network management tools: (a) weigh-in-motion control system (Yes/No) (b) national system of automatic speed enforce-ment (Yes/No)	This indicator will measure progress in the steps to be taken to achieve the successful rollout of a weigh-in-motion control system national speed enforcement system along the Kiev to Kharkiv road corridor as evidenced by the installation of automatic speed enforcement cameras, an associated processing center, and intensity of speed controls using mobile equipment. The first phase will imply limited implementation of the weigh-in-motion control system and speed enforcement in one road section to be defined in the initial specification of the works.	Quarterly	Project Progress Reports	UAD/ Traffic Police
Tolling strategy, system specification, and bidding documents prepared and adopted (Yes/No)	This indicator will measure the progress toward readiness for e-tolling or an alternative revenue generating system (such as e-vignette). It will, in particular, focus on the preparation of feasibility studies to assess viability and develop functional specifications and the preparation of bidding documents.	Annual	Project Progress Reports	UAD

Strategy for maintenance reform prepared and adopted (Yes/No)	This indicator will measure the steps toward the implementation of the maintenance reform program, from capacity assessment to implementation of key reforms, in particular the decentralization of DAKs.	Annual	Project Progress Reports	UAD
Digital passport implemented on national roads (with up-to-date conditions and traffic data) (kilometers)	This indicator will measure the implementation of digital passports, that is, a system of databases with up-to-date data on the condition of the roads and maintenance plans. The system will also be used to share information with the public via Internet.	Annual	Project Progress Reports	UAD
Feasibility and detailed design completed in kilometers (number)	This indicator will measure progress in the preparation of feasibility studies and detailed design initially for the Boryspil bypass and Lviv-Kherson corridor. The objective is the preparation of high quality projects to be financed in the future by the Bank or other financiers.	Quarterly	Project Progress Reports	UAD
Direct project beneficiaries (number), of which female (percentage)	This indicator measures the number of direct project beneficiaries and percentage of female beneficiaries among them.	Annual	Project Progress Reports	UAD
Beneficiaries that feel project investments reflected their needs, gender disaggregated (percentage)	This indicator measures the share of beneficiaries (men and women) reporting that their concerns have been taken into account during project design and implementation	Annual, starting from the second year of implementation	Project progress reports	UAD
Ukravtodor publishes annual report on grievance redress management and how issues were resolved (including resolution rates) (Yes/No)	This indicator measures the existence of an annual report on grievance redressal and how issues were resolved (including resolution rates)	Annual	Project progress reports	UAD

Annex 2: Detailed Project Description

UKRAINE: Road Sector Development Project (P149322)

1. The proposed project will be an IPF consisting of a loan in the amount of US$560 million to Ukraine. The proposed loan will finance 100 percent of eligible expenditures including VAT and land acquisition costs. This project will be a continuation of the RSIP and RSIP2 and will leverage returns on major road infrastructure investments in Ukraine, such as the EBRD- and EIB-funded improvements to European priority road corridors. The project will continue the improvement of the main road between Kiev and Kharkiv, the largest and second largest cities in Ukraine, respectively, strengthening economic and political integration with the east of the country. The project will also have a substantial component on maintenance to reverse the overall decline in the condition of the road network. These elements will be complemented by an institutional program with a strong focus on the implementation of the sector's renewed reform and innovation process including: (a) introduction of modern road safety and network management principles to reduce accident fatalities, protect network assets, and move toward sustainable finance; (b) support for the implementation of prioritized maintenance plans and restructuring of the maintenance industry; and (c) the development of a robust pipeline of sustainably financed road investments. The project will include the following components:

Component 1: Road Rehabilitation and Safety Improvement (Total estimated cost of US$436.7 million from the IBRD loan)

2. This component will continue financing the improvement to motorway standard of the road between Kiev to Kharkiv. The road will provide a high standard and safe corridor to integrate with the EU extended Trans-European Transport Network and improve the connection of Ukraine's two largest cities. This component will finance the civil works for the improvement of approximately 100 kilometers of selected sections of the M-03 highway, initially between Poltava and Valky. The road will be built to a category 1 standard which is a four-lane divided highway with high safety specifications including central crash barriers and side crash barriers where required. Through implementation of component 3(i) the road will also act as a pilot corridor for the implementation of automatic speed enforcement and improved weight control. The project will finance all necessary bridges, interchanges, infrastructure needed for installation of network management tools, site supervision, and land acquisition costs.

3. The work will include a combination of capital repairs on the sections that are already built to a four-lane standard and widening for those sections which are currently at less than four-lane standard. Table 2.1 provides the road sections and the proposed engineering interventions. The work will include bypasses which will be built to a four-lane standard in accordance with the rest of the corridor. The designs for the bypasses are currently being reviewed to confirm optimal alignment and engineering solutions.

Table 2.1. Road Sections and Proposed Works

Sect. No.	Section Name	Start km	End km	Type of Works
3.1	Bypass of Poltava	333 + 250	340 + 961	Bypass of Poltava
3.2	Poltava - Kulikove	340 + 961	356 + 200	Capital repair and bypass of Kopyly
3.3	Kulikove - Chutove	356 + 200	383 + 864	Widening to four lanes
3.4	Bypass of Chutove	383 + 864	395 + 064	Bypass of Chutove
3.5	Chutove - Valky	395 + 064	420 + 050	Widening to four lanes

Component 2: **Maintenance of Core National Road Corridors (Total estimated cost of US$102.3 million from the IBRD loan)**

4. This activity will finance maintenance on approximately 840 km of the country's most strategic road network. This will include the M-06, M-07, and M-03 which are the main international and domestic corridors. These roads have been improved over the last decade and are generally in good or fair condition. This will be done through 5-year performance-based maintenance contracts. The objective of these contracts is to maintain the roads in good condition through routine maintenance, periodic maintenance, and necessary road safety improvements. It will also contribute to the MoI strategic objective of having 5,000 km in the country under performance-based contracts and the divestiture of the DAKs. During implementation any outstanding road safety issues will be addressed. This component will finance all necessary design and site supervision.

5. This activity will build on the experience of the ongoing performance-based contract designed under RSIP and implemented using EBRD funds. Lessons from this experience suggest that the contracts should be simplified, limited to only routine and periodic maintenance activities and bid as part of a substantial package to attract greater competition and demonstrate commitment to the approach. The winning contractor for the ongoing performance-based contract has associated with the DAKs which will also be encouraged in this project to build the capacity and financial sustainability of the DAKs.

Table 2.2. Roads to be Maintained under Component 2

Road link	Length (km)	Current IRI	Average daily traffic levels
M-06 Kiev - Brody	424	1.2	15,000
M-03 Kiev - Boryspil	20	1.3	58,000
M-07 Kiev - Kovel	394	1.8	4,500
	838		

Component 3: Network Management and Development (Total estimated cost of US$19.6 million from the IBRD loan)

6. This component will finance institutional support to implementation of road management reform and cover the following areas:

Subcomponent 3(i): Road Safety and Network Management (Total estimated cost of US$4 million from the IBRD loan)

7. This activity will finance the implementation of an integrated network management system to improve the safety and sustainability of the national road network. The network management system will include e-tolling, weigh-in-motion system for axle load control, and automatic speed enforcement cameras. Broader road safety activities will also be supported to improve coordination between key stakeholders and ensure that the project-financed road corridors have an integrated approach to road safety. The subcomponent will finance specialist support to the government working group, consultancy services, and equipment, if required. The following activities are envisaged:

- Support in the preparation of relevant legislation and a regulatory framework for speed enforcement, weigh-in-motion, and e-tolling systems
- Assistance in preparation and implementation of priority and high impact road safety projects resulting from the road safety capacity review being prepared under a recent GRSF grant
- Support to increase social and key stakeholder awareness through public awareness campaigns and consultations
- Preparation of feasibility studies and functional specifications for a national system of tolling, weigh-in-motion, and automatic speed enforcement. The preparation and support in procurement of the necessary equipment for a first phase implementation including installation of speed enforcement and weight control systems on the M-03 corridor and the respective processing centers for automatic speed enforcement and support in weight control.
- Preparation of bidding documents for installation and operation of the national systems for speed enforcement and weigh-in-motion
- The preparation of concession documents for an operator to finance, install, and operate the national road tolling system and any procurement documents that may be needed for an initial rollout of the system
- Training and other institutional capacity-development activities for key stakeholders in operating and managing the new systems
- Consultants to oversee evaluation of the procurement process, supervise installation, and monitor the initial stages of operations and results as well as evaluation of impact achieved and lessons learned from the first stage of systems implementation

Subcomponent 3(ii): Maintenance Management (Total estimated cost of US$1 million from the IBRD loan)

8. Given the overall underfunding of the sector and in the context of the proposed reform of the maintenance industry and the decentralization agenda, this subcomponent will finance the institutional work required to implement key aspects of the reform agenda. It will also finance the necessary work to plan, implement, and monitor the maintenance works in Component 2. The following key activities would be supported:

- Necessary data collection, planning, design, safety audits, and project management support to ensure effective implementation of prioritized maintenance plans. The rollout of the road digital passport will also be supported as a framework for the collection of road-specific data and a portal for disclosure of road maintenance plans to the public

- Consultancy services to support Ukravtodor's reform plans for the maintenance industry including capacity building and institutional arrangements to facilitate implementation of improved systems and monitor subsequent implementation and impact

Subcomponent 3(iii): Preparation of Feasibility Studies and Design (Total estimated cost US$11 million from the IBRD loan)

9. This component will finance the preparation of feasibility studies, associated social and environmental documents compliant with the Bank's safeguard standards, detailed design, and bidding documents for priority road improvement schemes. The objective of this activity is to prepare a pipeline of high quality projects for external financiers and also to support the MoI objective of divestiture of the design capacity from Ukravtodor controlled entities to the private sector. The road schemes to be supported will include the Lviv - Kherson road. This 950 km corridor forms a key route between Lviv and the port cities in the south.

Subcomponent 3(iv): Project Management and Implementation Support (Total estimated cost of US$3.6 million from the IBRD loan)

10. This subcomponent will finance activities necessary for the effective implementation of the project including technical audits, safety audits, financial audits, design reviews, incremental operating costs, and consultancy services.

Annex 3: Implementation Arrangements

UKRAINE: Road Sector Development Project (P149322)

Project Institutional and Implementation Arrangements

1. This project will be the third Bank-funded road project executed by Ukravtodor as implementing agency. Over the past eight years, Ukravtodor and its PIU for externally funded projects, Ukrdorinvest, have gained a lot of experience in the execution of large externally funded road projects (mostly by the Bank, EBRD, and EIB). Under this arrangement, Ukravtodor, as the main implementing agency, signs an annual contract with Ukrdorinvest to provide project management services including management of the procurement process, contract management, and monitoring and evaluation. However, all contract signatures, disbursements, and FM are directly executed through Ukravtodor—no funds pass through Ukrdorinvest. For this project all components of the project will be undertaken on this basis.

2. Broadly, this arrangement has been successful and Ukrdorinvest has good experience with procurement, FM, and safeguards, and has well-trained and experienced staff. However, to accommodate this new project there will be a need to monitor existing staffing levels, particularly during peak implementation. The MoI is currently undertaking a capacity review of Ukrdorinvest and additional staff have been appointed; during appraisal it was agreed that an additional safeguards specialist will be appointed and this will be a condition of effectiveness. The recent events in the country have caused implementation delays which have been largely outside the control of Ukravtodor and caused by a lack of counterpart funds for VAT and land acquisition payments. To mitigate these risks this project is designed to finance these activities together with other operating costs associated with undertaking effective project management.

3. The previous projects also dealt with social and environmental issues. For the project preparation stages (road design, feasibility studies, environmental and social assessments, and so on) most of the work has been undertaken through Ukridiprodor, the design institute, who have good experience, equipment, and expertise to manage these types of road projects although budget constraints have caused delays in the process. The diagram below shows the overall institutional arrangements for the road sector in Ukraine.

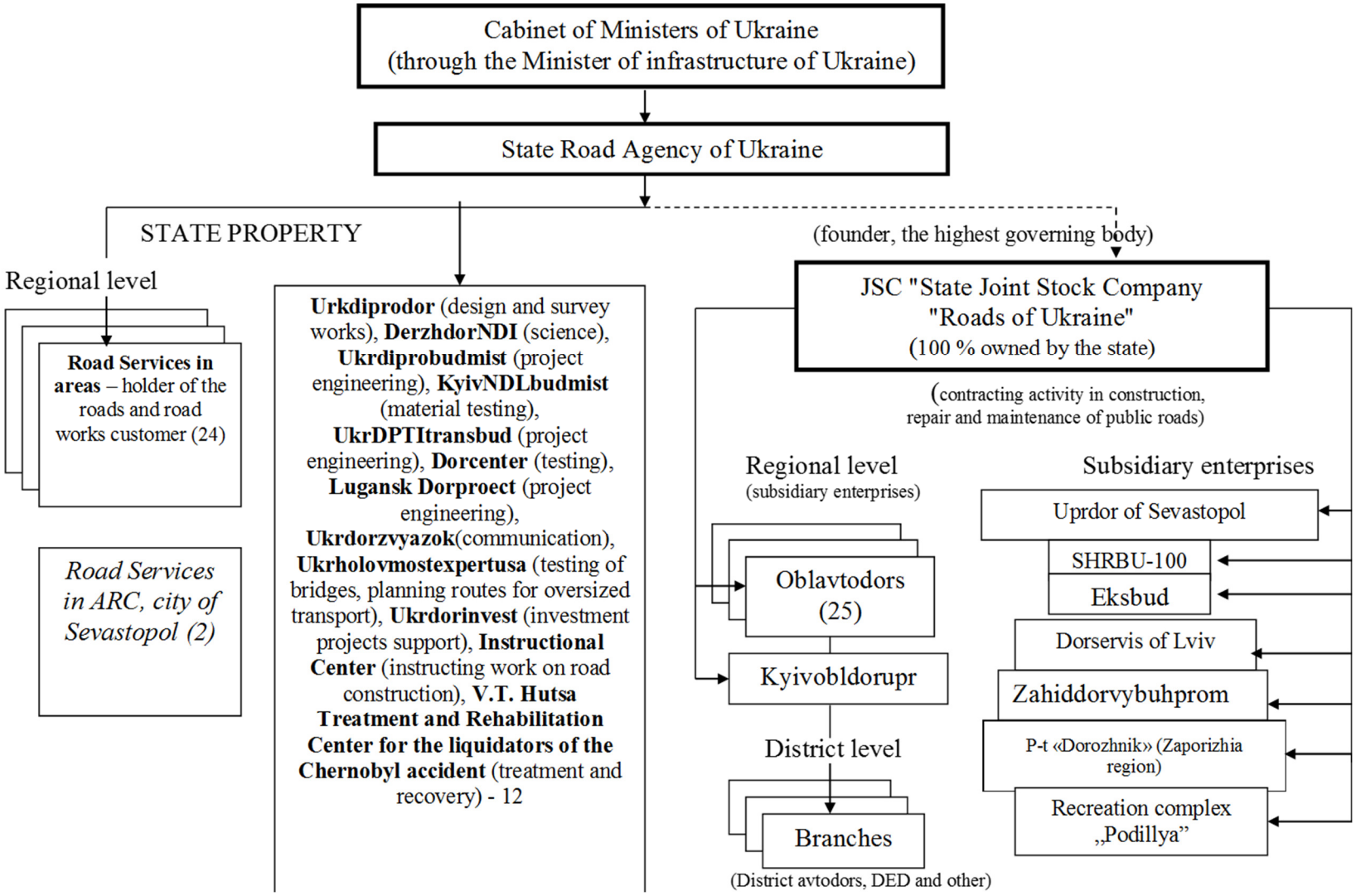
4. For undertaking project components related to e-tolling, weigh-in-motion, speed enforcement, and other road safety measures it has been agreed to set up a working group consisting of high level representatives of the main stakeholders including all key beneficiaries, that is, Ukravtodor, the police, the future National Agency for Traffic Safety, MoI, MoIA, MoF, MoRD, and other relevant stakeholders. The work on the respective project subcomponents benefitting institutions other that Ukravtodor will be monitored and supervised by this working group who will set up an office in the MoI. While project management and all procurement for all components will continue to be undertaken by Ukravtodor, a governmental, ministerial order or other appropriate regulation will be agreed between the institutions involved and issued to formalize the roles associated with project preparation and implementation, including preparation of terms of reference, bid evaluation, and contract execution of the respective subcomponents.

5. Under the ongoing RSIP and RSIP2, regular technical audits by an independent international auditor are being carried out to verify that all road works have been executed in compliance with the technical specifications. The same type of technical audits will also be part of the implementation arrangements for the RSDP.

Table 3. 1. Beneficiary Institutions and their Key Roles in the Project

Beneficiary Institution	Loan Components	Comments on Roles and Responsibilities
Ukravtodor	1, 2, 3	PIU, overall management, and coordination
The future National Agency for Traffic Safety	1 (partly), 2 (partly), 3(i)	In relation to weighing system, but possibly speed enforcement system and other relevant road safety subcomponents
MoI	1 (partly), 2 (partly), 3 (partly)	In particular in relation to legal and regulatory framework, but also policies related to weighing, road tolling, road safety, reform of road sector management, institutional capacity development, investment and maintenance policies, and programming
Traffic police and MoIA	1 (partly), 2 (partly), 3(i)	In particular in relation to policies, legal and regulatory framework regarding speed enforcement, preparation and implementation of automatic speed enforcement system (including location of speed controlling equipment and associated infrastructure), but also other relevant road safety subcomponents and related institutional capacity development. Provision of vehicle registration database to support automatic enforcement activities.
MOF	3(i)	In particular in relation to policies, legal and regulatory framework related to road tolling and revenues from fines for overweight vehicles, speeding, and other traffic offences but also investment and maintenance policies and programming
MoRD	3(i)	In particular in relation to reform of the road management system in Ukraine to assure that it is in line with the general decentralization process undertaken by the government, but also policies related to road safety at the regional and local level

Figure 3.1. Institutional and Management Structure of the Road Complex of Ukraine



Financial Management, Disbursements and Procurement

Financial Management

6. The overall FM risk for this project is assessed as Substantial. Ukravtodor and its PIU for externally funded projects, Ukrdorinvest, will be responsible for the FM and disbursements functions. Ukravtodor is currently implementing Bank-financed projects (RSIP and RSIP2), and FM arrangements were confirmed by Bank staff to be moderately satisfactory.

7. Ukravtodor will continue using the same FM arrangements for the RSDP as currently are being used for the RSIP and RSIP2. The same staff of Ukravtodor and the PIU will continue carrying out FM and disbursement functions. The staff have experience in implementation of the RSIP as well as other externally funded road projects. Ukravtodor has adequate internal controls for project implementation, which have been periodically reviewed by the Bank and are defined in the POM. Before effectiveness, the POM will be updated and changes to the POM subsequently agreed with the Bank. To further improve the quality and efficiency of project accounting, the PIU has acquired an automated accounting system and it will continue to be used for the RSDP. Accounting records related to the RSDP will be maintained as the segregated set of accounts, separate from all other records of the PIU.

8. Unaudited IFRs will be submitted on a quarterly basis, starting from the first quarter in which disbursements occur, within 45 days after the end of each quarter. An eligible independent auditor will carry out annual audits of the project financial statements, in accordance with the International Standards on Auditing, and the audit reports and management letters will be submitted within six months from the end of each fiscal year. The cost of audits will continue to be financed from the project funds. In accordance with the Bank's Policy on Access to Information, the audited project financial statements will need to be publicly disclosed by Ukravtodor in a timely manner acceptable to the Bank. In addition, the Bank will separately disclose the reports on its website. Ukravtodor will also submit to the Bank, reports on its external reviews by the accounting chamber and other state authorities within one month of their receipt by Ukravtodor. The sample format of unaudited IFRs and the sample audit terms of reference to be used for this project will be included in the POM.

Disbursements

9. For the purposes of the project, a DA will be opened and managed in UKREXIMBANK, including appropriate protection against set-off, seizure, and attachment. Replenishment for the DA will follow IBRD procedures. The account will be opened by the state treasury for Ukravtodor. The DA ceiling will be established in the amount of US$80,000,000. The minimum value of applications for reimbursements, direct payments and special commitments in US dollars is 20 percent of the balance of the DA. Additionally, Ukravtodor will open two own transit accounts in the state treasury, one in UAH (state treasury) and one multicurrency account (UKREXIMBANK). All of the above accounts will be used solely for payments related to the implementation of the RSDP and only for payments below the minimum application amount.

10. Disbursements from the IBRD loan account will follow the transaction-based method, that is, traditional Bank procedures: advances, direct payments, special commitments, and reimbursement (with full documentation and against SOEs). For certain payments, above the minimum application size, as specified in the Disbursement Letter, the borrower will submit withdrawal applications to the Bank for payments to suppliers and consultants directly from the loan account. The withdrawal applications will be prepared by the PIU, authorized by Ukravtodor, and then submitted to the MOF for final review and authorization. Payments from the special/transit account will be authorized by Ukravtodor with no further countersignature of the MOF.

11. All disbursements will be made on the basis of full documentation for (a) contracts for goods costing more than the equivalent of US$300,000 each; (b) contracts for works costing more than the equivalent of US$500,000 each; and (c) services under contracts of more than the equivalent of US$100,000 each for consulting firms and more than the equivalent of US$50,000 each for individual consultants. Disbursements below these thresholds will be made according to certified SOEs. This documentation will be retained by the implementing agency for at least one year after receipt by the Bank of the audit report for the year in which the last disbursement was made or for a longer period, if required by local legislation.

Procurement

12. Procurement for the proposed project will be carried out in accordance with the Bank's "Guidelines: Procurement of Goods, Works, and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers", published in January 2011 and revised in July 2014; "Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers", published in January 2011 and revised in July 2014; and "Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits", dated October 15, 2006 and revised in January 2011.

13. The PIU in Ukrdorinvest will manage procurement under the project. This is an experienced PIU which was involved in implementation of two previous Bank-financed projects in the road sector. This PIU is also implementing EBRD-financed projects. The procurement section of the POM, will be based on RSIP2, but updated to reflect peculiarities of implementation arrangements under the new project and revisions in procurement requirements as per the applicable Bank guidelines. The implementation arrangements are built on experience in previous projects. Consultants with wide experience in supervision of International Federation of Consulting Engineers contracts will be hired to supervise construction. Their contracts will include transfer of the knowledge component to build capacities of the beneficiary and the private sector.

14. An assessment of the PIU's procurement capacity was conducted and it concluded that the PIU currently has four procurement persons, staff of Ukrdorinvest. Additional staff will be hired, as needed. Two other specialists have previous experience in procurement under smaller investment projects. One additional procurement consultant with previous experience in Bank procurement was recently hired to reinforce the PIU. Training on the Bank's procurement procedures is required for all procurement specialists.

15. Results-based contracts will be used for the roads maintenance component, building on pilot project recently implemented by the PIU and financed by EBRD. Initial assessment of the standard bidding document (SBD) for related Performance Based Procurement has been handled. The basic issues identified at the time of the Bank's initial assessment of the pilot implementation were complicated evaluation procedures, low level of interest and experience in the market, readiness of the designs, and management of the contract. Use of single-stage bidding for performance-based contracts was also discussed and agreed during the assessment to address some of the issues above. The SBD currently used by Ukrdorinvest will be revised upon completion of the consultant's review of the implementation issues of the pilot project and taking into account the consultant's suggestions. The finalized SBD will be received by the Bank for review by November 2015.

16. The main risks are related to

- insufficient knowledge of the Bank's procurement rules and procedures by new staff and lack of a program for continuous training of the PIU procurement staff;
- problem with financing services for design documentation, which may negatively impact timely project implementation;
- insufficient capacities in supervising construction; and
- implementation delays due to the complexity of the procurement packages and the use of performance-based contracts.

17. The following mitigation measures are proposed during project preparation:

- Consider all available options for ensuring timely preparation of the design documentation
- Initiate the preparation of bidding documents and requests for proposals in advance for the contracts in the first year of the project including issuing the request for expressions of interest (REOIs) for key consultancy services for design and supervision

18. The following mitigation measures are proposed during project implementation:

- Ensure attendance by the PIU of the procurement training programs delivered by the Bank staff
- Hire construction supervision consultants to help the beneficiary with contracts management

19. The procurement plan was discussed with the PIU and will be finalized by the time of the negotiations. The finalized agreed initial procurement plan will be disclosed on the Bank's external website upon completion of negotiations. The pre-qualification procedure should start upon finalization of the procurement plan to allow timely project implementation.

20. During project implementation, the Bank will review the procurement arrangements performed by Ukrdorinvest including contract packaging, applicable procedures, and the scheduling of the procurement processes for their conformity with the Bank's Procurement and Consultant Guidelines, the proposed implementation program, and the disbursement schedule. The procurement plan will be updated, as needed, in agreement with the Bank project team to reflect the actual project implementation needs.

21. The procurement packages are made based on the availability of the design documentation.

Table 3. 2. Procurement Plan

Contract Description	Contract Type	Estimated Cost (US$, millions) (VAT included)	Procurement Method	Start of Procurement Process	Contract Completion Date	Comments
Component 1: Road Rehabilitation and Safety Improvement						
Supervision consultancy services on contracts 3.1–3.4. Incl. design of lot 3.4 Phase I.	Consultant Services	4	QCBS	September 2015	September 2019	
Supervision consultancy services on contract 3.5 Phase I.	Consultant Services	1.5	QCBS	October 2015	September 2019	
Lot 3.1 Poltava bypass (km 4+144 of M-22 road–km 340+961 of M-03 road)	Civil Works	120.4	ICB	September 2015	March 2019	ICB for 6 lots with pre-qualification
Lot 3.2 Capital Repair of M-03 Kyiv-Kharkiv-Dovzhansky Road (km 340+961–km 356+200)	Civil Works	105.2		September 2015	March 2019	
Lot 3.3 Reconstruction of M-03 Kyiv-Kharkiv-Dovzhanskiy Road (km 356+200–km 383+864)	Civil Works	83.5		September 2015	March 2019	
Lot 3.4 M-03 Kyiv-Kharkiv-Dovzhansky Road (km 383+864–km 395+064). New construction of Chutove bypass	Civil Works	56.4		September 2015	September 2019	
Lot 3.5 M-03 Kyiv-Kharkiv-Dovzhansky Road (km 395+064–km 420+050)	Civil Works	65.7		September 2015	March 2019	
Component 2: Maintenance of Core National Road Corridors						
Project management services OPRC-3.1	Consultant Services	1.1	QCBS	July 2016	December 2021	
Project management services OPRC-3.2	Consultant Services	0.5	QCBS	July 2016	December 2021	
Project management services OPRC-3.5	Consultant Services	1	QCBS	July 2016	December 2021	

Lot OPRC-3.1 Kyiv-Brody section (km 14–km 434) of M-06 Kyiv-Chop Road	Civil Works	50.2	ICB	November 2015	October 2021	
Lot OPRC-3.2 Kyiv-Boryspil section (km 18–km 38) of M-03 Kyiv-Kharkiv-Dovzhanskiy Road	Civil Works	20	ICB	December 2015	December 2021	
Lot OPRC-3.5 Section km 30–km 424 of M-07 Kyiv-Kovel-Yagodyn Road	Civil Works	29.5	ICB	November 2015	October 2021	
Component 3: Network Management and Development						
Road safety and network management	Consultant Services	4	QCBS	January 2016	December 2018	
Maintenance management	Consultant Services	1	QCBS	January 2016	December 2018	
Design for road sections in the Lviv-Kherson direction (N-02 Lviv-Ternopil, M-12 Stryi-Kirovograd)	Consultant Services	6	QCBS	September 2015	December 2018	
Subcomponent 3(iv): Project Management and Implementation Support						
Operational costs	n.a.	4.4	n.a.	September 2015	December 2021	
Technical audit	Consultant Services	0.2	CQS	September 2015	December 2021	
Financial audit	Consultant Services	0.2	LCS	September 2015	December 2021	
Environmental supervision	Consultant Services	0.2	CQS	September 2015	December 2021	
Total		**560**				

Note: CQS = Selection Based on Consultants' Qualifications; LCS = Least-Cost Selection; QCBS = Quality- and Cost-Based Selection

22. The procurements not prior reviewed (if any) by the Bank will be subject to the Bank's ex post review in accordance with the procedures set forth in Appendix 1 of the Procurement and Consultant Guidelines on a random basis. Post review of the procurement documents will normally be undertaken during the Bank's supervision mission or the Bank may request to review any particular contract at any time. In such cases, Ukrdorinvest will provide the Bank for its review the relevant documentation.

Environmental and Social (including safeguards)

23. Upon approval of the technical design for the respective road segment requiring land acquisition, Ukrdorinvest with the support of the road service of the respective region and local administrations will finalize the census of the affected persons and produce a RAP satisfactory to

the Bank. Upon the Bank's clearance the RAP will be disclosed and consulted upon. The finalized RAP will be placed on the website of the UAD, local authorities, and in the Bank's Infoshop. Ukravtodor will be responsible for completing the implementation of the RAP before any land needs to be vacated for the construction. The section on the implementation of the resettlement will be included in the ISR.

24. As per the RPF and ESMF, Ukrdorinvest has designated one full-time staff member to monitor compliance with the Bank's environmental and social safeguards policies (OPs 4.01 and 4.12), specifically in land acquisition procedures. The designated staff member has been actively involved in the preparation of safeguards documents for the proposed RSDP. The Bank will provide opportunities for further training and skills development for the staff member.

Monitoring and Evaluation

25. Ukrdorinvest will remain responsible for the monitoring of results of the RSDP. As has been under the RSIP and RSIP2, regular monitoring reports will be prepared by staff of Ukrdorinvest, both for the IFI's and for other government agencies such as the MOF and the Ministry of Economy. During the regular implementation review visits, IFI staff and Ukrdorinvest staff will continue working together for a joint results monitoring. The cost of Ukrdorinvest is covered by Ukravtodor (and thus by the government budget), based on a contractual relationship between the two organizations.

26. In the case of road safety data, Ukrdorinvest will be responsible for collaborating with the road traffic police and research institutions for obtaining crash data and monitoring impacts of the engineering improvements to be introduced.

Table 3.3. Status of Engineering and Safeguards

Lots Description	Estimated Land Acquisition (ha)	Estimated PAPS quantity	Estimated Cost of Land (US$)	Status of Design and State Expertise	Safeguard Instruments
Component 1: Road Rehabilitation and Safety Improvement					
Lot 3.1 - New construction of Poltava bypass (four lanes)	46.0	60.00	1,480,000	90% Pending state expertise	RAP/EMP/EIA will be prepared in line with the ESMF and RPF
Lot 3.2 - Capital repair of existing four-lane road and new construction of Kopyly bypass (km 340–356)	2.0	–	50,000	90% Pending state expertise	RAP/EMP/EIA will be prepared in line with the ESMF and RPF
Section of Lot 3.2 between km 340 and 345. Capital repair of existing four-lane road.	–	–	–	100% With state expertise	No RAP required - EMP prepared and disclosed
Lot 3.3 - Widening to four lanes (km 356–384)	–	–	–	90% With state expertise	No RAP required - EMP/EIA will be prepared in line with the ESMF
Lot 3.4 - New construction of Chutove bypass (four lanes)	50.0	No data	950,000	50%	RAP/EMP/EIA will be prepared in line with the ESMP and RPF
Lot 3.5. widening to four lanes (km 395–420)	–	–	–	100% With state expertise	No RAP required - EMP prepared and disclosed
Component 2: Maintenance of Core National Road Corridors					
OPRC on M-03, M-06, and M-07	–	–	–	Design of contracts underway	EMP/EIA will be prepared in line with the ESMF
Component 3 (iii): Preparation of Feasibility Studies, Design, and Safeguard Documents					
Feasibility studies and design works for the Boryspil bypass and Lviv-Kherson road	No data	No data	–	Loan will finance design works	Loan will finance preparation of safeguard documents in line with Bank requirements
	116.0		**$2,895,000**		

Annex 4: Sector Context

UKRAINE: Road Sector Development Project (P149322)

1. Before the 2015 Budget Law and Budget Code, certain road related duties, taxes, and tolls were accumulated in the Special Budget Fund of the state budget established in 1991, including the following revenues:

- Excise and import duties on oil products
- Excise and import duties on imported vehicles and tires for the vehicles
- Other revenues according to the law on state budget of Ukraine for the current year
- Payments for transfer of the roads to a concession or lease
- Charges for vehicles, where weight or dimensional parameters exceed permitted values
- Tolls exacted from foreign registered vehicles
- Road toll on the tolled highways
- Other sources that are not prohibited by the legislation of Ukraine

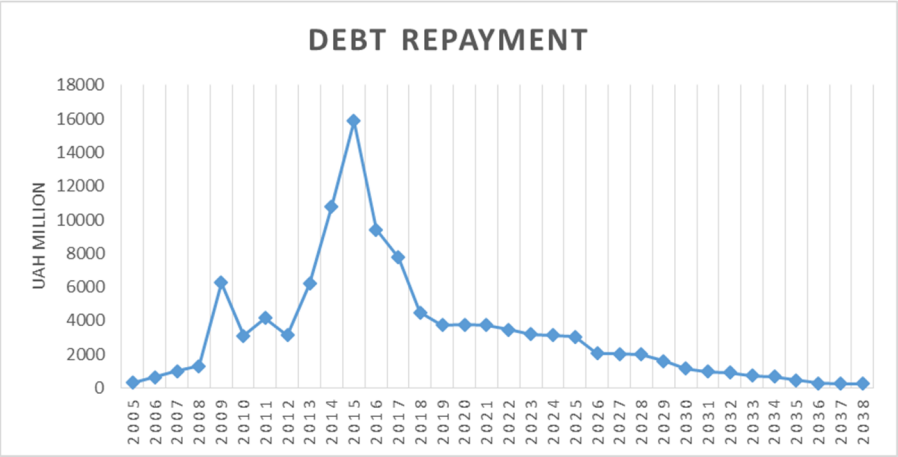
2. These revenues were hypothecated for purposes of funding the road sector and were, in whole or in part, made available to the State Road Fund, from where they were used to fund the construction, renovation, repair, and maintenance of roads. A small part of the funds was to be used as a direct subvention to local budgets for communal roads, the exact amount again being specified in the annual state budget law. In 2015, that linkage has been broken and Ukravtodor is now financed from the general fund of the state budget.

3. The impact of this change in budgetary policy on road sector funding in 2015 is unclear. It is likely, however, that the breakage of the hypothecation link between revenues related to road usage and the budget allocated to construct, overhaul, and maintain roads has implications for the future certainty of the budget for the subsector and the ability to plan for that future.

4. The debt service relating to a variety of loans and other commercial fund raising has claimed a disproportionate share of funds available to Ukravtodor in recent years. Figure 4.1 shows the UAD's current debt repayment schedule as of December 2014. Since these debts tend to be denominated in foreign currencies, the impact of the debt service in Ukrainian hryvnia will have grown considerably as the currency has depreciated during the present security and consequent economic crisis.

5. Repayments in 2005 were about 10 percent of financing from the Special Budget Fund, rising to over 90 percent in 2015. The UAD had assumed that the financing from the Special Budget Fund would increase by a nominal 5 percent per year after 2015, when debt repayments decline sharply. To cover some of the shortfall in 2014, the UAD is understood to have requested a subvention from the government for additional funds from the general budget. The problem in 2015 is even greater.

Figure 4.1. UAD Debt Repayment Schedule (UAH, Millions)



Source: Road Sector Diagnostic Report, HPR, April 2015.

6. The summary budget allocation for roads in 2015 is shown in table 4.1, from which it can be seen that a **total of UAH 20.819 billion is allocated, out of which UAH 17.418 billion is devoted to debt service**. This leaves just over UAH 3.4 billion for development and maintenance of roads, a catastrophically low amount that will not even pay for the most basic level of maintenance of the road network, let alone any capital repairs or new construction.

Table 4.1. Budget for 2015 (UAH, Millions)

Program Code	Operation Code	Item	Consumption, of which			Development	Total
			Total	Salaries	Communal Services		
3111010	0456	Management	7.2	6.5	0.7	0.0	7.2
3111020	0456	Development and maintenance	0.0	0.0	0.0	3,401.2	3,401.2
3111030	0456	Debt repayment	17,410.6	0.0	0.0	0.0	17,410.6
3111000		**Total**	**17,417.8**	**6.5**	**0.7**	**3,401.2**	**20,819.0**

Source: Road Sector Diagnostic Report, HPR, April 2015.

7. The recent radical change in budgetary philosophy with Ukravtodor being funded directly from the general budget and without any hypothecation of road-related taxes or duties to the Special Budget Fund, if persisting into future years and lacking any declared policy with regard to funding the road sector, leaves Ukravtodor with the difficulty of planning for the improvement and upkeep of the road network without guidance on the funding likely to be made available. This situation is exacerbated by the current macroeconomic situation in which no realistic plan for medium-term expenditure can be made. It is recommended that alternative sources of funds are explored (such as electronic tolling, which is discussed later) and that maintenance is given priority against new construction.

Revenues and Expenditure

8. Ukraine budgets annually rather than in a multiyear framework, under which budgets and expenditures may be rolled forward. In countries with a multiyear budgetary system, the

year ahead will be fixed and a rolling budget for the next 1–3 years is estimated that is always confirmed for the year ahead. In the Ukrainian system, there is no differentiation between the recurrent and capital budgets; all end at the end of the year.

9. There is provision for target budget programs and the road subsector has a target program for the years 2013–2018. However, inclusion in the target program does not provide a guarantee that projects commenced in one year will be funded in the next. This has a profound effect on major road projects, which invariably span two or more budget periods. Domestic contracts have provisions for deferred payment in the event that budget funds are delayed and for termination in the event that they are unavailable. That is barely sustainable for a state monopolistic contractor such as the DAK. It is wholly untenable for private contractors and constitutes a serious barrier to the establishment of a competitive market in road construction and maintenance.

10. The revenues potentially attributable to the road subsector and included in the state budget for the years 2005 through 2008 and then for years 2013 and 2014 are shown in table 4.2.

Table 4.2. Road Sector Revenues (UAH, Millions)

Budget Code	Budget Heading	2005	2006	2007	2008	2013	2014
Special Fund, including:							
602100	Balance at year start	–	114	375	951	0	–
Excise Tax							
14020800/900	On domestic transport vehicles	20	2,181	85	127	4,785	4,139
14021700	On domestic petrol and diesel fuel	1,172		1,583	1,270		
14021800	On other domestic oil products	667		860	616		
14030800/900	On imported transport vehicles	107	863	216	312	8,360	10,216
14031700	On imported petrol and diesel fuel	149		490	1,036		
14031800	On other imported oil products	87		475	761		
Customs Duty							
15010500	On imported oil products and vehicles	860	2,094	4,048	3,923	2,774	2,572
24061100	On oversized vehicles	–	–	–	14	20	21
Funds borrowed from IFI						3,150	2,291
Funds from selling of securities under state guarantees						10,051	6,857
Total Funding		**3,062**	**5,252**	**8,132**	**9,010**	**29,140**	**26,096**

Source: Road Sector Diagnostic Report, HPR, April 2015.

11. Although the revenues rose significantly in 2013 and 2014, this was not fully reflected in the proportion actually made available to Ukravtodor, which was only 65 percent in 2013.

12. In addition to the taxes and charges included in theState Road Fund, a vehicle ownership charge at registration is levied annually. The resulting revenue, designated as going to "oblast budgets", was actually remitted for distribution to the oblasts, specifically for local roads and the budget of the local authority (city, settlement, or village) that collects the revenue. The allocation between the above varies by year depending on the provisions of the State Budget Laws for that

year. Between 2003 and 2005, the proportion retained by the local authority was 100 percent for Kyiv Municipality, 70 percent for Sebastapol and oblasts, and 50 percent for other local authorities.

13. Table 4.3 shows the recorded expenditure on public roads in the years 2010 through 2013. Most expenditure is devoted to Intermediate Repairs, especially on Local roads. The unit costs of capital repairs seem to be rather high, due to the inclusion in this category of maintenance work of much road improvement rather than purely renewal work.

Table 4.3. Recorded UAD Expenditure on Public Roads (UAH, Millions)

	2010	2011	2012	2013
Repair and construction works from:	2,097	5,096	3,723	3,831
- budget funds	1,031	1,430	2,391	923
- borrowed funds	1,066	3,666	1,332	2,908
Road maintenance	2,867	2,332	2,487	3,076
Co-financing of projects with IFIs	1,974	2,994	3,177	3,166
Other co-financing	436	490	632	504
IFI funding	1,538	2,504	2,545	2,662
Communal roads	–	2,086	2,213	1,776
Total	**12,018**	**19,664**	**17,930**	**21,205**

Source: Road Sector Diagnostic Report, HPR, April 2015.

14. Comparing the budgeted and the actual expenditure by Ukravtodor in 2013 shows a UAH 12.9 million gap. The major difference was in repair and construction works, where the recorded expenditure was around UAH 8 billion less than what was budgeted by Ukravtodor. This reflects the shortfall in available funds discussed earlier and that pattern has worsened to the point where there is no available funding for capital works at all in 2015.

15. A summary of the road subsector target program for the years 2013–2018 is shown in table 4.4.

Table 4.4. Program of Public Road Development (UAH, Millions)

Type of Activity	By Year					
	2013	2014	2015	2016	2017	2018
I. Construction and reconstruction	**6,138**	**5,728**	**9,109**	**11,113**	**11,599**	**12,142**
1. Public roads	4,167	3,744	5,733	7,976	8,755	9,145
2. Bypasses	1,527	1,109	2,300	1,089	875	648
3. Local roads	198	198	140	1,249	1,361	1,653
4. Structures affected by floods	53	141	394	354	55	0
5. Access roads	9	299	298	248	363	519
6. Design and survey works	184	236	243	198	190	177
II. Major repair	**3,238**	**2,670**	**3,364**	**6,850**	**7,040**	**5,451**
7. National roads	3,137	2,280	2,592	5,727	5,494	3,904
8. Local roads	101	390	772	1,123	1,546	1,547
III. Periodic maintenance	**7,739**	**9,211**	**7,732**	**6,300**	**6,592**	**6,271**
9. National roads	6,726	5,445	3,943	2,955	2,577	2,443
10. Local roads	1,013	3,766	3,790	3,345	4,015	3,828
IV. Routine maintenance	**4,153**	**6,058**	**4,738**	**4,823**	**4,290**	**4,290**

11. Routine maintenance	4,153	6,058	4,738	4,823	4,290	4,290
V. Research	**203**	**365**	**394**	**356**	**367**	**381**
12. Research	203	365	394	356	367	381
VI. Repayment of loans under government guarantee	**7,501**	**8,108**	**8,797**	**9,915**	**9,976**	**10,569**
13. Repayment of loans under government guarantee	7,501	8,108	8,797	9,915	9,976	10,569
Total	**28,971**	**32,139**	**34,134**	**39,357**	**39,864**	**39,104**

Source: Road Sector Diagnostic Report, HPR, April 2015.

16. During the plan years 2013–2015, the objective is to provide:

- effective operation, proper maintenance, and safety of traffic on public roads;
- construction, reconstruction, and repair of roads, primarily on road corridors, on the approaches to major cities, the entrances to villages, and on roads with highest traffic;
- improvements to traffic safety, speed, comfort, and efficiency of passenger and freight by road; and
- gradual transition to the required financing construction works in accordance with scientific and reasonable DerzhdorNDI needs.

Efficiency of Expenditure

17. While there is undoubtedly a shortage of funds for maintenance, a central question is whether the system is efficient enough to ensure that any available resource is well spent. Internally, the underlying cause of almost all problems faced by Ukravtodor is perceived to be a shortage of funding. Supposedly, if more money was available, all of the activities that are currently not possible could be done, solving all of the problems with the road network.

18. This simplistic argument overlooks the inefficiencies that are widely perceived by the public to have taken place in the past when more money was available. Whatever money is available needs to be used more efficiently, with decisions based on up-to-date data about the road network and objective analysis. Decision making and project implementation need to be sufficiently transparent so that the public can see that the best value for money is being achieved with whatever limited funding is available.

19. As a first insight, road maintenance costs seem to be high. The total maintenance needs for state roads according to the 2013–2018 Roads Development Program[3] are on average for the period about UAH 6.4 billion per year or roughly US$320 million, representing about US$16,000 per km and per year.

20. As for comparison, the state of Minneapolis in the United States of America counts about 20,000 km of state roads, similar to Ukraine and spends an average of US$200 million per year. In Romania, the average maintenance needs are estimated at US$11,000 per km and per year. Ukraine's high maintenance costs are directly linked to the damage caused by overweight trucks. Unofficial estimates indicate that more than 80 percent of all trucks in Ukraine exceed the maximum permitted weight. Appropriate use of control systems such as weigh-in-motion

[3] Supposing that about 50 percent of the routine maintenance is used on state roads.

associated with efficient enforcement and dissuasive penalties has the potential to significantly decrease the costs of maintenance and rehabilitation of the roads.

21. The lack of a reliable pavement management system hinders the planning process. While such a system has been implemented in the past, its use has been discontinued. Today, no reliable and up-to-date information on the conditions of the roads is available, and in spite of more than 200 automatic traffic counters installed in the country, the latest traffic information available dates back to 2008. Many of these counters are damaged or have no power and are currently not being used, apparently due to lack of finance. Where automatic traffic counters are operable, they often cannot transmit data for lack of funded SIM cards.

22. Also, there is currently little evidence of effective competition for contracts either for work commissioned from institutes by Ukravtodor or for contracts procured by oblast road services organizations. It appears that government procurement rules are generally being complied with, but the outcome of procurement processes somehow seems to produce results that would not be expected if true open competition were taking place. In many cases, this situation is hardly surprising. Particular institutes have specific skills, experience, and equipment that make them the obvious choices for certain specialist contracts. Also, fully equipped and optimally positioned existing linear road maintenance units will be expected to make it difficult for a new contractor to offer the same service at a lower price.

23. The procurement law is complied with by various means. For instance, it is understood that if a procurement process fails twice because there is only one bidder, direct negotiations can take place with that bidder. If a proper environment for competitive procurement does not exist, a major rethink is needed. There is little point in following procedures that are not going to produce the results that are needed. A lack of proper competition, almost inevitably, results in higher costs; and inappropriate procedures lead to delays and extra costs, for instance through repeating failed bidding processes.

24. In the short term, a way must be found for getting the work done. For instance, if there is only one institute suitable to carry out a contract, find ways to acknowledge this officially and proceed straight to direct procurement.

25. In the longer term, the whole contracting environment needs to be restructured to make competition work. For instance, it might be possible to group several linear road maintenance units into a more viable area contract. Larger area contracts over periods of several years might attract more commercially minded bidders. Centrally procured road data collection for the whole country, perhaps in a small number of lots each covering a number of oblasts, might enable different institutes to bid competitively.

Electronic Tolling as an Alternative to Finance Road Maintenance

26. Several countries implemented e-tolling as a way to improve the finances of the road sector, in particular to secure a revenue stream for maintenance. E-tolling, as a distance-based charge applied mainly for trucks is seen as a smart and equitable way to distribute costs among road users. Technology offers new options to collect revenue from different types of vehicles and on different roads, so that those vehicles that damage the roads more, pay more.

27. Tolling technology has become easier to use; in-vehicle equipment has become far cheaper and its services have been proven in use and successfully generated extra revenues for many countries, especially for trucks. New systems and services are being deployed every year and the evidence base and market size is increasing. Many Eastern European countries now have heavy vehicle tolling in place and some are looking at all vehicle solutions in the future. As well as tolling, mainstream consumer and vehicle technology now coming on stream offers connectivity to vehicles and people, new ways to pay for services, and further ways to reduce costs.

28. In Ukraine, the total number of truck-kilometers on the roads was about 9.4 billion in 2008 (latest comprehensive data available). Considering a net toll[4] of US$0.07 per km (about US$0.1 per km gross rate, slightly less than the rate applied in neighboring countries such as Slovakia and Poland), the total net revenue from e-tolling for trucks will be about 660 million per year, substantially higher than the annual maintenance needs in Ukraine. This very macro assessment demonstrates that the option should be analyzed in more detail.

29. Several policy options must be considered and several challenges may slacken or even prevent the implementation of an e-tolling system in Ukraine. These include the following:

30. **Types of vehicles.** There are two distinct types of road users to consider for tolling—heavy vehicles with a maximum permissible gross vehicle weight of more than 3.5 tons and the remainder of vehicles, typically passenger cars. These two types of road users have different volumes and patterns of travel, user needs, abilities to pay, and expectations.

31. **Road network.** There is a need to consider the road network to be charged, which could be at a minimum some motorways or expanded to all state roads in Ukraine. Each level of network coverage by tolls/charges has not just revenue and cost implications but also implications on diversion of traffic and hence implications for damage to roads, socioeconomic impact, management of vehicles, and enforcement. There is also a willingness-to-pay implication related to the level of the network and the condition of the roads since users are more inclined to pay for motorways in good conditions with the toll reflecting the level of service provided.

32. **Technology for charging**. The technology for charging offers a range of possibilities that need to be considered, from an improved vignette system through to DSRC beacons for section-based tolling and GNSS/CN-based satellite charging.

33. However, a successful implementation relies on many aspects. From a legislation perspective, a number of changes are needed to implement tolling, especially if it is combined with enforcement measures such as weigh-in-motion and speed control. Similarly, the institutional setup must ensure that different organizations, public and private entities, work together in an efficient way.

[4] Net toll excludes collection costs; international experience indicates that for large networks, net toll represents about 70 percent of the collected toll.

Annex 5: Implementation Support Plan

UKRAINE: Road Sector Development Project (P149322)

Strategy and Approach for Implementation Support

1. Implementation support missions, including field visits, will be carried out semiannually, and will focus on (a) technical aspects of works, (b) institutional strengthening, and (c) environmental and social safeguards training.

(a) **Technical aspects of works.** Close cooperation and review of planned road works will be carried out from the design phase until completion of works. Engineering inputs will be provided to all designs to ensure proper technical specifications and appropriate consideration of road safety. During bid evaluation, the review will ensure fair assessment of the technical aspects of bids. During construction and commissioning, technical supervision will be provided to ensure technical, environmental, and social contractual obligations are met. The team's engineers will conduct site visits on a semiannual basis throughout project implementation.

(b) **Institutional strengthening.** As part of the PDO, institutional strengthening will receive substantial focus during the project implementation and related implementation support. This will include a regular dialogue on the progress of M-03 improvement work, road safety, the development of modern network management systems, and the maintenance component.

(c) **Environment and social safeguards training.** The PIU has had a training session on Bank safeguards policies. Support will be provided in updating the POM to include the provisions and particular focus will be given to ensuring that land acquisition and resettlement activities are fully reported.

Implementation Support Plan

2. The project implementation support missions will coincide with the missions on the ongoing roads project. The implementation support missions will involve engineering, procurement, and safeguards specialists and at least once annually FM as well. Particular focus will be on supervising the implementation of the road safety measures.

3. Capacity regarding environmental and social safeguards will be continuously monitored by the Bank environmental and social specialists who will participate regularly in implementation support missions and provide inputs directly to the client in the course of the EMP and RFP preparation and works supervision.

4. The midterm review of the project, expected to take place in the first quarter of 2018, will include technical workshops to discuss road safety, the development of modern network management systems, and the maintenance component.

Main Focus in Terms of Support to Implementation During the Project

Time	Focus	Skills Needed
First 12 months	Procurement of civil works Concept design for network management systems Capacity review for oblast-level maintenance activities Road safety coordination work	Road engineering Procurement Safeguards Project management Road safety Information and Communication Technology
12–48 months	Civil works Procurement	Road engineering Procurement Project management Road safety

Skills Mix Required

Skills Needed	Number of Staff Weeks Per Year	Number of Trips Per Year
Task team leader	10	3
Transport economist/specialist	8	3
Road engineer	8	3
Financial specialist	4	2
ICT/ITS specialists	4	2
Procurement specialist	6	2
Environmental management specialist	2.5	2
Social development specialist	1.5	1

Annex 6: Economic Analysis

UKRAINE: Road Sector Development Project (P149322)

Introduction

1. The economic analysis was conducted using the Highway Development and Management Tool (HDM-4), which simulates life-cycle predictions of road deterioration, road works effects and their costs, road user costs, and CO_2 emissions, and provides economic decision criteria for road construction and maintenance works. The HDM-4 analyzes projects by computing present values, at a given discount rate, of costs and benefits of different investment options with regard to changes in road maintenance costs, VOCs, travel time costs, road safety costs, and CO_2 emission costs. The comparison is done between the 'do something' scenario (project case) and the 'do minimum' scenario (without project case) over the analysis period. The 'do minimum' scenario incorporates an assessment of what would happen to the road infrastructure and road users if the project was not undertaken. The project scenario consists of the project construction works followed by proper maintenance works over the analysis period.

2. The economic evaluation was done for Component 1, road rehabilitation and safety improvement of the M-03 highway between Poltava to Kharkiv, and for Component 2, maintenance of core national road corridors, accounting for the totality of the project's civil works.

Component 1: Road Rehabilitation and Safety Improvement

3. The project will improve six road sections of the M-03 highway between Poltava to Valky to motorway standard. The project roads will be built to a category 1 standard, which is a four-lane divided highway, and will bypass the population centers of Kopyl, Poltava, Chutove, and Valky. The project will bring direct benefits to road users arising from a reduction in VOCs, travel time costs, and road safety costs as a consequence of improved ride quality, relief from road congestion, and reduction in road accidents. The project will have a positive impact on communities living in the vicinity of the project road through the construction of the bypasses that will reduce the long-distance traffic passing through the communities.

4. For the purpose of the economic evaluation, the project road was divided into five homogenous sections with regard to road condition and traffic. The total length of the existing road is 86.9 km, while the total length of the project roads will be 87.3 km due to the construction of the bypasses. Table 6.1 presents the project road homogeneous sections.

Table 6. 1. Project Road Homogenous Sections

Road	Section	Road Section Name	Start Point (km)	End Point (km)	Road Class	Existing Length (km)	Project Length (km)
M-03	1	Bypass of Poltava	333+250	340+961	New	7.7	7.3
	2	Poltava - Kulikove (with Kopyl Bypass)	340+961	356+200	I	15.3	15.3
	3	Kulikove - Chutove	356+200	383+864	II	27.7	27.7
	4	Bypass of Chutove	383+864	395+064	New	11.2	12.0
	5	Chutove - Valky	395+064	420+050	II	25.0	25.0
Total						86.9	87.3

5. The current roads are two- or four-lane asphalt concrete roads with an IRI of 2.63 m/km average roughness and 0.89 mm average falling weight deflectometer central deflection. Table 6.2 presents the road sections' basic characteristics.

Table 6.2. Road Sections' Basic Characteristics

Road	Section	No Lanes	Width (m)	Average Gradients (%)	Roughness (IRI)	Central Deflection (mm)	Area of Cracks (%)
M-03	1	4	15.0	4	3.9	0.92	21
	2	4	15.0	1	3.6	0.89	29
	3	2	7.5	1	2.5	0.88	15
	4	2	7.5	2	2.0	1.04	10
	5	2	9.0	1	1.8	0.85	12
Average			9.9	1.8	2.6	0.9	17

Project Traffic

6. The 2014 average annual daily traffic of the project roads was 8,913 vehicles per day. Table 6.3 presents the road sections' traffic from 2009 to 2014.

Table 6.3. Road Sections' Traffic

Road	Section	Average Annual Daily Traffic (vehicles per day)						Growth 2009-2014 (%)
		2009	2010	2011	2012	2013	2014	
M-03	1	13,173	13,579	14,285	15,132	16,127	17,160	5.4
	2	10,089	10,390	10,914	11,562	12,339	12,104	3.7
	3	7,930	8,158	8,555	9,063	9,687	8,565	1.6
	4	5,646	5,771	6,063	6,437	6,877	6,298	2.2
	5	5,087	5,191	5,437	5,753	6,134	5,978	3.3
Total		7,662	7,870	8,260	8,750	9,340	8,913	3.1

7. The average annual daily traffic increased on average by 3.1 percent per year from 2009 to 2014. The normal traffic is estimated to grow at 2.8 percent per year from 2016 to 2017, increasing to 4.0 percent per year afterwards, based on the IMF estimate that the GDP in Ukraine will grow on average at 2.8 percent per year from 2016 to 2017 and at 4.0 percent per year from 2018 to 2020 and a conservative elasticity of traffic growth to GDP growth of 1.0.

8. The proposed project will have a positive impact on the existing roads on the bypasses, as there will be a reduction in traffic volume on the existing roads with the proposed project. However, for a conservative evaluation, the economic analysis did not consider the benefits to the remainder traffic on the existing roads. In addition, no generated traffic was considered in the economic evaluation.

Road User Costs

9. The working time cost per bus passenger was assumed to be US$2 per hour, based on 2014 average monthly wages in Ukraine (UAH 3,476 per month).[5] The cost of non-working time was assumed to be 30 percent of the working time cost. The car passenger time cost was assumed to be double the bus passenger cost. Without the project, the average speed of a car is 56 km/h, corresponding to 140 minutes of travel time. With the project, the expected average speed of a car is 80 km/h, corresponding to 96 minutes of travel time.

10. Table 6.4 presents the vehicle fleet characteristics and economic unit costs adopted in the economic analysis and the average traffic composition on the project road, which shows the percentage of trucks as 34 percent.

Table 6.4. Vehicle Fleet Characteristics and Economic Unit Costs

	Car	Pickup	Light Bus	Medium Bus	Light Truck	Medium Truck	Heavy Truck	Articulated Truck
Economic Unit Costs								
New Vehicle Cost (US$/vehicle)	20,000	30,000	100000	200,000	40,000	50,000	80,000	100,000
New Tire Cost (US$/tire)	70	120	150	200	120	150	250	300
Fuel Cost (US$/liter)	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Lubricant Cost (US$/liter)	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Maintenance Labor Cost (US$/hour)	1.78	1.78	2.13	2.13	2.13	2.13	2.13	2.13
Crew Cost (US$/hour)	1.07	1.07	1.42	1.42	1.42	1.42	1.42	1.42
Overhead (US$)	500	500	1000	2500	1000	2000	2500	3000
Interest Rate (%)	12	12	12	12	12	12	12	12
Working Passenger Time (US$/hour)	4.00	4.00	2.00	2.00	0.00	0.00	0.00	0.00
Non-working Passenger Time (US$/hour)	1.20	1.20	0.60	0.6	0.00	0.00	0.00	0.00
Cargo Delay (US$/hour)	0.00	0.00	0.00	0.00	2.50	2.50	5.00	10.00
Utilization and Loading								
Kilometers Driven per Year	10,000	30,000	50,000	70,000	30,000	50,000	70,000	100,000
Hours Driven per Year	250	750	1,250	1,750	750	1,250	1,750	2,500
Service Life (years)	14	8	15	15	15	15	15	7
Percent of Time for Private Use	90	0	0	0	0	0	0	0
Number of Passengers	3	1	20	40	0	0	0	0
Work Related Passenger Trips (%)	50	50	50	50	0	0	0	0
Gross Vehicle Weight (tons)	1.03	2.00	5.00	14.20	2.00	7.34	15.40	35.00
Equivalent Standard Axles	0.00	0.01	0.74	1.44	0.10	0.23	0.52	6.50
Traffic Composition (%)	57	6	2	1	14	3	5	12

11. With the project, the unit VOCs for a car and medium truck, in US$ per vehicle-km, will be 9 and 7 percent, respectively, less than 'without' the project due to the improved ride quality and increased travel speeds (see table 6.5).

[5] Reported by the State Statistical Services for Ukraine for December 2014.

Table 6. 5. Unit VOCs (US$ per vehicle-km)

Scenario	Car	Pickup	Light Bus	Medium Bus	Light Truck	Medium Truck	Heavy Truck	Articulated Truck
Without Project	0.34	0.36	0.76	0.98	0.41	0.51	0.88	1.11
With Project	0.30	0.34	0.66	0.83	0.37	0.48	0.84	1.09
Change	-9%	-6%	-14%	-15%	-10%	-7%	-4%	-2%

12. Table 6.6 presents the fatalities on the project road from 2009 to 2014, which correspond to a fatality rate of 5.7 fatalities per 100 million vehicle-km. The economic evaluation assumed that the fatality rate will decrease by 40 percent with the project and the cost of a fatality is US$500,000 per fatality.

Table 6. 6. Road Sections' Fatalities

Road	Section	Number of Road Fatalities Per Year							Fatalities per 100 million vehicle-km
		2009	2010	2011	2012	2013	2014	2009–2014 Average	
M-03	1	0	6	2	3	4	1	2.7	6.4
	2	4	2	9	2	3	4	4.0	6.4
	3	4	3	4	4	2	4	3.5	4.0
	4	0	1	0	0	2	1	0.7	2.6
	5	4	17	3	2	1	1	4.7	9.1
	6	14	8	13	12	9	5	10.2	5.6
Average		26	37	31	23	21	16	25.7	5.7

13. Table 6.7 presents the number of serious injuries on the project road from 2009 to 2014, which corresponds to a serious injuries rate of 25.1 injuries per 100 million vehicle-km. The economic evaluation assumed that the serious injuries rate will decrease by 25 percent with the project and the cost of a fatality is US$100,000 per injury.

Table 6. 7. Road Sections' Injuries

Road	Section	Number of Road Injuries							Injuries per 100 million vehicle-km
		2009	2010	2011	2012	2013	2014	2009–2014 Average	
M-03	1	7	1	1	3	6	1	3.2	7.56
	2	10	11	39	19	21	10	18.3	29.23
	3	17	15	12	12	11	10	12.8	14.66
	4	5	10	10	13	7	7	8.7	34.29
	5	8	14	11	13	13	14	12.2	23.82
	6	73	67	58	60	59	32	58.2	31.78
Average		120	118	131	120	117	74	113.3	25.10

14. In the year of the opening of the project road, it is estimated that the road sections' traffic will emit 136,733 tons of CO_2, which represents a 23 percent increase in CO_2 emissions compared to the 'without' project case (110,857 tons). Over the evaluation period, the total CO_2 emissions are expected to increase by 16 percent with the project (from 3,448,484 to 4,099,643 tons). The increase in CO_2 emissions is due to the higher speeds and fuel consumption with the project as a result of improved ride quality and improved capacity of the project roads. The economic

evaluation used a baseline estimate of the social value of carbon starting at US$30 per ton in 2015 and increasing to US$80 per ton in real terms by 2050.[6]

Project Costs

15. Table 6.8 presents the proposed road works and the estimated financial investment cost per road section. The total road works cost is US$431.2 million, including taxes and contingencies, corresponding to US$43.9 million per km. Economic investment costs were estimated to be 75 percent of the financial costs.

Table 6.8. Road Works Costs Including VAT

Road	Section	Road Work Type	Total Cost (US$, millions)	Total Cost (US$/km, millions)
M03	1	Bypass of Poltava	120.4	16.5
	2	Capital Repairs and Bypass of Kopyl	105.2	6.9
	3	Widening to Four Lanes	83.5	3.0
	4	Bypass of Chutove	56.4	4.7
	5	Widening to Four Lanes	65.7	2.6
Total			431.2	4.9

Economic Analysis Results

16. The evaluation considered a 12 percent discount rate and a 23-year evaluation period assuming a three-year construction period. The return on the investments of the project is satisfactory with an EIRR of 15.8 percent, NPV of US$113.8 million, and a cost-benefit ratio of 1.4. The switching values analysis shows that construction costs will have to increase by 39 percent for the project EIRR to be reduced to 12 percent. The results of the economic analysis are presented in table 6.9.

Table 6.9. Economic Evaluation Results

Road	Section	EIRR (%)	NPV (US$, millions)	Cost-Benefit Ratio
M-03	1	13.2	8.6	1.1
	2	16.1	28.8	1.4
	3	19.4	50.9	1.9
	4	12.5	1.7	1.0
	5	16.5	23.9	1.5
Total		15.8	113.8	1.4

17. Table 6.10 shows the distribution of the project's net benefits in present value terms, at 12 percent discount rate. The majority of the project's benefits (47 percent) derive from travel time costs, while VOCs accounts for 43 percent of the benefits. The increase in the CO_2 emission costs

[6] SDNCE/CCGCE Guidance Note on social value of carbon in project appraisal, July 14, 2014.

with the project (US$5.9 million) is highly compensated by the reduction in VOCs, travel time costs, and road safety costs brought about by the project (US$428.3 million).

Table 6.10. Distribution of Benefits

		Present Value (US$, millions)
Costs	Road Agency	308.6
Benefits	Vehicle Operating Costs	182.3
	Travel Time	196.6
	Road Safety	49.4
	Emissions	-5.9
Net Benefits		113.8

18. A sensitivity analysis was carried out to assess the robustness of the results to possible variations in key project parameters, which in this case were identified as construction costs and the main project benefits with regard to VOCs and travel time costs. A severe worst case scenario with construction costs increased by 15 percent and project benefits decreased by 15 percent shows an acceptable EIRR of 12.8 percent for the project. The economic analysis sensitivity results are presented in table 6.11.

Table 6.11. Sensitivity Analysis

Road	Section	Base EIRR (%)	A: Cost+15% (%)	B: Benefit-15% (%)	A & B (%)
M-03	1	13.2	11.5	11.7	10.1
	2	16.1	14.4	14.6	12.9
	3	19.4	17.7	17.9	16.2
	4	12.5	11.0	11.2	9.8
	5	16.5	15.0	15.2	13.7
Total		15.8	14.1	14.3	12.8

19. The case of not accounting for road safety and emissions benefits yields an EIRR of 14 percent. Excluding the social costs of CO_2 emissions increases the EIRR of the project marginally to 16 percent. Assuming a lower increase in the economy and a corresponding traffic growth rate of 3 percent per year during the evaluation period, the EIRR of the project reduces to 14.9 percent.

Component 2: Maintenance of Core National Road Corridors

20. The project will finance periodic and recurrent maintenance road works on core national corridors. Detailed data regarding condition, traffic, and road work requirements of the corridors is not yet available. Therefore, a simplified representative economic evaluation was done based on aggregate data and capturing only the benefits of the expected periodic maintenance works (for example, overlays or mill and replace works). Table 6.12 shows the core national corridors evaluated and their basic characteristics. The total length of the corridors is 1,094 km and their average traffic is 11,357 vehicles per day. The table shows a rough estimate of the length of each network in need of periodic maintenance over the next five years and recurrent maintenance the other years and the length of the remainder roads that need only recurrent maintenance over the five-year period.

Table 6.12. Road Corridor Characteristics

Network	Road	Section	Lanes	Total Length (km)	Periodic Maintenance (km)	Recurrent Maintenance (km)	Average Traffic (vehicles/day)
1	M-06	Kiev-Brodi	2	424	100	324	15,000
2	M-03	Kiev-Boryspil	4	20	20	0	58,000
3	M-03	Boryspil-Lubny	2	147	30	117	15,000
4	M-03	Lubny-Poltava	2	109	30	79	8,500
5	M-07	Kiev-Kovel	2	394	20	344	4,500
Total				1,094	220	874	11,357

21. Table 6.13 shows the estimated total investment cost for periodic and recurrent maintenance works over the next five years per road network and the corresponding economic indicators computed, assuming an average periodic maintenance cost of US$200,000 per km for two-lane roads and US$800,000 per km for the four-lane road. The rough economic evaluation shows that with the high level of traffic on the proposed corridors, the component most likely will have a very high economic justification with EIRR higher than 25 percent as expected for road preservation works on high traffic roads.

Table 6.13. Economic Evaluation Results

Network	Total Investment (US$, millions)	EIRR (%)	NPV (US$, millions)
1	51.5	50	274.5
2	20.5	62	178.1
3	17.8	47	81.5
4	13.2	39	53.8
5	30.2	26	22.6
Total	133.3	50	610.4

Public Sector Financing and World Bank Added Value

22. Public sector financing is the appropriate vehicle for financing the improvement of the proposed highways because the private sector will not be able to recover the construction costs through tariffs alone due to high costs of widening a road from two lanes to four lanes. Public investment in road infrastructure is desirable because it is a way the government plays a key role in the country's development by handling a range of issues that can only be accomplished or implemented through government actions, such as road safety regulations and road asset management. The Bank's role is justified because of the project's economic and social benefits and because of the value add it brings beyond financing in areas such as construction quality control, road safety, transport planning, environmental risk management, safeguards, procurement, and FM.