

# Project Completion Report

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## Investment Loan PCR

Project Name:	Meerzorg - Albina Corridor Rehabilitation Project
Country:	Suriname
Sector:	Transport
Original Project Team:	Alejandro Taddia (INE/TSP), Project Team Leader; Miroslava E. de Nevo, Vera Lucía Vicentini (INE/TSP); Christopher Persaud (TSP/CGY); Chantal Elmont (CCB/CSU); Kevin McTigue (LEG/SGO); and Caterina Vecco (INE/TSP)
Project Number:	SU-L1006 and SU-L1021 (supplementary loan)
Loan Number:	2062/BL-SU; 2063/OC-SU and 2887/OC-SU
QRR Date:	07/11/2019
Approval Date:	07/11/2019

PCR Team: Edgar Zamora (TSP/CSU); Christopher Persaud (TSP/CBH); Joao Sarolli (INE/TSP); and Alana Fook (TSP/CJA).

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## ACRONYMS AND ABBREVIATIONS

AFD	<i>Agence Française de Développement</i> (French Development Agency)
CBA	Cost-Benefit Analysis
CS	Country Strategy
EA	Executing Agency
EIRR	Economic Internal Rate of Return
ESA	Environmental and Social Assessment
EU	European Union
GDP	Gross Domestic Product
GOS	Government of Suriname
IDB	Inter-American Development Bank
IIRSA	Integration of Regional Infrastructure in South America
IRI	International Roughness Index
MOF	Ministry of Finance
MPW	Ministry of Public Works
NIMOS	National Institute for Environment and Development in Suriname
NPV	Net Present Value
OFID	OPEC Fund for International Development
OPEC	Organization of the Petroleum Exporting Countries
PEU	Project Execution Unit
PLOS	Ministry of Planning and Development Cooperation
RA	Road Authority
TORs	Terms of References
VOC	Vehicle operation costs

# I. BASIC INFORMATION

BASIC DATA (AMOUNTS IN US\$)	
<b>Project No:</b> SU-L1006 and SU-L1021 (supplementary loan)	<b>Title:</b> Meerzorg – Albina Road Rehabilitation Project
<b>Borrower:</b> Republic of Suriname	<b>Date of Board Approval:</b> SU-L1006: Nov 25, 2008   SU-L1021: Dec 12, 2012  <b>Date of Loan Contract Effectiveness:</b> SU-L1006: May 29, 2009   SU-L1021: Dec 21, 2012  <b>Date of Eligibility for First Disbursement:</b> ` SU-L1006: Aug 19, 2009   SU-L1021: Mar, 26 2013
<b>Executing Agency (EA):</b> Ministry of Planning and Development Cooperation	<b>Months in Execution</b> * from Approval: 96 * from Contract Effectiveness: 90
<b>Loan:</b> 2062/BL-SU; 2063/OC-SU; 2887/OC-SU	<b>Disbursement Periods</b>  <b>Original Date of Final Disbursement:</b> SU-L1006: May 29, 2014   SU-L1021: Dec 21, 2015  <b>Current Date of Final Disbursement:</b> SU-L1006: May 29, 2014   SU-L1021: Dec 21, 2016  <b>Cumulative Extension (Months):</b> 12 months (SU-L1021) <b>Special Extensions (Months):</b> 0
<b>Sector:</b> Transport	<b>Loan Amounts</b> * <b>Original Amount: 102,500,000.00</b> <ul style="list-style-type: none"> <li>SU-L1006: 62,500,000</li> <li>SU-L1021: 40,000,000.00</li> </ul> * <b>Current Amount: 102,500,000.00</b> <ul style="list-style-type: none"> <li>SU-L1006: 62,500,000.00</li> <li>SU-L1021: 40,000,000.00</li> </ul> * <b>Pari Passu (if applicable): 78,200,000.00</b> <ul style="list-style-type: none"> <li>SU-L1006: 64,400,000.00</li> <li>SU-L1021: 13,800,000.00</li> </ul>
<b>Lending Instrument:</b> Specific Investment Lending Project	<b>Disbursements</b> * <b>Amount to date: 98,512,864.99 (96.1%)</b> <ul style="list-style-type: none"> <li>SU-L1006: 62,491,081.41</li> <li>SU-L1021: 36,021,783.58</li> </ul>
<b>Poverty Targeted Investment (PTI):</b> No	<b>Total Project Cost (Original Estimate): 126,900,000.00</b> <b>Redirectioning</b> <b>Has this Project?</b> <b>Received funds from another Project</b> [ ] <b>Sent funds to another Project</b> [ ] <b>N/A</b> [ X]
<b>Social Equity (SEQ):</b> No <b>Environmental Classification:</b> B	<b>On Alert Status</b> <b>Is project currently designated "on Alert" by Country:</b> No

Summary Performance Classifications				
DO	<input type="checkbox"/> Highly Probable (HP)	<input checked="" type="checkbox"/> Probable (P)	<input type="checkbox"/> Low Probability (LP)	<input type="checkbox"/> Improbable (I)
IP	<input type="checkbox"/> Highly Satisfactory (HS)	<input checked="" type="checkbox"/> Satisfactory (S)	<input type="checkbox"/> Unsatisfactory (US)	<input type="checkbox"/> Very Unsatisfactory (VU)
SU	<input type="checkbox"/> Highly Probable (HP)	<input type="checkbox"/> Probable (P)	<input checked="" type="checkbox"/> Low Probability (LP)	<input type="checkbox"/> Improbable (I)

## II. THE PROJECT

### A. Project Context

#### i. Macroeconomic aspects at the time of project preparation

At the time of preparation of the project in 2007, Suriname was one of the three poorest countries in the Caribbean. On the Human Development Index of 2007, Suriname stood at the 85th place out of a total of 177 countries. By 2010, the economy of Suriname was growing at an average of 4.4% annually throughout the global economic downturn, due mainly to the contribution of its extractive industries – oil, bauxite, and gold – which represented 85% of the country's exports and 50% of its economic activity. The combination of adequate fiscal performance, robust economic growth, and clearance of arrears with bilateral creditors helped reduce the public debt to the lowest level in the Caribbean<sup>1</sup>.

#### ii. Regional integration initiatives at the time of project preparation

The Government of Suriname (GOS) stressed that the need to improve the efficiency and the physical infrastructure of the country's transport sector was a key component of a strategy aimed at supporting private sector development in a context of growing regional and global integration. Developing and maintaining an efficient, modern, reliable, secure, competitive and high-quality national and international transport system was a stated goal. In this regard, the process of integration of transport in the Caribbean and on the South American continent is fully supported, as part of the Initiative for the Regional Infrastructure Integration in South America (IIRSA).

By that moment, IIRSA included a portfolio of projects categorized into 10 Integration and Development Hubs and for each, an anchor project, essential to catalyze the synergies of the projects in the hub. Suriname participated in the Guyanese Shield Hub together with Brazil, Guyana, and Venezuela. The "Albina – Paramaribo – Nieuw Nickerie Road Improvement" was defined as one of the two anchor projects for Suriname.

#### iii. The main problems and causes presented at the time of project preparation can be described as follow

Suriname's relatively poor connectivity with neighbor markets (mainly Guyana and French Guiana), restricts its potential to reap the benefits of economic complementarities and to integrate value chains across borders. The country sought to attain regional economies of

<sup>1</sup> In the period 2005-2011, debt-to-GDP ratio reduced from 37% to 19%.

scale via Guiana's Shield Hub since a scarce population and the fact that over 80% of its territory is covered with tropical rain forest, have meant that most of its 530,000 inhabitants reside within a 30 km wide coastal region and that 70% of the population resides in its capital city Paramaribo. The vehicle fleet had also grown steadily at a rate of 9% annually since 2005, reaching 190,000 registered vehicles in 2010. The Meerzorg – Albina Corridor (140 km) links Paramaribo, the capital of Suriname, to the eastern border with French Guiana, represents almost 10% of the national primary network, and conveys approximately 23% of the country's traffic flow. The section between Meerzorg and Moengo (95 km) was built and asphalted during the early 1960s, mainly across flat landscapes and marshlands at altitudes below 10 meters; while the section between Moengo and Albina (45 km), was a dirt road reconstructed and paved in the early 1970s, across rolling terrain where elevation peaks at 46 m. At the moment of preparation of the operation, the road had two lanes, was paved and considered to be in regular to poor conditions, and had 14 bridges, spanning 531.7 m of total length. Average daily traffic varied between 1,300 vehicles along the eastern section of the road to 7,400 vehicles near Meerzorg.

The rehabilitation of the 140 km integration corridor was identified as a priority because: (i) the roadway was between 6.0 to 6.3 m wide (below internationally accepted standards of 7.2 m) and was deteriorated over more than 100 km having come to the end of its effective life cycle with over 30 years of use and the lack of overloading control; (ii) asphalt cracks, pavement deformations, subsidence at bridge approaches and other structural disorders affected more than two thirds of the alignment; (iii) as vegetation invaded roadside shoulders, drivers were compelled to straddle the centerline leading to traffic hazards and accidents; (iv) markings and road furniture were inadequate; and (v) in urban crossings, sewer networks overflow during rainstorms severely restricted both local and long-haul traffic.

Its poor condition, combined with rapid motorization growth, contributed to a relatively high level of traffic fatalities (20 deaths every 100,000 inhabitants), sub-standard average travel speeds (below 35 km/h) resulting in travel time of 4.5 hours and high vehicle operation costs to travel between Meerzorg and Albina.

## **B. Project Description**

### **i. Development Objective**

The main objective of the project was to lower transport costs and reduce accident rates, improving access to an important agricultural zone and facilitating regional integration of the country, through the rehabilitation and improvement of the Meerzorg – Albina road.

The specific objective of the program was the improvement of road reliability and driving conditions by rehabilitating the corridor. Expected results included: (i) reduction of generalized transport and logistical costs, contributing to economic growth and social development; (ii) reduction of future periodic road maintenance costs; (iii) improved accessibility of surrounding communities to markets and services; (iv) reduction of traffic related fatalities and injuries; and (v) institutional strengthening of the Ministry of Planning and Development Cooperation (PLOS) in the areas of planning, programming and implementation of projects.

## ii. Components

The programs were designed with the following components:

### Component 1. Rehabilitation of the Meerzorg – Albina corridor

Loan	IDB (US\$ million)	GOS (US\$ million)	Totals (US\$ million)
SU-L1006	52.85	56.25	109.10
SU-L1021	35.20	12.40	47.60
<b>Totals</b>	<b>88.05</b>	<b>68.65</b>	<b>156.70</b>

The scope of works carried out along this road included the following activities: (i) widening of the road width from 6.0 - 6.30 m to 7.0 m; (ii) refurbishment of 7 bridges, restructuring of 5 bridges and construction of 2 new bridges; (iii) upgrading the existing 60 culverts, replacing 30 of them and building 30 new additional culverts; (iv) res

ation of ebb-tide and floodwater interchanges in swamp areas; (v) pavement reconstruction, recycling the existing pavement with new stabilization techniques; (vi) any resettlement along the route of the corridor deemed necessary as a result of the study for the Resettlement Plan; and (vii) improvements of urban crossings, and roadside amenities, including pedestrian sidewalks, bus stops and parking areas and terminal facilities at key locations to enhance safety and socioeconomic benefits. In addition, roadside public utility infrastructure was properly relocated. Sound interface between road drainage and urban sewage networks was introduced in town crossings.

### Component 2. Implementation support

Loan	IDB (US\$ million)	GOS (US\$ million)	Totals (US\$ million)
SU-L1006	6.00	0.25	6.25
SU-L1021	4.00	1.40	5.40
<b>Totals</b>	<b>10.00</b>	<b>1.65</b>	<b>11.65</b>

This component financed the consulting services for the supervision of the civil works in Component 1 as well as for the conduct of required technical, environmental and safety supervision and audits, and the completion of final designs. Costs for the Project Executing Unit (PEU) were also financed under this component.

### Component 3. Institutional strengthening

Loan	IDB (US\$ million)	GOS (US\$ million)	Totals (US\$ million)
SU-L1006	0.20	0.30	0.50
SU-L1021	0.60	-	0.60
<b>Totals</b>	<b>0.80</b>	<b>0.30</b>	<b>1.10</b>

This component would provide support to: (i) PLOS, in the public investment planning and monitoring function through the establishment of a Public Investment System; (ii) Minister of Public Works (MPW), through a legal and technical expert consultancy for the development of a specific rule to setup the Right-of-Way along Meerzorg - Albina road and the requirements for its uses and occupancy; (iii) National Institute for Environment and development in Suriname (NIMOS), through a technical expert consultancy for the development of an Environmental and Social Management System for the Transport Sector, including: (a) specific and detailed guidelines and Terms of References (TORs) for environmental assessment of road projects; and (b) technical and socio-environmental specifications for roads construction, rehabilitation and maintenance works and operation, and (iv) NIMOS and the environmental specialist from the PEU, through a training program to be provided by the environmental expert of the supervision firm. This component was

implemented in tandem with the institutional strengthening of the MPW to be financed by the European Union (EU).

### **C. Quality -At- Entry Review**

#### **i. Consistency with country's development goals and country's strategy**

The Transport Sector Policy Study and Master Plan, issued in 2003 by PLOS, defined five sector goals: (i) improved mobility and efficiency, including cross-border traffic; (ii) better access to remote communities and productive zones; (iii) efficient maintenance of the infrastructure; (iv) multi-modal coordination at policy and strategic level; and (v) institutional strengthening.

Throughout the different stages of the project (i.e. program design, approval, and implementation), there were three IDB Country Strategies (CS) for the following periods: 2006-2010 (CP-3326), 2011-2015 (CP-3440) and another for 2016-2020 (GN-2873). Between 2006-2010, during design stage and beginning of execution, the CS aimed to support the country's efforts to modernize and transform the economy. In accordance with the objective, the CS supported the country's efforts to modernize the public and private sectors and to promote the regional integration. The transport sector strategy focused on four main areas: (i) develop a balanced transport system; (ii) develop criteria to prioritize projects rationally within a general strategy; (iii) improvement and regulation of the public transport system; and (iv) improve the performance of the main logistic chains which sustain the economic growth of the country. In 2011-2015, during the period of execution of SU-L1006 and approval of SU-L1021, the Bank's country strategy included transport as one of the priority areas of support of the Bank to the country, focusing on the rehabilitation and enhancement of the transport infrastructure with special emphasis in the eastern link to French Guiana (Meerzorg-Albina road) as an important corridor for the regional integration. For 2016-2020, by the period of finish of both loans, the Bank's country strategy still aimed to support the increase of quality of transport infrastructure as a means for enabling the development of the private sector, through the increase of agricultural exports and their diversification.

#### **ii. Project objectives and key performance indicators**

The design of the operation presented an adequate diagnosis of the problems and a proper characterization of the proposed solutions. The main factors (or causes) contributing to the problems were clearly identified. The solutions proposed to address the deficiencies of this important connection between Suriname and French Guiana were well defined and in accordance with standard engineering measures for the rehabilitation and improvement of roads. The vertical logic of the proposed intervention, that is the cause and effect relationship between the project's inputs, activities, outputs, outcomes, and impacts was reflected in the results matrix.

#### **iii. Cost-benefit, sensitivity and risk analysis**

During the design stage of the first operation, a Cost-Benefit Analysis (CBA) was conducted to evaluate the economic feasibility of the operation. The evaluation of this rehabilitation project resulted in a net present value (NPV) of US\$142.8 million, an economic internal rate of return (EIRR) of 26.5%. This economic evaluation was complemented by sensitivity analyses, to evaluate the impact of the reduction of projected



traffic and the increase of capital and recurrent costs; also, the combined impact of traffic reduction and costs increase was tested. The sensitivity analysis showed that under those circumstances, the project kept socially feasible. For the approval of the supplementary loan, the economic assessment was updated on the basis of the new forecasted costs, observed traffic counts during the construction of the project and direct benefits of road improvements. The evaluation of this rehabilitation project resulted in an NPV of US\$27.8 million, and an EIRR of 14%; the project was thus feasible and at the end of its lifecycle, it would yield a positive impact.

#### **iv. Environmental impact analysis**

During the preparation of the original loan in 2008, an Environmental and Social Assessment (ESA) was prepared by an expert team of specialists. The ESA concluded that the project was not anticipated to generate permanent, widespread or irreversible significant negative impacts. As part of the preparation for the supplementary loan, an environmental and social review was conducted that confirmed no environmental liabilities remaining from the previous loan and that the compensation activities had been conducted in accordance with Bank's policies.

#### **v. Risk analysis**

As a result of the scarce technical information, especially in detailed designs and budgets, at the time of preparing the first operation, some key assumptions of the design of this operation were not fully met. This was added to technical and macroeconomic situations during the execution of the works contracts, resulting in the need for the approval of a supplementary loan of US\$40 million, to complete such a strategic project for subregional integration. The main causes for the cost overruns were: (i) higher than anticipated quantities due to utilities relocation and renewal; (ii) increase in quantities due to design reviews; (iii) price escalation; (iv) higher than anticipated bid prices; (v) decline in value of the Euro against the US Dollar with a resulting shortfall of the original counterpart resources; and (vi) prolongation of contracts.

### **III. RESULTS**

#### **A. Project Outcomes**

The project objective was to contribute to the reduction in transport costs and accident rates for road users by improving and maintaining road reliability and driving conditions.

The expected outcomes of the project were: (i) reduction in vehicle travel times on the road; (ii) improvement of volume/capacity ratio on the road; (iii) reduction in the number of accidents along the road corridor; and (iv) more efficient and effective planning and programming of transport projects by PLOS.

The following table shows a comparison of the expected outcomes and the actual results:

ACHIEVEMENT OF DEVELOPMENT OBJECTIVES (DO) <sup>2</sup>																																								
Expected outcome: reduction of generalized transport costs, contributing to economic growth and social development																																								
Planned indicators			Results																																					
i. Reduction in travel time			Achieved. In general, travel time was reduced more than the 38% expected.																																					
Unit: hours																																								
Baseline	Intermediate	End of project																																						
4 (2008)	N/A	2.5 (2015)																																						
			<table><tr><th>Type</th><th>2008</th><th>2015</th><th>Change</th></tr><tr><td>Motorcycle</td><td>4:00</td><td>1:44</td><td>-57%</td></tr><tr><td>Car</td><td>4:00</td><td>1:49</td><td>-55%</td></tr><tr><td>Pick-up</td><td>4:00</td><td>1:37</td><td>-60%</td></tr><tr><td>Bus I &lt; 30 pass</td><td>4:00</td><td>1:57</td><td>-51%</td></tr><tr><td>Bus II &gt; 30 pass</td><td>4:00</td><td>1:48</td><td>-55%</td></tr><tr><td>Light truck &lt; 5 ton</td><td>4:00</td><td>1:56</td><td>-52%</td></tr><tr><td>Medium truck</td><td>4:00</td><td>2:34</td><td>-36%</td></tr><tr><td>Heavy truck</td><td>4:00</td><td>2:13</td><td>-45%</td></tr></table>		Type	2008	2015	Change	Motorcycle	4:00	1:44	-57%	Car	4:00	1:49	-55%	Pick-up	4:00	1:37	-60%	Bus I < 30 pass	4:00	1:57	-51%	Bus II > 30 pass	4:00	1:48	-55%	Light truck < 5 ton	4:00	1:56	-52%	Medium truck	4:00	2:34	-36%	Heavy truck	4:00	2:13	-45%
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Heavy truck	4:00	2:13	-45%																																					
ii. Reduction in vehicle operation costs (VOC) in rehabilitated sections			Partially achieved. In general, reduction in VOC are close to the 22% expected.																																					
Unit: Percentage (%)																																								
Baseline	Intermediate	End of project																																						
100 (2008)	N/A	78 <sup>3</sup> (2015)																																						
			<table><tr><th>Type</th><th>2008</th><th>2015</th><th>Change</th></tr><tr><td>Motorcycle</td><td>0.079</td><td>0.079</td><td>0%</td></tr><tr><td>Car</td><td>0.255</td><td>0.208</td><td>-18%</td></tr><tr><td>Pick-up</td><td>0.460</td><td>0.369</td><td>-20%</td></tr><tr><td>Bus I &lt; 30 pass</td><td>0.397</td><td>0.32</td><td>-19%</td></tr><tr><td>Bus II &gt; 30 pass</td><td>0.618</td><td>0.49</td><td>-21%</td></tr><tr><td>Light truck &lt; 5 ton</td><td>1.013</td><td>0.758</td><td>-25%</td></tr><tr><td>Medium truck</td><td>1.493</td><td>1.175</td><td>-21%</td></tr><tr><td>Heavy truck</td><td>1.805</td><td>1.452</td><td>-20%</td></tr></table>		Type	2008	2015	Change	Motorcycle	0.079	0.079	0%	Car	0.255	0.208	-18%	Pick-up	0.460	0.369	-20%	Bus I < 30 pass	0.397	0.32	-19%	Bus II > 30 pass	0.618	0.49	-21%	Light truck < 5 ton	1.013	0.758	-25%	Medium truck	1.493	1.175	-21%	Heavy truck	1.805	1.452	-20%
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Heavy truck	1.805	1.452	-20%																																					
iii. Reduction in the economic damage of road accidents			Not achieved																																					
Unit: Percentage (%)			An adequate system for road safety data collection and analysis was not developed, thus is not possible to determine the proportion of fatalities, injuries, and damages, in accordance to the methodology proposed in the result matrix.																																					
Baseline	Intermediate	End of project																																						
100 (2008)	N/A	76 (2015)																																						
Expected outcome: reduction of future periodic road maintenance costs																																								
Planned indicators			Results																																					
i. Percentage of road sections that are classified according to maintenance priorities			Achieved																																					
Unit: Percentage			The corridor was handed over to the Road Authority in September 2016 and it was included in the maintenance program for the roads under RA administration.																																					
Baseline	Intermediate	End of project																																						
0 (2008)	N/A	100 (2015)																																						

<sup>2</sup> Elaborated according with the outcomes and indicators included in the Result Matrix of SU-L1021.

<sup>3</sup> This target was set for private vehicles.

Expected outcome: reduction of future periodic road maintenance costs			
Planned indicators			Results
ii. Maximum IRI <sup>4</sup> on rehabilitated and reconstructed asphalt-paved sections			Not achieved IRI was not measured after the finish of works nor after 3 years of use and maintenance, as it was planned.
Unit: m/km			
Baseline	Intermediate	End of project	
3.1	N/A	2.8	
Expected outcome: improve road safety conditions in the interurban road system			
Planned indicators			Results
i. Accidents with fatal victims at the East West Corridor Marowijne -Commewiine (15% reduction)			Achieved For 2015, the total deaths registered in the corridor were 6 <sup>5</sup> (25% reduction).
Unit: deaths			
Baseline	Intermediate	End of project	
8 (2008)	N/A	7 (2015)	
ii. Accidents with injured victims at the East West Corridor Marowijne -Commewiine (15% reduction)			Not achieved The system for road safety data collection and analysis was not developed, thus there is no detailed information about the accidents enough to have adequate statistics about the quantity of accidents with injured victims. The official records only show data for deaths.
Unit: accidents			
Baseline	Intermediate	End of project	
18 (2008)	N/A	15 (2015)	
Expected outcome: institutional strengthening in the areas of planning, programming, and implementation of projects			
Planned indicators			Results
i. Public Investment System			Achieved The project originally contemplated the establishment of a Public Investment System. However, PLOS was dismantled in September 2010 and functions incorporated into MOF. Public Investment System was financed through the Public Capital Expenditure Management Program (2666/OC-SU).
Unit: unit			
Baseline	Intermediate	End of project	
0 (2008)	N/A	1 (2015)	
ii. Environmental and Social Management System for the Transport Sector			Achieved The system was implemented, and it is being used by the National Institute for Environment and Development in Suriname (NIMOS).
Unit: unit			
Baseline	Intermediate	End of project	
0 (2008)	N/A	1 (2015)	
iii. Definition of the needed road reserve areas, and development of a management plan inclusive of the rules and requirements for the use and occupancy of such areas			Not achieved The activity was not developed.
Unit: unit			
Baseline	Intermediate	End of project	
0 (2008)	N/A	1 (2015)	

<sup>4</sup> International Roughness Index (IRI). Generally defined as an expression of irregularities in the pavement surface that adversely affect the ride quality of a vehicle, and thus the user. The original Results Matrix did not include measurement of roughness on completion and accordingly there was no requirement in the civil works contracts nor was the supervising consultant required to conduct IRI tests. The revised Results Matrix included this as an indicator, but the contracts did not include this requirement and consequently no measurement was taken.

<sup>5</sup> Source: Suriname Police Force statistics.

Summary Development Objective(s) Classification (DO):			
<input type="checkbox"/> Highly Probable (HP)	<input checked="" type="checkbox"/> Probable (P)	<input type="checkbox"/> Low Probability (LP)	<input type="checkbox"/> Improbable (I)
<b>Justification:</b>  Six out of ten indicators were achieved. It is considered that the program has probability of reaching the development objectives, mainly because, through the implementation of the activities it was substantially achieved the reduction in costs, generalized transport times and accidents with fatalities (considered the most important ones); although some other impact indicators, were not reached or cannot be verified due to the absence of adequate ex-post program information.			
<b>Country Strategy:</b>  The project was aligned with the CS, which aimed at expanding and maintaining public infrastructure investments in priority areas as required for private sector development.  The program contributed to support the Bank's country strategy insofar as a result of the rehabilitation of this important international corridor, the general transport cost and travel and times were reduced, the access to an important agricultural zone were improved and the regional integration of the country was facilitated.			
<b>Economic profitability:</b>  The results of the ex-post cost-benefit analysis determined that the profitability indicators shown an Economic Net Present Value (ENPV), (discount rate of 12%) of US\$17.3 million and an Economic Internal Rate of Return (EIRR) of 13.5%, while the Benefit/Cost ratio is 1.16 and the ENPV/Investment ratio is 0.12. The ENPV is positive and the EIRR is above the cut rate of 12.0% with acceptable value, while the Benefit/Cost ratio and ENPV/Investment ratio are also satisfactory. For these reasons, it is considered that the project is profitable from the economic point of view.			

## B. Project Externalities

### i. Increase in travel speed

Although through the implementation of the improvements of the Meerzog - Albina corridor it was possible to achieve substantially the expected results in reduction of costs and generalized transport times, it is also important to highlight that it is evident in the observations made by the MPW and the RA, that the improvements in the condition of the corridor encourages a good number of drivers to exceed the speed limits in certain sections of the corridor. This, added to the scarce presence of police, could cause an increase in the corridor's accident rate, contrary to what was expected in the design of the operation.

### ii. Decrease in projected traffic

Traffic counts carried out in 2012 as part of the revised economic analysis indicated a significant reduction in traffic flows when compared to the 2007 counts instead of the 5.6% per annum growth projected. The assumption made then was that the reduction was due to the road conditions resulting from the ongoing rehabilitation works and that the traffic would return to the original projection when the works were completed. However, this has not fully materialized as a traffic count conducted by the Road Authority at the Stolkertsijver bridge in September 2016 (18 months after completion of the works) while reflecting a recovery from the decline during the period when the rehabilitation works was ongoing, was still 32% less than the 2007 figures near that location. One factor that should be considered in analyzing this slow recovery is that with the improved road conditions the larger commuter buses have once again commenced plying the route. Consequently, the number of taxis has not returned to the pre-project values. One other traffic count carried

out in June/July 2016 at the Suriname bridge recorded 10,634 vpd<sup>6</sup>. While this reflects an average annual increase of 13.3% over the 2012 figures, it is 1.5% below the annual average projected in the original analysis.

### C. Outputs

IMPLEMENTATION PROGRESS (IP) <sup>7</sup>			
Component 1: Civil works			
<u>Planned indicators</u>			<u>Outputs achieved</u>
<b>i. Rehabilitation of existing roads</b>			<b>Achieved</b> 137.7 km of existing roads between Meerzorg and Albina were rehabilitated and improved.
<b>Unit:</b> km			
<u>Baseline</u> 4 (2009)	<u>Intermediate</u> 73 (2012)	<u>End of project</u> 136.9 (2014)	
<b>ii. Hydraulic structures (bridges/culverts)</b>			<b>Achieved</b> A total of 13 bridges and 60 culverts were built or reconstructed along the corridor. The initial estimation of 78 culverts included in the Result Matrix of SU-L1021 was not in exact accordance with the final designs.
<b>Unit:</b> bridges/culverts			
<u>Baseline</u> 0/0 (2009)	<u>Intermediate</u> N/A	<u>End of project</u> 13/78 (2014)	
<b>iii. Road safety works</b>			<b>Achieved</b> The designs included standard road safety measures along the whole corridor, such as side barriers, vertical and horizontal signalization, improvement at urban crossings, pedestrian sidewalks, bus stops, and parking areas.
<b>Unit:</b> N/A			
<u>Baseline</u> N/A	<u>Intermediate</u> N/A	<u>End of project</u> N/A	
Component 2: Implementation support			
<u>Planned indicators</u>			<u>Outputs achieved</u>
<b>i. Supervision monthly reports</b>			<b>Achieved</b> An external supervision firm was hired and available during the duration of the works. Supervision reports were available every month.
<b>Unit:</b> reports			
<u>Baseline</u> 0 (2009)	<u>Intermediate</u> 12 each year	<u>End of project</u> 12 (2014)	
Component 3: Institutional strengthening			
<u>Planned indicators</u>			<u>Outputs achieved</u>
<b>i. Road Maintenance Management System approved and implemented (includes prioritization of maintenance per each road)</b>			<b>Achieved</b> A basic system was developed and is in use by the Road Authority.
<b>Unit:</b> unit			
<u>Baseline</u> 0 (2009)	<u>Intermediate</u> N/A	<u>End of project</u> 1 (2014)	

<sup>6</sup> Vehicles per day.

<sup>7</sup> Elaborated according with the outputs and indicators included in the Result Matrix of SU-L1021.

Component 3: Institutional strengthening			
Planned indicators			Outputs achieved
<b>ii. Road safety strategy and action plan approved and implemented</b>  <b>Unit:</b> unit <u>Baseline</u> <u>Intermediate</u> <u>End of project</u> 0 (2009)                      N/A                      1 (2014)			<b>Not achieved</b> Only a specific road safety action plan for the intervened corridor was developed.
<b>iii. Axle weighing survey study</b>  <b>Unit:</b> unit <u>Baseline</u> <u>Intermediate</u> <u>End of project</u> 0 (2009)                      N/A                      1 (2014)			<b>Achieved</b> An axle load survey was carried out by the Road Authority
<b>iv. Axle weighing portable machine</b>  <b>Unit:</b> unit <u>Baseline</u> <u>Intermediate</u> <u>End of project</u> 0 (2009)                      N/A                      1 (2014)			<b>Achieved</b> The Road Authority acquired new equipment for load weighing
<b>v. Public investment system established</b>  <b>Unit:</b> unit <u>Baseline</u> <u>Intermediate</u> <u>End of project</u> 0 (2009)                      N/A                      1 (2014)			<b>Achieved</b> Public investment system was financed through the Public Capital Expenditure Management Program (2666/OC-SU).
<b>vi. Environmental and Social Management guidelines for projects in the Transport Sector developed</b>  <b>Unit:</b> unit <u>Baseline</u> <u>Intermediate</u> <u>End of project</u> 0 (2009)                      N/A                      1 (2014)			<b>Achieved</b> Air quality equipment and translation into Dutch of the Environmental and Social Management Plan for the Transport Sector and the Social Engagement Plan for the Stolkertsijver Bridge.
<b>vii. Management plan for road reserve areas developed and implemented</b>  <b>Unit:</b> unit <u>Baseline</u> <u>Intermediate</u> <u>End of project</u> 0 (2009)                      N/A                      1 (2014)			<b>Not achieved</b> This activity was not developed.

Summary Implementation Performance Classification (IP):			
[ ] Highly Probable (HP)	[X] Probable (P)	[ ] Low Probability (LP)	[ ] Improbable (I)
<b>Justification:</b>  Nine of eleven indicators were achieved. It is considered that the implementation is satisfactory because most of the outputs were delivered. The road between Meerzorg and Albina was rehabilitated following the approved designs, incorporating measures for road safety. Most of the Institutional Strengthening Plan was developed as planned, although the PCR team recognizes that these actions are not sufficient to fill the capacity gaps that sectoral institutions have, which may be an opportunity to further deepen through other future Bank's interventions.			

## D. Project Costs<sup>8</sup>

Categories	Financing Plan			Actual costs		
	IDB	Local	Total	IDB	Local	Total
(in million US\$)						
<b>1. Meerzorg – Albina Corridor Rehabilitation</b>	<b>91.20</b>	<b>69.05</b>	<b>160.25</b>	<b>87.13</b>	<b>59.25</b>	<b>146.38</b>
<b>2. Implementation support</b>	<b>10.47</b>	<b>1.65</b>	<b>12.12</b>	<b>10.84</b>	<b>3.59</b>	<b>14.43</b>
Supervision	9.72	1.40	11.12	10.23	3.59	13.82
PEU costs	0.75	0.25	1.00	0.61	-	0.61
<b>3. Institutional strengthening</b>	<b>0.48</b>	<b>0.30</b>	<b>0.78</b>	<b>0.38</b>	<b>-</b>	<b>0.38</b>
<b>4. Financial audit and M&amp;E</b>	<b>0.35</b>	<b>-</b>	<b>0.35</b>	<b>0.17</b>	<b>-</b>	<b>0.17</b>
<b>5. Contingencies</b>		<b>3.60</b>	<b>3.60</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>6. Price escalation</b>		<b>3.60</b>	<b>3.60</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>7. Financing cost</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3.79</b>	<b>3.79</b>
<b>TOTAL</b>	<b>102.52</b>	<b>78.20</b>	<b>180.70</b>	<b>98.52</b>	<b>66.63</b>	<b>165.15</b>

## IV. PROJECT IMPLEMENTATION

### A. Analysis of Critical Factors

Several critical factors contributed to the less than optimal results presented in the execution of the present operation, including:

#### i. Cost overruns

The total financing estimated to complete Meerzorg Albina Corridor Rehabilitation Project was US\$126.9 million and in 2008 the IDB approved its contribution in two loans totaling US\$62.5M. Similarly, the *Agence Française de Développement* (AFD) approved its €25 million contribution in 2018, while the European Union (EU) approved its contribution of €17.5 million in 2009. The road corridor was divided into the following four sections (Lots) for procurement and execution purposes: Lot 1 with 20.5 km funded by EU, Lot 2A with 43.6 km funded by IDB, Lot 2B with 31.5 km funded by IDB and Lot 3 of 42.3 km funded by the AFD and IDB. Procurement for Lot 1 was done using EU policies, while Lots 2A, 2B and 3 were procured using IDB policies.

In 2012, it was determined that due to cost overruns, the cost of the project had increased by US\$53.8 million to US\$180.70 million. The IDB provide Supplementary Financing in the amount of US\$40 million which was approved in 2012 under operation SU-L1021. The remaining US\$13.8 million came from the Organization of the Petroleum Exporting Countries (OPEC) Fund for International Development (OFID) which became the fourth donor in 2013. The financing from IDB were dedicated to completing Lots 2A, 2B and 3 while OFID's contribution financed Lot 1 which was divided in Lot 1A and Lot 1B financed respectively OFID and the EU.

The following are considered the main causes of the cost surplus for the project:

- a) **Higher than anticipated quantities due to utilities relocation and renewal (US\$4.3 million).** Additional materials required as a result of sub-surface utilities works and the installation of new water lines in the Lot 1 project area totaled

<sup>8</sup> Source: Audited Financial Statements for the year ended Dec. 31st, 2016.

US\$3.6 million. While the direct costs were financed by GOS from its own fiscal budget (December 2011), the prolonged intervening period contributed to the increase in the cost of the Lot 1 works contract. In addition, and partly to accommodate the utilities in Lot 1, the width of the utility corridor had to be enlarged and, consequently, 2,928 m of walls and fencing, as well as 11 other obstacles, had to be relocated at a cost of US\$0.7 million.

- b) Increase in quantities due to design reviews (US\$20.1 million).** The review of designs completed after the awarding of civil works contracts based on further field investigation yielded cost variations above the original project budget. For Lot 1, the revised design required increased asphalt layer thickness costing US\$2.7 million extra. The design variations for Lot 2A and 2B included reconstruction of a longer section of pavement than originally expected, which resulted in increased asphalt thickness and additional quantities of new cost items, which totaled US\$5.9 million and US\$5.5 million, respectively. For Lot 3, the cost variation resulting from the design revision was due to the pre-treatment of existing asphalt, asphalt-concrete overlay and additional cost items for the reconstructed portions, similar to Lots 2A and 2B. In addition, traffic in the time since the detailed designs were prepared has caused additional lengths of road in Lot 3 to deteriorate further, increasing the length to be fully reconstructed from 16 to 19 km, adding to a total increase of US\$6.0 million. Prolongation of contracts (US\$12.7 million). Contractors claimed for extension of the time for completion of civil works as a result of: (i) the additional work resulting from the revised pavement design; and (ii) the delays caused by the design revision process. The extensions ranged from 14 to 22 months. The extension of the supervisory engineer's contract until the completion of civil works contracts and defects liability period resulted in an additional cost of US\$5.4 million for uninterrupted supervision.
- c) Higher than anticipated bid prices (US\$10.5 million).** Due, in part, to the inherent uncertainty of anticipating the way the international construction market would respond to the largest road construction project attempted in Suriname in more than a decade, and the number, quality and value of viable bids that would be received, the total cost of the four road contracts (Lots 1, 2A, 2B, and 3) at the time of award exceeded the original budgeted amount by US\$10.5 million. Another contributing factor was the increased inflation<sup>9</sup> during the intervening period (8 - 18) months between bid estimate and awarding.
- d) Price escalation occurred from commencement of works to completion (US\$11.7 million).** The extensions of the periods of the civil works contracts have given rise to claims for the adjustment of prices (escalation). Under the original contracts, prices were fixed, and the price adjustment clause was agreed to be inapplicable. A specialized consultant hired by the Bank made a determination that price escalation should be paid based on the additional escalation during the extension period in excess of the escalation that would have been incurred during the original planned contract period. The recommended approach embodied the principles of the standard FIDIC price adjustment formula and used appropriate indices related to the country of origin of the primary commodities for each contractor. The forecasts of the final project costs were premised on this approach

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<sup>9</sup> Inflation rose from 1.3% at the end 2009 to 10.3% at the end 2010 and 15.2% in 2011, following large wage increases as well as higher food and fuel prices.



and include a total projection of US\$11.7 million for price escalation over the entire period of the contracts, which was consistent with the expert's estimate in May 2012.

- e) **Decline in value of the Euro against the US Dollar, resulting in a shortfall of the counterpart resources (US\$3 million).** AFD resources are denominated in Euros and have declined in value over the contract period. The decline of the Euro resulted in a net reduction of resources allocated to Lot 3 (US\$3 million).

ii. **Leadership, stakeholder engagement, and project appropriation**

- f) **Multi Donor coordination.** In August 2006, GOS informed the Bank that, due to the scope and size of the project to rehabilitate the Meerzorg – Albina corridor, a multi-donor financing scheme would be developed, including the European Union (EU), the French Development Agency (AFD), and the Bank. The donor coordination efforts started with the TORs for the EU funded prefeasibility study being distributed for comments from the AFD and the Bank. The prefeasibility study developed more detailed TORs for the technical studies, economic feasibility, environmental and socio-cultural studies, and final designs, all of which were agreed to, by the three donors. The Bank has approved a technical cooperation (ATN/OC-10411/SU) to finance the feasibility studies and the preparation of final designs for the rehabilitation of the Meerzorg - Albina road. The AFD also provided resources for these studies which were through a technical assistance program.
- g) The Bank, the AFD and the EU have maintained participation over the years in the ongoing dialogue with the GOS on accompanying measures for the transport sector. The donors coordinated their efforts to oversee project execution, through regular donor meetings joint supervision missions, project inspections and interactions with the Borrower and the EA on critical implementation issues. Given that the Bank was the major contributor to the project and maintained a strong in-country presence, it took the lead role in this coordination.

**B. Borrower/Executing Agency Performance**

The Executing Agency at the commencement of project execution was the Ministry of Planning and Development Cooperation (PLOS). A Memorandum of Understanding was signed between PLOS, Ministry of Finance and the Ministry of Works defining the roles and responsibilities of each ministry regarding the execution of the operation. PLOS was the key interlocutor with the Bank, while the MPW was in charge of project monitoring, overseeing the contractors and supervisors, verifying all project activities before approval of payment certificates and works commissioning, the MOF was in charge of financial supervision of the program and the Loan resources destined for the program; and NIMOS was involved in the monitoring and supervision of the environmental aspects of the implementation of the Environmental and Social Management Plan during road construction. In 2010, PLOS was absorbed into the Ministry of Finance which then assumed the role of Executing Agency (EA).

A Project Executing Unit (PEU) was formed comprising of staff assigned from PLOS MOF, MPW and NIMOS and the unit was responsible for the fulfillment of technical, administrative and financial procedures related to the execution of the project, as well as

the planning, monitoring, supervision, and evaluation of the project. The staff assigned from the Ministries were not dedicated full time to the PEU and retained the responsibilities in their respective posts. In addition, some of the staff were not permanent members of the ministries and this led to attrition as persons left the institutions. The PEU was housed in an accommodation close to the site and was staffed with a full-time administrative assistant while the other PEU members would spend part of the work week at the office. This arrangement hampered the execution and management of the operation as activities and decisions were delayed.

After MOF assumed the role of EA, the PEU office was disbanded and the individual PEU members remained in the respective Ministries and would have frequent coordination meetings. A full-time Contracts Officer was hired to assist the PEU with procurement and contract administration and was housed in the MPW. Later, the same person was given a wider scope by being appointed as the General Coordinator, however, the authority to make decisions was not granted. During this period execution still suffered due to coordination owing to the PEU members being part time and there being no single PEU office.

Borrower/Executing Agency			
<input type="checkbox"/> Highly Satisfactory (HS)	<input checked="" type="checkbox"/> Satisfactory (S)	<input type="checkbox"/> Unsatisfactory (U)	<input type="checkbox"/> Very Unsatisfactory (VU)

### C. Bank Performance

The Borrower Evaluation (see Annex C) stated that the Bank supported throughout the implementation of the project especially during the change within the ministries.

Bank Performance			
<input type="checkbox"/> Highly Satisfactory (HS)	<input checked="" type="checkbox"/> Satisfactory (S)	<input type="checkbox"/> Unsatisfactory (U)	<input type="checkbox"/> Very Unsatisfactory (VU)

## V. SUSTAINABILITY

### A. Analysis of Critical Factors

The following are the main critical factors found for the sustainability of the project benefits:

#### i. Maintenance funding and institutional capacity

The rehabilitation contracts included a one-year defects liability period before being taken over by the Ministry of Public Works (MPW). The road was subsequently handed over to the Road Authority (RA) in September 2016. Maintenance to date has been limited to cutting of grass along the sides of the road by the MPW and to a lesser extent by the District Commissioners' offices. However, in a recent visit, several areas where the grass needed cutting were observed. This is an obvious sign of lack of adequate maintenance and is due mainly to a proper maintenance plan not being in place. In some areas, the white lines along the side of the road had already faded and needed to be remarked. The Road Authority should be reminded that road maintenance should not be seen as only to pot hole patching and sealing of cracks in the wearing surface but should include activities

such as maintenance of side drainage channels to avoid erosion, replacement of reflector spikes, remarking of white lines, replacement of traffic signs, etc.

A critical factor hindering the proper maintenance is the availability of funds for maintenance. Under the Road Authority Act, a proportion of the fuel levy and fees from the registration of motor vehicles should be set aside for road maintenance. However, the GOS suspended the registration of motor vehicles and the fuel levy is not placed directly in an account managed by the RA but deposited into the Consolidated Account in the Central Bank. Thus, the funds allocated are not always sufficient, and may not be delivered in a timely manner.

The RA currently conducts inspections of that portion of the road network assigned to it every 6 months. With the addition of the Meerzorg – Albina Corridor, the RA will need additional suitably qualified personnel to be able to undertake the inspection of the increased network.

Another factor that directly impacts on the sustainability of the rehabilitation works is the debris from the logs brought onto the road from the forests. This also reduces the life of the pavement while constituting a safety hazard.

#### **ii. Trucks load control**

An axle load survey carried out by the RA revealed that trucks traveling along the corridor carry loads in excess of 20 tons per axle. Given that the design was based on an axle load of 13 tons, carriage of loads of this magnitude will shorten the useful life of the road. The RA acquired mobile weighbridges (load cell plates), but legislation establishing their authority to use them in regulating the axle loads, as well as to establish weight limits, the process for measuring weights, the penalties for exceeding limits, and a process for enforcing the penalties, etc, has not been put in place.

#### **iii. Coordination with other agencies**

Another critical risk is that of the road being dug up by utility agencies. On a recent visit, excavation was being carried out by Telesur (telecommunications company) presumably to install or repair underground cables. Invariably, the restoration of the road after such activity is far below standard and greater collaboration between the RA and the utility company is required to minimise the number of such incidences and to ensure that the road is properly restored after completion of any necessary works.

### **B. Potential Risks**

In the current world financial situation, countries such as Suriname could face cash flow difficulties which could be a threat to local funding for maintenance activities. To ensure that road maintenance is adequately funded, the Bank should continue to include the maintenance in all future transport infrastructure projects and provide funding for this activity, should it become necessary.

The country's truck fleet is being populated with a growing number of heavier vehicles with high carrying capacities. The update and enforcement of weight limits in the road network is necessary for the preservation of the road network.

## C. Institutional Capacity

Suriname continues to carry out most of their road maintenance and improvement activities according to the same concepts it carried out during the beginning of project preparation. No substantial improvement in institutional capacity was reported given that most of the institutional strengthening measures are pending. In this context, there is no institutional capacity aspects related to the project activities that could be raised or evaluated in this section.

Sustainability Classification SU:			
<input type="checkbox"/> Highly Satisfactory (HS)	<input type="checkbox"/> Satisfactory (S)	<input checked="" type="checkbox"/> Unsatisfactory (U)	<input type="checkbox"/> Very Unsatisfactory (VU)

## VI. MONITORING AND EVALUATION

### A. Information on Results

Given the weak execution structure that was put into place for this project, the PEU was focused on the monitoring and reporting of the physical and financial progress of the project and compliance with the periodic reports to the three funders of the program. For that reason, added to the lack of experience in the evaluation of transport investments, adequate records on the indicators of expected results identified during the design of the operation were not kept. For the completion of the ex-post economic evaluation, there was no IRI data, since the measurement of this was not included in the works or supervision contracts. After the completion of the works, verification traffic counts were made at specific points in the corridor.

There is no system in place to collate the data required to assess the impact of the road safety program. The responsibility for data collection lies with the Road Authority, which is an institutionally weak entity. Attempts to institute a data collection system for the RA failed because of delays in awarding the contract for those services.

### B. Ex-post Cost-Benefit Analysis

An ex-post CBA (see Annex B) was conducted to determine the accomplishment of the project goals, specially reduction in travel time and costs, and to confirm the economic profitability of the project. For this analysis, the traditional methodology that considers the benefits of the changes in the consumer surplus (vehicle operating costs savings and travel times savings) and the changes in the road agency's costs for managing these roads (investment and maintenance costs), between the scenarios "Without Project" and "With Project" was used. The Highway Development and Management (HDM-4) model was used for this analysis as it is currently the usual tool for assessments of investments in roads.

The results of the ex-post cost-benefit analysis determined that the profitability indicators shown an Economic Net Present Value (ENPV [discount rate of 12%]) of US\$ 17.3 million and an Economic Internal Rate of Return (EIRR) of 13.5%, while the Benefit/Cost ratio is 1.16 and the ENPV/Investment ratio is 0.12. The ENPV is positive and the EIRR is above the cut rate of 12.0% with acceptable value, while the Benefit/Cost ratio and

ENPV/Investment ratio are also satisfactory. For these reasons, the project was considered profitable from the economic point of view.

## **VII. LESSONS LEARNED**

The lessons learnt from the project are as follows:

### **i. Importance of leadership**

It is generally accepted and was again confirmed, that projects introducing complex institutional reform have limited chances of success in the absence of strong, consistent leadership and sustained political support. In this case, despite the fact that the project counted on substantial leadership during its preparation, this did not continue to the same extent throughout the execution period.

Further, due to the Bank's internal restructuring and the resulting changes in project leadership, and in the absence of effective transition of the project, compromised the Bank's ability to maintain close coordination with stakeholders and monitor the timely execution of planned strategies, which are key elements for the success of institutional reform. This is a strong lesson learned by the Bank, which could have avoided many of the challenges faced by the project if the institutional memory of the project had been preserved throughout the execution period. This meant that the main strategy of the project document was not followed.

### **ii. Quality of designs**

The designs for the works produced by consultants at the project design stage should be reviewed thoroughly by the Executing Agency to ensure the solution is practical for the existing construction environment in order to avoid changes, delays, and increases in cost during project execution.

### **iii. Project execution**

The projects carried out in the program have been marked by some difficulties relating to the level of initial planning and initial technical choices that underestimated the scale of rehabilitation needs, on the one hand, and on the other, weaknesses in the technical and financial management of the contracts, consequently:

- a)** Future operations should be prepared on the basis of up-to-date and more comprehensive studies in order to avoid any changes during the execution of the contracts;
- b)** Pre-project studies should be updated at a preliminary stage;
- c)** The executing agency shall have more permanent technical resources to perform daily tasks both technically and in terms of management of contractual and financial progress;
- d)** Scheduling and phasing of activities should be carefully analyzed, and realistic times be assigned for activities required for implementation of a project. The need to award contracts should not be the driving factor for compressing the timeline

since the costs could be affected due to lack of critical information which are inputs to the design phase;

- e) The planning and preparation stage of large civil works projects are crucial for the success of the project. In particular, adequate time should be given for the preparation of the final designs on which the civil work will be tendered. This would reduce the likelihood of design amendments being needed while the contract is under execution and additional cost due to increase quantities and time;
- f) The utility companies are a key stakeholder in road projects since utility infrastructure are also installed in the same corridor. It is prudent that the final versions of the designs be share with these companies and an onsite visit be hosted to identify the location of utility infrastructure in the corridor;
- g) Large civil works project should be executed by the technical ministry, where-by the MOF performs a level of financial supervision. The management and execution of multi-donor complex civil works projects require a Project Execution Unit with dedicated and stable staff housed in a single location. In cases where the PEU consist of staff from stakeholder Ministries, these personnel should relocate to the PEU facility and cooperate with other members on a daily basis;
- h) In cases where skill sets are not available in the PEU or within government, it would be useful to have retainer contracts with suitable experts to support the PEU. For instance, there are no claims experts in Government or on the Suriname market. For future projects, it should be considered to have such and experts on board from the commencement of execution project;
- i) One of the intentions of the having a PEU comprised of staff from stakeholder Ministries was to strengthen the Government officers in their capacity to plan and execute large infrastructure projects. Some of the PEU personnel were contracted employees of the Ministries, as such, there were changes in PEU members as these persons left to accept jobs elsewhere. Long term employment commitments with PEU members would avoid the repetition of this phenomena should be considered for future projects;
- j) The employees in the public sector which are responsible for the execution of civil work contracts should be trained on the administration of these especially it relates to the roles and obligations of the employer, contractor, and engineer under the contract. This would avoid delays in decision making which in some cases could result in the employer being liable for additional costs;
- k) The removal of encroachment on the road corridor is a manageable task once there are participative consultations with the affected parties. Compensation does not have to be monitory as was demonstrated in this project where the fences that were relocated was done by the contractor;
- l) The rumble strip edge lines and high visibility cycling paths were two innovations that were introduced in this project and should be implemented in new road projects executed in Suriname. In order to effectively evaluate road safety interventions, investment should be made in a geo-spacial database and annual traffic counts;

- m) For large international contracts, a good practice is to have a price fluctuation clause from the commencement of the contract rather than having to negotiate rate increases at a later date when delays may be attributed to the employer;
- n) The Roads Authority should be included in the project execution team for road projects given that this entity will have to assume the responsibility of maintaining the infrastructure upon its completion. In order to assist the RA with its mandate, as far as is possible, extended maintenance periods should be included as part of the construction contracts. Detailed as built drawings should also be provided to the RA to serve as input to the maintenance planning process.

## **ANNEXES**

- I. [Minutes from the exit workshop](#)
- II. [Ex post Cost-Benefit Analysis](#)
- III. [Borrower evaluation](#)
- IV. [Final Audited Financial Statements](#)



**Meerzorg – Albina Integration Corridor Rehabilitation Project**  
**SU-L1006 and SU-L1021**  
**Exit Workshop Minutes**  
**April 28, 2017**

**1. Participative Project Assessment**

- 1.1 The exit workshop took place on April 28, 2017 with participants representing the Ministry of Finance, Ministry of Public Works, the Roads Authority, National Institute for Environment & Development, the District Commission, the French Development Agency and the Inter-American Development Bank (see Annex 1). The Draft PCR prepared by the final evaluation consultant Mr. James Campbell was shared ahead of time with the participants to attain the objectives of the Exit Workshop. The Draft PCR included information on the indicators including the planned and achieved outputs and outcomes organized by components.
- 1.2 A Power Point presentation (Annex 2) was made by the IDB, summarizing the project and the outputs and outcomes assessed in the final evaluation. A short oral presentation was made by the Ministry of Finance. The participants were engaged in an active discussion group analysis where outputs and outcomes of the possible future impacts initiated by the project and their benefits were discussed. Based on that information gathered during these discussion groups, the necessary actions and measures were recommended. A summary of the main points identified by the participants is presented below.

**2. Assessment of Project Results by Component**

- 2.1 **Component 1: Rehabilitation of the Meerzorg – Albina Corridor (US\$108.85 million).** The major output of the project is the rehabilitation of 138 km of road from Meerzorg in Paramaribo to Albina in Marowijne. To facilitate the rehabilitation process, the road was divided into four contract packages namely Lot 1, Lot 2A, Lot 2B and Lot 3. Due to delays in the relocation of utilities in the first 5 km of Lot 1 and the associated cost increases, this segment was further subdivided into two producing Lot 1A and Lot 1B. Lot 1B comprised those works that could be completed within the deadline for the financing that was being provided from the EU. Additional financing was sought and obtained through the OPEC Fund for International Development (OFID) for Lot 1A. However, the scope of the Lot 1A works was reduced by omitting several elements in order bring the contract amount for the works to within the available financing provided by OFID. The Lot 1A rehabilitation works have been completed except for the omitted works.
- 2.2 Works completed at the end of the project included:
  - 137.9km of roads with 7m wide paved carriageway
  - 2 Roundabouts at busy intersections
  - 27.2km of cycle lanes





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- 13 pre-stressed concrete bridges
  - 60 reinforced concrete culverts
  - Thermoplastic road markings
  - Reflective road traffic signs
- 2.3 **Component 2: Implementation Support (US\$6.25 million).** All the civil works executed under Component 1 were continuously supervised by a supervising consultant, consultants were also contracted to (i) provide design services; (ii) provide contract management support; and (iii) audit and evaluate the project.
- 2.4 The following activities were completed supported the project:
- Construction Supervision services
  - Independent Design Review
  - Design Modifications services
  - Claims Specialist to review Contractor's claims
  - Project Execution Unit Costs: General Coordinator, Contract Specialist, vehicles, office equipment and administrative staff
  - Financial Audits
  - Mid-term and Final Evaluations
- 2.5 **Component 3: Institutional Strengthening (US\$0.5 million).** The other outputs of the project relate to the institutional strengthening of the Ministries of Planning and Development Cooperation, Finance and Public Works as well as the National Institute for Environment and Development (NIMOS).
- 2.6 The following outputs were completed supported the project:
- Establishment of a Public Investment System
  - Development of an Environmental and Social Management System for the Transport Sector
  - NIMOS and the Environmental Specialist from the Project Execution Unit trained
  - Strengthening of the Roads Authority
  - Conduct an axle load survey, draft legislation and purchase of vehicle scales



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**3. Discussion on Challenges faced during execution**

- 3.1 **Project Management.** The government faced several challenges managing the project which started off with three financing agencies IDB, AFD and EU with a fourth, OfID joining at a later stage. The Ministry of Planning (PLOS) was initially the government's lead agency which coordinate other stakeholder ministries such as the Ministry of Works and Natural Resources. A PEU was formed with members of the stakeholder Ministries, however, staff attrition led to many changes in personnel. POLS later became part of the MOF and while their involvement was maintained at a technical level raising the role of collaboration and coordination was unclear. A General Coordinator was then hired to lead the PEU, however, coordinator did not have sufficient authority to decide on the technical matters that were being contemplated on the project. The coordination and collaboration effort was challenging at times leading to delays due to red tape. The PEU changes also had ramifications for the closure of the program, given that the project files were not consistently maintained.
- 3.2 **Design Amendments.** The first task of the construction supervisor was to undertake a constructability review of the designs to be implemented. The supervision firm had questions regarding the design philosophy and the Government facilitated exchanges between that firm and the designers. At the end of the review, the supervisor disagreed with some elements of the designs while the designers maintained that their work was suitable for construction. The government hired a third engineer to provide an independent review of the design and that review mostly agreed with the supervisor position.
- 3.3 The outcome of the design review required addition design work for those road section that were identifies as inadequate. This led to there being a redesign of some of sections of the road. There were delays to the Contractors progress as the design amendments were being prepared. This required the extension of the contractors and the supervisor.
- 3.4 **FIDIC contracts.** Suriname was gradually moving from ABS to UWS and AWS and then to the design-built contracts and currently only FIDIC contracts are being used for the works that are being contracted. The expertise was growing in this field of using FIDIC contracts for the past years nonetheless in-depth knowledge is still lacking in the public sector. In Suriname, the custom is to amicable settlements of claims by the contractors, but in the FIDIC contracts there are procedures to abide by for the resolution of claims. The IDB provided training on FIDIC contract form for government personnel.



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- 3.5 **Relocation of Utilities.** The final design consultants met with the utility companies while they were undertaking their assignment. The utilities provide estimates for the relocation of the utilities that were in the construction zone of the road based on the draft designs. Due to the short time that was provided to the design consultants, the final version of the designs was not consulted with the utilities and this led to an increase in the quantity of utilities to be relocated above that catered for in the Bills of Quantities.
- 3.6 **Right of Way Clearance.** In the first 20km of the road, there were a number of fences that were encroaching on the right of way and within the limits of the works. Three fence designs were made and affected property owners were allowed to choose a fence of their preference. The existing fences were then removed and replaced with the new fences on the correct property line at the expense of the project. There were also a number of warung (Javanese Restaurant) that were close to the road reserve. None of these were affected as the parking lanes in road design was adjusted to reduce the impact of the road on these businesses. This was the first time in Suriname that the goal was met to relocate such a number fences with no social repercussions.
- 3.7 **Institutional Strengthening.** The plan was to build the capacity of Government officials in their capacity to execute large and complex civil works projects. However, the project suffered from changes to the PEU members as they moved on to accept different jobs. This prevented the institutional strengthening from being fully implemented.
- 3.8 **Stolkertsijver Bridge.** The renovation of the Stolkertsijver bridge was intended to increase the loading capacity of the bridge to a standard which would be adopted in future. The bridge was tendered at the commencement of the project as a design-build contract with the employer's preliminary design as a guide for the preparation of bids. The two bids received for the works were both significantly above the budget. With the application for the supplemental loan from the IDB, the budget for the bridge was increased and funding was made available for a detailed design to be undertaken. The consultant that was hired to prepare the designs could maintain the delivery schedule, and by the time the final designs was ready for tendering, the disbursement and extension period had elapsed as such the bridge was not completed, however, the government has signal its intention to complete the bridge.



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**4. Lessons Learned and Recommendations**

- 4.1 Scheduling and phasing of activities should be carefully analyzed, and realistic times be assigned for activities required for implementation of a project. The need to award contracts should not be the driving factor for compressing the timeline since the costs could be affected due to lack of critical information which are inputs to the design phase.
- 4.2 The planning and preparation stage of large civil works projects are crucial for the success of the project. In particular, adequate time should be given for the preparation of the final designs on which the civil work will be tendered. This would reduce the likelihood of design amendments being needed while the contract is under execution and additional cost due to increase quantities and time.
- 4.3 The utility companies are a key stakeholder in road projects since utility infrastructure are also installed in the same corridor. It is prudent that the final versions of the designs be share with these companies and an onsite visit be hosted to identify the location of utility infrastructure in the corridor.
- 4.4 Large civil works project should be executed by the technical ministry, where-by the MOF performs a level of financial supervision. The management and execution of multi-donor complex civil works projects require a Project Execution Unit with dedicated and stable staff housed in a single location. In cases where the PEU consist of staff from stakeholder Ministries, these personnel should relocate to the PEU facility and cooperate with other members on a daily basis.
- 4.5 In cases where skill sets are not available in the PEU or within government, it would be useful to have retainer contracts with suitable experts to support the PEU. For instance, there are no claims experts in Government or on the Suriname market. For future projects, it should be considered to have such and experts on board from the commencement of execution project.
- 4.6 One of the intentions of the having a PEU comprised of staff from stakeholder Ministries was to strengthen the Government officers in their capacity to plan and execute large infrastructure projects. Some of the PEU personnel were contracted employees of the Ministries, as such, there were changes in PEU members as these persons left to accept jobs elsewhere. Long term employment commitments with PEU members would avoid the repetition of this phenomena should be considered for future projects.
- 4.7 The employees in the public sector which are responsible for the execution of civil work contracts should be trained on the administration of these especially it relates to the roles and obligations of the employer, contractor and engineer under the contract. This would avoid delays in decision making which in some cases could result in the employer being liable for additional costs.



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- 4.8 The removal of encroachment on the road corridor is a manageable task once there are participative consultations with the affected parties. Compensation does not have to be monetary as was demonstrated in this project where the fences that were relocated was done by the contractor.
- 4.9 The rumble strip edge lines and high visibility cycling paths were two innovations that were introduced in this project and should be implemented in new road projects executed in Suriname. In order to effectively evaluate road safety interventions, investment should be made in a geo-spatial database and annual traffic counts.
- 4.10 For large international contracts, a good practice is to have a price fluctuation clause from the commencement of the contract rather than having to negotiate rate increases at a later date when delays may be attributed to the employer.
- 4.11 The Roads Authority should be included in the project execution team for road projects given that this entity will have to assume the responsibility of maintaining the infrastructure upon its completion. In order to assist the RA with its mandate, as far as is possible, extended maintenance periods should be included as part of the construction contracts. Detailed as built drawings should also be provided to the RA to serve as input to the maintenance planning process.



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Project Exit Workshop

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**INTER-AMERICAN DEVELOPMENT BANK**

**SURINAME**

**MEERZORG-ALBINA REHABILITATION PROJECT  
(SU-L1006)**

**EX-POST ECONOMIC ANALYSIS**

**December 2017**

This document was prepared by Diego Gagliardi (Consultant).

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## **MEERZORG-ALBINA CORRIDOR REHABILITATION PROJECT (SU-L1006)**

### **1. Introduction.**

- 1.1 Suriname belongs to the three poorest countries in the Caribbean and is at the lower bottom of the middle group in Latin America. On the Human Development Index of 2007, Suriname stands at the 85<sup>th</sup> place out of a total of 177 countries. The Government of Suriname has stressed the need to improve the efficiency and the physical infrastructure of the country's transport sector as a key component of a strategy aimed at supporting private sector development in a context of growing regional and global integration. The goal of developing and maintaining an efficient, modern, reliable, secure, competitive and high-quality transport system is formulated for the national transport system and also for international transport. In this regard, the process of integration of transport in the Caribbean and on the South-American continent is fully supported, as part of the Initiative for the Regional Infrastructure Integration in South America (IIRSA).
- 1.2 Between 2004 and 2007 several studies of the transport sector were undertaken with funding from the European Commission (EC), the French Development Agency (FDA) and the Bank; likewise, during 2006 the Government of Suriname prepared the Multi Annual Development Program (MADP) 2006-2011. The EC funded the prefeasibility study for the Rehabilitation of the 'Meerzorg - Albina' Corridor; this corridor has 138 km approximately and links Paramaribo, the capital of Suriname, to the eastern border with French Guyana. In 2007 the Bank and FDA cofinanced the feasibility studies and preparation of preliminary designs. These studies analyzed the proposed rehabilitation project, and identified options for prioritization, reduction or phasing in time the scope of the project. In addition, based on preliminary designs, identified the expected benefits and impacts, and assessed the potential sustainability of the project results.
- 1.3 The main objective of the project for the Rehabilitation of 'Meerzorg - Albina' Corridor is to improve access to important economic zones and facilitate tourism and regional integration of the country, as well as to lower transport costs and improve road safety. Specific objectives of the Program will be the improvement of corridor reliability and driving conditions. Expected results include: (i) reduction in generalized transport and logistical costs, contributing to economic growth and social development, (ii) reduction in future road periodic maintenance costs, (iii) improvement of accessibility of surrounding communities to markets and services; (iv) improvement of road safety, (v) institutional strengthening in the areas of planning, programming and implementation of projects.
- 1.4 The Rehabilitation of 'Meerzorg - Albina' Corridor was carried out between 2010 and 2015; the works were built through five independent works contracts, according to the way in which the selection of contractors was tendered.
- 1.5 This report relates to the ex-post economic evaluation of this project. For this analysis it was used the traditional methodology that considers the benefits for the changes in the consumer surplus (vehicle operating costs savings and travel times savings) and for the changes in the road agency's costs for managing these roads (investment and

maintenance costs), between the scenarios "Without Project" and "With Project". The Highway Development and Management (HDM-4) model was used for this analysis as it is currently the usual tool for assessments of investments in roads.

- 1.6 The analysis was prepared with documents, primary data and studies and information provided by the IADB local office. In some cases, the information was completed by the experience of the Consultant supported by visual information (e.g. photographs, Google Earth, etc.). It is estimated that a sufficiently good approximation was achieved to determine the economic viability indicators of the cost benefit analysis.

## 2. The Project. The infrastructure involved.

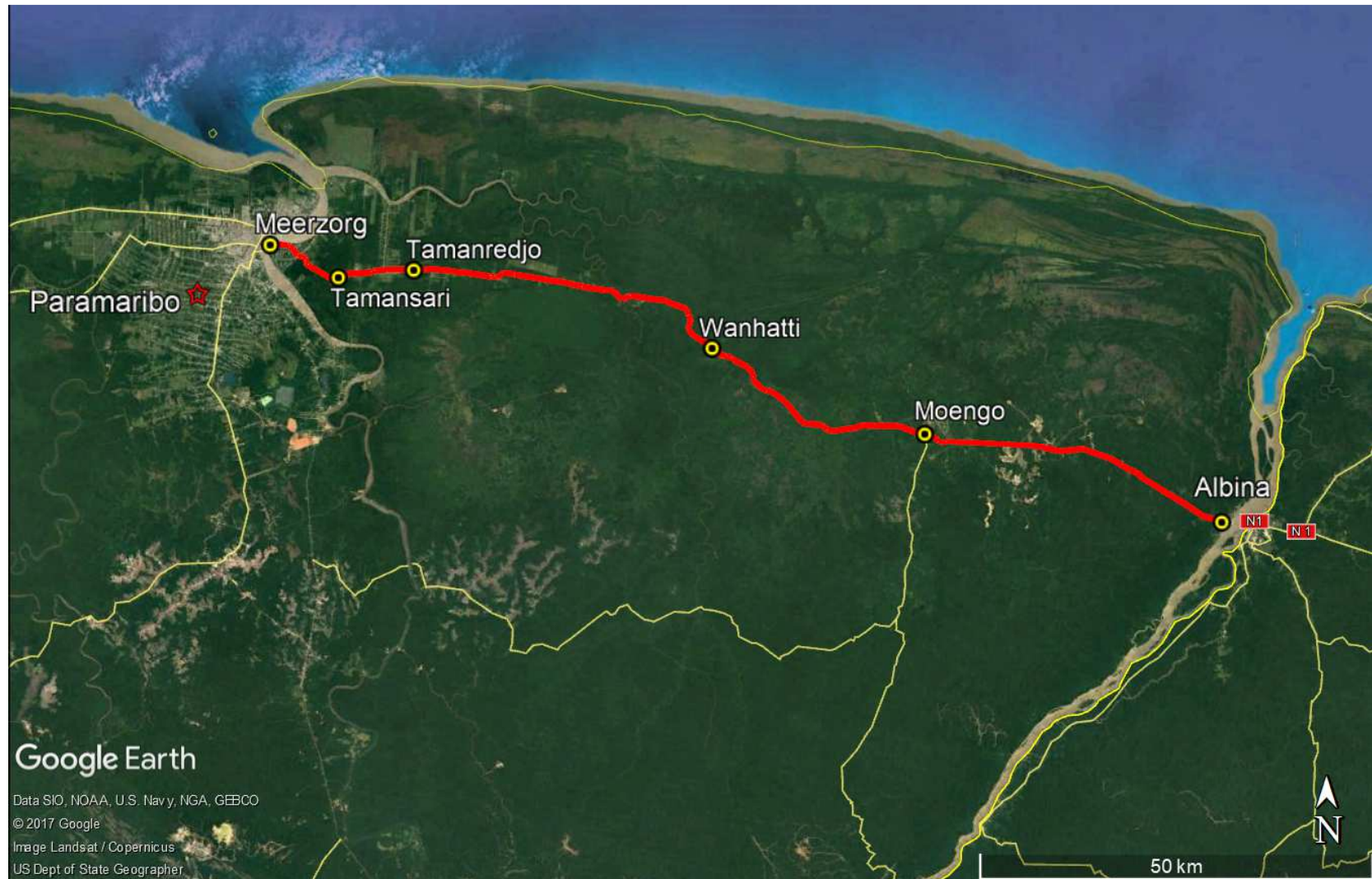
### A. CONTEXT OF THE PROGRAM.

- 2.1 The transport sector. The road network in Suriname is composed of 4,500 km where 1,200 km are mainly interregional, primary paved roads. The main roads are the East-West corridor between Albina and Nieuw Nickerie and the North-South corridor between Paramaribo and Brokopondo. Approximately 40% of all paved roads are in the urban areas of Paramaribo, Albina and New Nickerie, which have had major rehabilitation in recent years. Suriname's road network connects with Guyana and French Guyana by ferries across the Corantijne River in the West and the Marowijne River in the East. The Canawaima Ferry service was established in 1998 to serve the route between Suriname and Guyana. This service is maintained through a joint venture between the two countries.

### B. THE 'MEERZORG - ALBINA' CORRIDOR.

- 2.2 The 'Meerzorg – Albina' road is 137.86 km length, has two lanes and 14 bridges that cover 531.7 meters of total length. The corridor links Paramaribo, capital of Suriname, to the eastern border with French Guyana; this corridor represents almost 10% of the national primary network, and conveys approximately 23% of the country's traffic flow. The section between Meerzorg and Moengo (95 km) was built and asphalted during the early 1960s, mainly across flat landscapes and marshlands at altitudes below 10m; while the section between Moengo and Albina (45 km) was a dirt road reconstructed and paved in the early 1970s, across rolling terrain where elevation peaks at 46 meters. The Figure II-1 shows the location and layout of the corridor on a Google Earth map.
- 2.3 **The route before the execution of the project.** Before the works, the road was paved and considered to be in regular to poor conditions. The pavement, ranging in width from 6.0 to 6.3 m, was deteriorated in more than 100 km. The road had no markings, and the road furniture was limited to curves and speed bumps. As a result of the evaluations of the road conditions, it was estimated that the scope of the works should include the rehabilitation of pavements and bridges. The average daily traffic was between 1,300 vehicles along the East section of the highway to 8,100 vehicles in the vicinity of Meerzorg (2008).
- 2.4 No maintenance has been carried out since original construction, except some works (asphalt concrete overlay) on the short section near Meerzorg (5.60 km). Asphalt cracks, pavement deformations, subsidence at bridge approaches and other structural disorders affected more than two thirds of the alignment. As the vegetation invaded roadside shoulders, drivers were compelled to straddle the centerline, narrowing the existing width and compounding traffic hazards. In urban crossings, sewer networks overflow during rainstorms, jeopardizing both local and long-haul traffic. Then, the rehabilitation works should include the strengthening of sub-grades, layers of resilient pavement and renewed hydraulic structures, which would lead to a significant improvement in the load capacity and traffic safety of the rehabilitated road.

**Figure II-1**  
**'Meerzorg - Albina' Corridor**



- 2.5 For the technical analysis, this corridor is divided into six reasonably homogenous subsections, taking into consideration the traffic volume, the geometry of the road and the pavement condition.<sup>1</sup> In that sense, they are defined: (i) Subsection I: 'Meerzorg-Tamansari', with Subsection Ia (5.60 km) and Subsection Ib (4.90 km); (ii) Subsection II: 'Tamansari - Tamanredjo' (10.00 km); (iii) Subsection III: 'Tamanredjo - Wanhatti' (43.50 km); (iv) Subsection IV: 'Wanhatti - Moengo' (31.50 km); (v) Subsection V: 'Moengo - Albina' (42.36 km). The total length of the road is 137.86 km.
- 2.6 The Consultant estimated that this road section had a typical pavement built with 8.0 cm of concrete asphalt on 20 cm of cemented granular base and 30-60 cm of granular subbase, with a poor to medium subgrade quality (CBR 3 to 17)<sup>2</sup>. The pavement condition could be characterized 'acceptable' on the first subsection (5.60 km) due to a recent asphalt overlay (early 2000's), but the rest of the road was in a 'poor' condition, according to the information (visual and descriptive) that are available.
- 2.7 There are no reliable data regarding the IRI in the ex-ante condition. The Consultant has estimated these IRI values from the photographic records and the description of the condition of the different subsections according to the available studies;<sup>3</sup> in that sense, an IRI of 4.0 mm/m is estimated for Subsection Ia (Meerzorg-Tamansari on the first 5.60 km), 8.0 mm/m for Subsections Ib, II, III and IV (Meerzorg-Tamansari on the remaining 4.90 km and all the length Tamansari to Moengo), while an IRI of 5.0 mm/m for Subsection V (Moengo to Albina). The road length in poor condition, specially the final 4.90 km of Meerzorg-Tamansari and Tamansari-Moengo (89.90 km), the surface was old and the asphalt dry and brittle resulting in severe cracking (severe undulations had appeared in the carriageway along much of the middle section of the road).
- 2.8 **The rehabilitation works of the corridor.** According the Program, the scope of works to be carried out along this road included the following activities: (i) widening of the road width from the current 6.0-6.30 meters to 7.2 meters; (ii) refurbishment of 7 bridges, restructuring of 5 bridges and construction of 2 new bridges; (iii) upgrading the existing 60 culverts, replacing 30 of them and building 30 new additional culverts; (iv) restoration of ebb-tide and floodwater interchanges in swamp areas; (v) pavement reconstruction, recycling the existing pavement with new stabilization techniques; (vi) any resettlement along the route of the corridor deemed necessary as a result of the study for the Resettlement Plan; and (vii) improvements of urban crossings, and roadside amenities, including pedestrian sidewalks, bus stops and parking areas and terminal facilities at key locations to enhance safety and socioeconomic benefits. In addition, roadside public utilities infrastructure were supposed to be properly relocated.
- 2.9 The project included a widening of the carriageway and a new pavement on the total length of the corridor. The rehabilitation/reconstruction of the structure of the pavement was performed with a binder course (8.0 cm) and a wearing course (4.0 cm) of asphalt pavement, a cemented granular base (20-25 cm depending of the subsection) and a granular subbase (35-60 cm depending of the subsection), except on the Subsection I.

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<sup>1</sup> The economic evaluation methodology requires the definition of homogeneous subsections taking in consideration the type of works, the volume of traffic, etc.

<sup>2</sup> CBR (California Bearing Ratio) values obtained from the 'Meerzorg-Albina Road Rehabilitation Project'; Roughton International - ACE Consultancy, April 2009.

<sup>3</sup> Roughton International - ACE Consultancy; Op. Cit.

On the Subsection I, due to financial constraints, the following works have been omitted: (i) between Km 0+000 and Km 5+600 the binder course was only placed in the widening, the binder course overlay (4.0 cm) and wearing course (4.0 cm) were omitted; (ii) between Km 5+600 and Km 10+500 the wearing course (4.0 cm) was omitted; (iii) between Km 0+000 and Km 10+500 the pavement markings and road safety signs were omitted.

C. SUMMARY OF THE PHYSICAL CHARACTERISTICS OF THE PROJECT.

- 2.10 In the Table II-2 are shown the physical conditions of the roads in the “Without Project” and “With Project” scenarios, for the project. It is included, among other data, the basic dimensions of the road and the pavement structure, in the mentioned cases.

**Table II-2**  
**Road Rehabilitation of the 'Meerzorg - Albina' Corridor**  
**Basic Technical Characteristics of Road and the Projects**

Scenario	Sub-Section		Length (km)	Type	Lanes #	Traffic Flow	Traffic Pattern	Width (m)	Shoulders (m)	Bicy-Line (m)	IRI** (mm/m)	Pavement Structure (cm)*						
	#	Start - End										Subgrade CBR	Granular SubBase	Cemented Base	Sand Asphalt	Binder Course	Wearing Course	Structural Number**
WITHOUT Project	la	Meerzorg - Tamansari	5,60	Sub-Urban	2	2	Commuter	6,0	-	-	3,0	3	60,0	20,0	-	8,0	4,0	3,75
	lb	Meerzorg - Tamansari	4,90	Sub-Urban	2	2	Commuter	6,0	-	-	8,0	3	60,0	20,0	-	8,0	-	3,31
	II	Tamansari - Tamanredjo	10,00	Sub-Urban	2	2	Commuter	6,0	-	-	8,0	17	60,0	20,0	-	8,0	-	4,03
	III	Tamanredjo - Wanhatti	43,50	Rural	2	2	Interurban	6,0	-	-	8,0	15	45 - 60	20,0	-	8,0	-	3,96
	IV	Wanhatti - Moengo	31,50	Rural	2	2	Interurban	6,0	-	-	8,0	8	45 - 60	20,0	-	8,0	-	3,70
	V	Moengo - Albina	42,36	Rural	2	2	Interurban	6,0	-	-	5,0	12	35 - 53	20,0	-	8,0	-	3,81
	<b>TOTAL LENGTH</b>		<b>137,86</b>															
WITH Project	la	Meerzorg - Tamansari	5,60	Sub-Urban	2	2	Commuter	7,2	1,5	1,5	3,0	3	60,0	20 - 25	-	8,0	4,0	4,11
	lb	Meerzorg - Tamansari	4,90	Sub-Urban	2	2	Commuter	7,2	1,5	1,5	2,0	3	60,0	20 - 25	-	8,0	-	4,58
	II	Tamansari - Tamanredjo	10,00	Sub-Urban	2	2	Commuter	7,2	1,5-2,0 ***	2,2 ***	2,0	17	60,0	20 - 25	-	8,0	4,0	5,99
	III	Tamanredjo - Wanhatti	43,50	Rural	2	2	Interurban	7,2	2,0	-	2,0	15	45 - 60	20	-	8,0	4,0	5,79
	IV	Wanhatti - Moengo	31,50	Rural	2	2	Interurban	7,2	2,0	-	2,0	8	45 - 60	20 - 22	-	8,0	4,0	5,58
	V	Moengo - Albina	42,36	Rural	2	2	Interurban	7,2	2,0	-	2,0	12	35 - 53	21 - 24	3,0	6,0 - 10,0	4,0	5,78
	<b>TOTAL LENGTH</b>		<b>137,86</b>															

(\*): Previous pavement structure is a consultant estimate based on the available partial information (no exist details about this pavement).

(\*\*): Consultant estimate.

(\*\*\*): Partial length with shoulder, partial length with walking line and partial length with bicycle line.

Source: Prepared by the Consultant, based on studies provided by the IADB Suriname.

D. EVALUATION SETTING OF THE “WITHOUT PROJECT” SCENARIO.

- 2.11 For the evaluation setting of the scenario “Without Project”, in this case, it is adopted the hypothesis that the road is maintained, at least, in conditions of quality similar to the ex-ante condition, but never providing conditions that may affect seriously the flow of traffic. There is no place to adopt the hypothesis of doing no works at all and leave the road get totally deteriorated; this assumption would be incompatible with a responsible roads Administration, for it would mean a curb on development.
- 2.12 Therefore, it is assumed that minimum works will be done in order to ensure that at least the current conditions will be maintained. In these regards, it is assumed that maintenance works will be done with an emphasis on good quality, and rehabilitation works for the carriageway will be done when it is reaching the end of its useful life, to avoid sections in bad conditions that prevent having reasonable traffic throughout the analysis period.
- 2.13 **Maintenance and reinvestment policy.** According to the before mentioned criteria, for the “Without Project” scenario it is defined a general policy of works as follows:<sup>4</sup>
- (a) Miscellaneous works (carriageway cleaning, drainages, etc.).
  - (b) Standard maintenance (potholing and crack sealing) of the pavement road throughout the length the section respective.
  - (c) Improvement works (reinvestment), by reconstructing the asphaltic surface of the carriageway (4.0 cm overlay), for each subsection where the IRI reaches a limit value of 10.0 mm/m.<sup>5,6</sup>
- 2.14 This hypothesis, for the “Without Project” scenario, is a “medium requirement” for the project, as long as it involves comparing it to an alternative that has limiting effects on the vehicle operating costs and travelling times; however, because of its very nature, this alternative does not involve a significant improvement in the cost of the trips and the road safety conditions.

E. EVALUATION SETTING OF THE “WITH PROJECT” SCENARIO.

- 2.15 The main works consist of the rehabilitation/reconstruction of the carriageway pavement and complementary works. The project includes:
- (a) Widening of the carriageway and reconstruction of the pavement on the total length of the Corridor.
  - (b) Construction of shoulders (gravel or earth covering with milled material), bicycle lines and walking lines, according to each subsection.

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<sup>4</sup> The details for the maintenance and reinvestment policy are presented in the occasion of the analysis of costs for this case (§5.2).

<sup>5</sup> Criteria used by the last ex-ante economic evaluation study: "The update of the economic analysis and the traffic count of Meerzog-Albina Corridor Rehabilitation Project"; G. Delanoë and ACE Consultancy, April 2012. It is important that the ex-post analysis is consistent with the accepted ex-ante analysis.

<sup>6</sup> This value of IRI (without considering other aspects affecting the flow) allows developing a speed of 60 km/h, according the report “Guidelines for Conducting and Calibrating Road Roughness Measurements”. Sayers M, Gillespies T, Paterson W. Word Bank Technical Paper N°46; 1986.



- (c) Improvements in the safety of the road, by: (i) road signs, vertical and horizontal, according to international standards; (ii) bus stops signs; (iii) bicycle lines, walking lines and others works for traffic protection.
- 2.16 **Maintenance and reinvestment policy.** Notwithstanding the rehabilitation or reconstruction works of the project, the following policy of works for the operation period (20 years) is also assumed:<sup>7</sup>
- (a) Miscellaneous works (carriageway cleaning, drainages, etc.).
  - (b) Standard maintenance (potholing and crack sealing) of the pavement throughout the length of the respective section.
  - (c) Improvement works (reinvestment), by rehabilitating the asphaltic surface of the carriageway (4.0 cm overlay), for each subsection where the IRI reaches the limit value of 4.0 mm/m (reasonable value admitted for a principal route).<sup>8,9</sup>

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<sup>7</sup> The details for the maintenance and reinvestment policy are presented in the occasion of the analysis of costs for this case (¶5.3).

<sup>8</sup> Criteria used by the last ex-ante economic evaluation study: "The update of the economic analysis and the traffic count of Meerzog-Albina Corridor Rehabilitation Project"; G. Delanoë and ACE Consultancy, April 2012. It is important that the ex-post analysis is consistent with the accepted ex-ante analysis.

<sup>9</sup> This maximum value of IRI (without considering other aspects affecting the flow) allows developing a speed of 90 km/h, according the report "Guidelines for Conducting and Calibrating Road Roughness Measurements". Sayers M, Gillespies T, Paterson W. Word Bank Technical Paper N°46; 1986.

### 3. The Project. The demand on the infrastructure involved.

#### A. TRAFFIC AND PROJECTIONS BEFORE THE WORKS.

3.1 For the economic evaluation it is necessary to have the Annual Average Daily Traffic (AADT) discriminated between the different type of vehicles, since each vehicle has a different impact on the life of the road infrastructure and the traffic flow conditions, as well as different vehicle operation costs and time costs. It was provided the information of the traffic counts conducted in 2007 (ex-ante condition) and 2017 (ex-post condition). The traffic counts in 2007 recorded light vehicles (cars and pick-ups), buses, light trucks, medium trucks and heavy trucks; bicycles and other non-motorized vehicles were not recorded; the traffic counts in 2017 recorded light (motorcycles, cars and pick-ups), buses and light trucks (together), medium trucks and heavy trucks.<sup>10</sup> Because the different criteria, the traffic counts carried up in 2007 and 2017 are not fully supported.

3.2 **Normal traffic.** The traffic counts carried out during the ex-ante studies (specifically in November-December 2007) did not include the motorcycles, but these vehicles were included in the ex-post survey. For the modeling of traffic flow, it is important to include the motorcycles; therefore, the Consultant estimated the AADT corresponding to the motorcycles from the registers of the respective AADT carried out in 2017 counts, decreasing these values with an annual rate of 6.5% (according the available traffic projections; ¶3.4).

3.3 With this aforementioned adjustment, the complete classification of traffic in the ex-ante condition, assignable to the year 2008, is available. Then, the average AADT (2008) on the Corridor (average weighted on the length of each subsection) is 3,022 veh/day; while, the partial AADT for the Subsections I and II is 8,096 veh/day (typical suburban traffic), for the Subsection III and IV is 2,635 veh/day and for the Subsection V is 1,250 veh/day (rural traffic). The relative participation of the vehicles, for each subsection, is 92-77% of light vehicles (motorcycles, cars and pick-ups), 4-11% of buses and 4-12% of trucks.

3.4 **Normal traffic projections.** There are not historic traffic studies available to help to define a basic rate for the traffic growing. The last study about the feasibility ex-ante of the project, considering the elasticity to the GDP, assumed the following annual growing rates: (i) 6.5% (passenger vehicles) and 5.5% (goods vehicles) until 2014; (ii) 5.5% (passenger vehicles) and 4.5% (goods vehicles) after 2024. This Consultant estimates very reasonable this analysis and adopts these growing rates.<sup>11</sup>

#### B. TRAFFIC AND PROJECTIONS AFTER THE WORKS.

3.5 **Normal traffic.** The projections of the normal traffic from the AADT data registered in 2008, considering the growing rates before referred (¶3.4) and including the AADT for motorcycles registered in 2017, allowed to estimate the AADT in 2017. Then, the average AADT (2017) is 5.295 veh/day; while the partial AADT for the Subsections I and II is 14,221 veh/day, for the Subsection III and IV is 4,614 veh/day and for the Subsection V is 2,182 veh/day.

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<sup>10</sup> Traffic counts carried out by the Roads Authority of Suriname (August-September 2017).

<sup>11</sup> G. Delanoë and ACE Consultancy; Op. Cit.

- 3.6 The traffic counts carried out in 2017 are very useful for this analysis. The results of these counts were: (i) the AADT for the Subsections I and II is 20,812 veh/day; (ii) the AADT for the Subsection III and IV is 4,634 veh/day; and (iii) for the Subsection V is 2,452 veh/day. The AADT corresponding to Subsections III-IV and V is very similar (slightly higher) to the projections made from the 2007 data; but, the AADT corresponding to Subsections I-II is much higher (46% higher) than the respective projection of the 2007 registered data. There is no clear explanation for the discrepancy noted between the projections and the traffic metrics for Subsections I-II; one possibility is that the counts made in 2017 are influenced by seasonal traffic, but this cannot be guaranteed.
- 3.7 Based on the information available, the Consultant deems it appropriate to adopt transit projections using the mentioned growth rates. In any case, this criterion is well founded and conservative, bearing in mind the traffic counts made in 2017.
- 3.8 **Diverted and generated traffic.** The main works supported by this project consist of the widening of the carriageway and the rehabilitation/reconstruction of the pavement, plus complementary works such as road safety improvement works. May be this project include diverted and generated traffic, but it is not expected to have high rates of increase in the demand due to diverted or generated traffic associated with the nature of these works.
- 3.9 The economic ex-ante study (2008) estimated that 40% of cargo traffic to and from the harbor of Dégrad-des-Cannes port will be diverted to Paramaribo port; this traffic was estimated at 45 AADT made up heavy trucks only.<sup>12</sup> The last mentioned study (¶3.4) did not consider new generated traffic nor benefits of the estimated diverted traffic on the cost-benefits analysis.
- 3.10 According to the available information, the Consultant considers the existence of diverted traffic (small volume) possible and it is probable that a modest generated traffic is presented. However, there are no adequate studies available for its determination; therefore, with conservative criteria, this type of traffic is not considered for the economic analysis.

C. SUMMARY OF EX-ANTE AND EX-POST TRAFFIC.

- 3.11 **Summary of the ex-ante and ex-post AADT.** In the following Tables III-3a and III-3b are shown, respectively, the details of the existent previous AADT (2008) and the assumed present AADT (2017) for the project, according to the subsections defined.

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<sup>12</sup> "Feasibility Study for the Rehabilitation of the Eastern Part of the Suriname East-West Road Connection: Meerzorg-Albina"; TECHNIPLAN S.p.A, April 2008.

**Table III-3a**  
**Road Rehabilitation of the 'Meerzorg - Albina' Corridor**  
**Adopted Composition for the AADT<sup>(1)</sup> (veh/day) - 2008**

Scenario	Sub-Section		Length (km)	Year	Motorcycle		Car		Pick-up		Bus I < 30 pass		Bus II > 30 pass		Light Truck < 5 ton		Medium Truck		Heavy Truck		TOTAL
	#	Start - End			AADT	%	AADT	%	AADT	%	AADT	%	AADT	%	AADT	%	AADT	%	AADT	%	AADT
WITHOUT Project	I	Meerzorg - Tamansari	10,50	2008	778	9,6%	5.635	69,6%	1.009	12,5%	223	2,8%	112	1,4%	191	2,4%	145	1,8%	3	0,0%	8.096
	II	Tamansari - Tamanredjo	10,00	2008	778	9,6%	5.635	69,6%	1.009	12,5%	223	2,8%	112	1,4%	191	2,4%	145	1,8%	3	0,0%	8.096
	III	Tamanredjo - Wanhatti	43,50	2008	146	5,6%	1.709	64,8%	339	12,9%	159	6,0%	67	2,5%	116	4,4%	96	3,6%	3	0,1%	2.635
	IV	Wanhatti - Moengo	31,50	2008	146	5,6%	1.709	64,8%	339	12,9%	159	6,0%	67	2,5%	116	4,4%	96	3,6%	3	0,1%	2.635
	V	Moengo - Albina	42,36	2008	21	1,7%	773	61,8%	168	13,4%	93	7,4%	46	3,7%	80	6,4%	67	5,4%	2	0,2%	1.250
	TOTAL LENGTH		137,86																		

(1): AADT: Annual Average Daily Traffic

(2): AADT for motorcycles is estimated by the consultant using data obtained by traffic counts in 2017 with a traffic decrease rate of 6,5% annual.

(3): AADT for others vehicles was obtained from traffic counts information of November/December 2007.

Source: Prepared by the Consultant, based on information provided by the IADB and the Roads Authority.

**Table III-3b**  
**Road Rehabilitation of the 'Meerzorg - Albina' Corridor**  
**Assumed Composition for the AADT<sup>(1)</sup> (veh/day) - 2017**

Scenario	Sub-Section		Length (km)	Year	Motorcycle		Car		Pick-up		Bus I < 30 pass		Bus II > 30 pass		Light Truck < 5 ton		Medium Truck		Heavy Truck		TOTAL
	#	Start - End			AADT	%	AADT	%	AADT	%	AADT	%	AADT	%	AADT	%	AADT	%	AADT	%	AADT
WITH Project	I	Meerzorg - Tamansari	10,50	2017	1.371	9,6%	9.932	69,8%	1.778	12,5%	393	2,8%	197	1,4%	309	2,2%	235	1,7%	5	0,0%	14.221
	II	Tamansari - Tamanredjo	10,00	2017	1.371	9,6%	9.932	69,8%	1.778	12,5%	393	2,8%	197	1,4%	309	2,2%	235	1,7%	5	0,0%	14.221
	III	Tamanredjo - Wanhatti	43,50	2017	258	5,6%	3.012	65,3%	598	12,9%	280	6,1%	118	2,6%	188	4,1%	155	3,4%	5	0,1%	4.614
	IV	Wanhatti - Moengo	31,50	2017	258	5,6%	3.012	65,3%	598	12,9%	280	6,1%	118	2,6%	188	4,1%	155	3,4%	5	0,1%	4.614
	V	Moengo - Albina	42,36	2017	37	1,7%	1.362	62,4%	296	13,6%	164	7,5%	81	3,7%	130	5,9%	108	5,0%	3	0,1%	2.182
	TOTAL LENGTH		137,86																		

(1): AADT: Annual Average Daily Traffic

(2): AADT for motorcycles was obtained from traffic counts made in 2017.

(3): AADT for others vehicles was obtained from traffic counts information of November/December 2007 using a growing rate of 6,5% annual (passenger vehicles) and 5,5% annual (goods vehicles).

Source: Prepared by the Consultant, based on information provided by the IADB and the Roads Authority.

#### 4. Methodology and Inputs for the Economic Analysis.

##### A. GENERAL METHODOLOGY.

- 4.1 **Traditional Methodology.** The ex-post economic feasibility analysis of the rehabilitation of 'Meerzorg - Albina' Corridor is performed with the traditional methodology used for road investment projects, based on a comparison of the total economic costs and benefits between the "Without Project" and "With Project" scenarios, during the analysis period (construction plus operating period). Once the net flow of economic costs and benefits along the analysis period is obtained, the usual economic feasibility indicators are calculated using a discount rate of 12.0%, such as the Economic Net Present Value (ENPV), the Economic Internal Rate of Return (EIRR), the Benefit/Cost<sup>13</sup> ratio and the ENPV/Investment<sup>14</sup>.
- 4.2 **Cost factors.** As it is an economic analysis, then the estimated "economic costs" for all cost components corresponding to 2012 were used as representative costs for the works period (¶4.8 to ¶4.10).
- 4.3 The estimate of the total economic costs in each year of the analysis period, for the "Without Project" and "With Project" scenarios, as well as all the above mentioned economic feasibility indicators, were calculated using the HDM-4 model. This model was fed with the following inputs applicable to the country: (i) design parameters applicable to the conditions of the existing previous road and the rehabilitated road (altimetry, geometry of the layout and cross section, pavement structure, etc.); (ii) conditions of the local environment (climate, local effects that limit the speeds, etc.); (iii) characteristics of the vehicle fleet (type, weight, etc.) and the users (number of passengers per vehicle, etc.); (iv) unit labor costs (investment and maintenance), the input costs of the vehicles, the cost of time (working and non-working time value), etc.
- 4.4 **Calibration.** The HDM-4 was calibrated to model the current situation in the best way possible. This is essential to ensure that the modeling of the HDM-4 is able to reasonably represent the behavior of the traffic and of the road on the "Without Project" and "With Project" scenarios, for the whole period of analysis. The calibration was based on average speeds of current traffic flows (2017); these speeds were estimated by the Roads Authority for a light vehicle.
- 4.5 The proper modeling of speeds depends on: (i) the factors that the HDM-4 algorithms "internally" consider from the volume of traffic, as well as the IRI and other pavement conditions; (ii) the factors that need to be "informed" to the HDM-4, such the traffic pattern (distribution of AADT in the day), plus the external conditions that limit the capacity of the road.
- 4.6 External condition to the road that reduce the actual capacity (and consequently affect the speed), such as grade crossings, type of shoulders and proximity of obstacles to

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<sup>13</sup> The most recognized definition for the Benefit/Cost ratio is adopted, consisting of the ratio of the Present Value of Benefits (operation and time) and the Present Value of Costs (investment and maintenance), namely  $VA(\text{Benefit})/VA(\text{Cost})$ .

<sup>14</sup> While the Benefit/Cost ratio is traditionally used, the ratio NPV/Investment is more useful to compare and prioritize investments, as it directly includes the amount of the investment (the subject of financing in Bank projects).

the road, are represented by the XFRI parameter or "lateral friction".<sup>15</sup> The details of the calibration of the HDM-4 using the current speeds and the traffic patterns are presented later (§7.1 to §7.7).

## B. INPUTS FOR THE ANALYSIS.

- 4.7 **Technical parameters.** The technical parameters of the HDM-4 model, such as those applicable to the vehicle fleet for each vehicle type (annual mileage, lifetime, private or professional use, number of crew members, number of passengers, work travel or entertainment travel for passengers, operating gross weights, equivalent axles to 18 Kips, etc.), were estimated by the Consultant using data from previous studies and other information prepared by the Consultant.
- 4.8 **Economic prices for works.** There are no recent studies showing the correction factors necessary to determine the economic costs from the respective market costs. However, there are sector studies prepared in 2012 including these shadow price adjustment factors.<sup>16</sup> Therefore, the Consultant has used the shadow price adjustment factors calculated in those documents, as the best estimate available.
- 4.9 Consequently, the economic costs of civil works, the following adjustment factors on the market costs were used: (i) 0.85 in the case of construction costs of the project; (ii) 0.80 or 0.85 (depending of the activity) in the case of the works of ordinary and extraordinary maintenance.
- 4.10 **Economic prices for vehicles, labor costs and passengers time.** The economic costs of vehicles (new vehicles, parts, fuel and other inputs) and labor working time (bus and truck drivers, maintenance workers, etc.), plus working and non-working time of passengers, were obtained from the aforementioned most recent study of the sector.<sup>17</sup>
- 4.11 **Summary.** The vehicle fleet parameters for the HDM-4 and the economic costs to users (technical features and cost of vehicles, supplies operating, time of passengers, etc.), are presented in Table IV-1.

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<sup>15</sup> It could not be used the "XNMT" parameters or factor affecting non-motorized traffic on motorized traffic (bicycles on other vehicles) and "XMT" or factor affecting the motorized traffic on non-motorized traffic (vehicles on bicycles), as traffic counts do not consider bicycles and other non motorized vehicles.

<sup>16</sup> G. Delanoë and ACE Consultancy; Op. Cit.

<sup>17</sup> G. Delanoë and ACE Consultancy; Op. Cit.

Table IV-1

**Road Rehabilitation of the 'Meerzorg - Albina' Corridor  
Parameters and Economic Costs of the Vehicles Fleet for Suriname**

Item	Concept	Unit	Motorcycle	Car	Pick-up	Bus I <30 pass	Bus II >30 pass	Light Truck < 5 ton	Medium Truck	Heavy Truck
<b>BASIC CHARACTERISTICS</b>										
PHYSIC CHARACTERISTICS	Passenger car space equivalence (PCSE)	N°	0.50	1.00	1.00	1.40	1.50	1.30	1.60	1.80
	N° of wheels	N°/veh	2	4	4	4	6	4	10	18
	N° of axles	N°/veh	2	2	2	2	2	2	3	5
TYRES	Tyre type	Bias/Radial	Bias ply	Radial ply	Radial ply	Bias ply	Bias ply	Bias ply	Bias ply	Bias ply
	Base n° of recaps	N°	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
	Retreated cost	%	15	15	15	15	15	15	15	15
AVERAGE USE	Life method	Constant/Optimal	Optimal life	Constant life	Constant life	Optimal life	Optimal life	Optimal life	Optimal life	Optimal life
	Annual km	km/year	10,000	23,000	30,000	80,000	70,000	30,000	60,000	60,000
	N° of working hours for crew	hours/year	400	550	1,300	1,950	1,750	2,000	2,050	2,050
	Average life	years	10	10	8	8	8	10	12	12
	N° of crewmember	N°/veh	--	--	--	1.0	1.0	1.0	1.0	1.0
	N° of passenger	N°/veh	1.50	2.00	3.00	15.00	40.00	--	--	--
	Work related passenger-trips	%	75	75	75	75	75	--	--	--
AVERAGE WEIGHT	Equivalent Single Axle Load Factor to 8,16 ton (ESALF)	N°/veh	--	--	0.001	0.200	1.500	0.300	3.500	4.000
	Operating weight	ton	0.200	1.200	1.800	2.500	6.000	5.000	28.000	38.000
<b>OPERATION AND TIME ECONOMIC COSTS</b>										
VEHICLE	New vehicle cost	US\$/veh	3,000	15,000	40,000	37,000	75,000	114,000	130,000	146,000
	Replacement tyre cost	US\$/tyre	30	56	140	80	300	130	490	490
	Fuel cost	US\$/liter	0.97	0.97	--	--	--	--	--	--
	Diesel cost	US\$/liter	--	--	1.02	1.02	1.02	1.02	1.02	1.02
	Lubricating oil cost	US\$/liter	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95
	Maintenance labour cost	US\$/hour	4.00	4.00	4.00	4.00	6.00	6.00	6.00	6.00
	Crew wages cost (per person)	US\$/hour	--	--	--	1.50	1.50	1.70	3.10	3.10
	Annual overhead	US\$/year	150	500	600	600	1,200	1,000	1,500	1,500
	Annual interest	%	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
TIME	Passenger working time cost	US\$/hour	1.00	2.00	2.00	1.00	1.00	--	--	--
	Passenger non working time cost	US\$/hour	0.25	0.5	0.5	0.25	0.25	--	--	--
	Cargo cost	US\$/hour	--	--	--	--	--	0.01	0.01	0.01

Source: Prepared by the Consultant, based on information of "The update of the economic analysis and the traffic count of Meerzorg-Albina Corridor Rehabilitation Project"; G. Delanoë and ACE Consultancy, April 2012.

## 5. Investment and Maintenance Costs.

### A. SCENARIOS AND COST AMOUNTS.

5.1 The calculation of the cost flows for the State (agency) involves determining, for each year of the analysis period, the investment costs (in the real period of execution of the works), reinvestment costs and road maintenance costs (during the period of use of the old or the new infrastructure).

5.2 **Costs of the "Without Project" Scenario.** As was previously noted (§2.11 to §2.14), in this scenario are considered the following costs associated with the execution of works, reinvestment or maintenance tasks necessary to maintain reasonable traffic conditions for the road:<sup>18</sup>

- (a) Routine maintenance (carriageway cleaning, drainages, replacing traffic signs, minor repairs, etc.), annually.<sup>19</sup>
- (b) Routine maintenance (patching and sealing wide cracks), when the amount of 0 potholes/km and 0% cracked area is exceeded.
- (c) Rehabilitation with an overlay of asphalt of 4.0 cm thick in a particular subsection, when the IRI reaches the value of 10.0 mm/m.<sup>20</sup>
- (d) Partial Recovery of capital (or residual value of the investment) at the end of the analysis period, depending on the remaining life span for the type of reinvestment work involved.<sup>21</sup>

5.3 **Costs of the "With Project" Scenario.** As was previously noted (§2.15 to §2.16), in this scenario are considered the following costs associated with the implementation of works as well as reinvestment and maintenance tasks that are necessary to preserve the quality and capacity throughout the analysis period:

- (a) Investment in the new works, assigned in the real basic execution period for each subsection contract, including the construction of a controlled quality pavement (the Consultant assume a final surface with IRI of 2.0 mm/m).
- (b) Routine maintenance (cleaning, replacing traffic signs, minor repairs, etc.), every year.<sup>22</sup>
- (c) Routine maintenance (patching and crack sealing), when the amount of 0 potholes/km or of 0% structural cracked area is exceeded, respectively.
- (d) Rehabilitation with a 4.0 cm thick asphalt overlay, when the IRI reaches the value of 4.0 mm/m in a particular subsection.<sup>23</sup>

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<sup>18</sup> Tasks are assigned by the HDM-4 at the time (year) that the preset conditions for the deteriorating state of the pavement (number of potholes and cracks, IRI average, road capacity) are reached, so these conditions act as "triggers" (depending on the algorithm modeling pavement deterioration with use and driving conditions on the road).

<sup>19</sup> Carriageway, shoulders and drainages cleaning, minor spot repairs, care and replacement of traffic signs, etc.

<sup>20</sup> Idem Footnote No. 5.

<sup>21</sup> Normally, it is considered that the overlay has a service life of 10 years.

<sup>22</sup> Idem Footnote No. 19.

<sup>23</sup> Idem Footnote No. 8.



- (e) Partial recovery capital (residual value of the investment) adopted at the end of the evaluation period; for these works it is assumed as residual value the 30% of the initial investment.<sup>24</sup>

5.4 **Investment costs.** The budget investment for the project reaches a total of US\$ 164.6 million (real market price paid) or US\$ 140.0 million (economic cost). The Table V-1 shows the amounts of total investment (works and supervision services) for the project according to the sub-sections involved.

**Table V-1**  
**'Meerzorg - Albina' Corridor**  
**Project Cost**

Sub-Section		Length km	Project Financial Cost (1)				Project Economic Cost (2)	
#	Start - End		Works US\$	Supervision (3) US\$	TOTAL		TOTAL	
					US\$	US\$/km	US\$	US\$/km
I	Meerzorg - Tamansari	10,50	13.772.684 (4)	772.924	14.545.607	1.385.296	12.363.766	1.177.502
II	Tamansari - Tamanredjo	10,00	16.226.452 (5)	910.629	17.137.082	1.713.708	14.566.520	1.456.652
III	Tamanredjo - Wanhatti	43,50	48.965.888	2.747.969	51.713.857	1.188.824	43.956.778	1.010.501
IV	Wanhatti - Moengo	31,50	40.267.188	2.259.797	42.526.984	1.350.063	36.147.937	1.147.554
V	Moengo - Albina	42,36	36.681.697	2.058.579	38.740.276	914.549	32.929.234	777.366
<b>TOTAL</b>		<b>137,86</b>	<b>155.913.909</b>	<b>8.749.898</b>	<b>164.663.806</b>	<b>1.194.428</b>	<b>139.964.235</b>	<b>1.015.264</b>

(1): Final construction costs estimated by the Supervision consultant.

(2): According to the available studies, an adjustment factor of 0.85 is adopted to estimate the economic cost from the market cost.

(3): Distribution estimated by the consultant according to the construction costs of each subsection.

(4): 1 US\$ = 3,24 SRD (exchange rate average during the period of this works).

(5): 1 EUR = 1,33 US\$ (exchange rate average during the period of this works).

Source: Prepared by the consultant.

5.5 **Reinvestment and Maintenance costs.** The economic costs of the different works or interventions, in reinvestment and maintenance are presented in Appendix I.

<sup>24</sup>

The distribution of costs between the different works is not available, but the proportion of 30% is very conservative for the economic analysis.

## 6. User Costs.

### A. BENEFITS FOR THE NORMAL TRAFFIC.

6.1 **Quantification of benefits.** The economic benefits, for the project, were calculated using the traditional method which involves quantifying the variation of "consumer surplus"; in that sense, the calculated benefits were: (i) savings in vehicle operating costs for different road users, depending on changes in the characteristics and condition of the road; (ii) savings in travel times for users (passengers time), according to the speeds supported by the road and the traffic, depending on the changes in the physical condition of the road. Cost factors are presented in a previous section (§4.8 to §4.10).

6.2 Estimates of operating costs and travel time costs for users are made by the HDM-4 model in the "Without Project" and "With Project " scenarios, through functions that include: (i) for vehicle operating costs, speed and physical condition of the pavement (modeling deterioration), depending on the type of vehicles defined and specific costs; (ii) for time costs, speed for each type of vehicle and number of passengers in each, based on the cost of work and leisure time (mainly for passengers).

### B. BENEFITS NOT QUANTIFIED.

6.3 The existence of possible diverted traffic and probable generated traffic was not quantified, so these endogenous benefits have not been included in the analysis. The information available regarding historical traffic counts is very limited to determine with basics the presence of this type of traffic; therefore, with conservative criteria, it is preferred to exclude them from the economic analysis.

6.4 In the same way, the effects on road safety (decrease in accident rate) as a result of improvements in the project (including good road signage, shoulder construction, bicycle and walking lines, etc.) have not been taken into account. The quantification of the benefits of improvements in road safety could not be made on the basis of limited information on accidents in the ex-post scenario (quantity, typology, etc.) and their consequences.

## 7. Economic Feasibility.

### A. MODELING WITH THE HDM-4. GENERAL CRITERIA.

- 7.1 **Calibration.** The modeling with the HDM-4 was calibrated, taking advantage of the best information available, with the aim of reproducing the conditions in which the traffic is developed on the road under study, in both 'Without Project' and 'With Project' scenarios; this is an essential instance for modeling with reasonably approximation the behavior of vehicles in the traffic flow and the road in such scenarios during the entire analysis period.
- 7.2 In this sense, the main input for the calibration is the speed value at which the vehicles circulate in each of the road sections; this, since the speed is associated to the operating costs and the time costs linked to each vehicle that circulates on the infrastructure. Taking into account that the HDM-4 is powered by the technical-economic parameters of the vehicles, as well as with the physical conditions of the infrastructure, the calibration using the speed in each sub-section allows assuming a reasonably reliable modeling (maximum reliability is obtained when speeds are available for more than one-hour period, depending on the traffic flow pattern present).
- 7.3 For the calibration, at least two adjustment parameters are used; on the one hand, the IRI based on the available data and, on the other hand, the parameter XFRI or "lateral friction", which reflects the effects on the speed of the vehicles of the presence of obstacles in the vicinity of the road, existence and type of shoulders, possible risks of accidents, etc. With this, the HDM-4 is conditioned to model the speed of a light vehicle in the ex-ante situation ('Without Project'), with reasonable approximation to the real speed measured on the track; in the case of an ex-post evaluation, there is also a similar calibration for the situation after the execution of the works ('With Project').
- 7.4 **Speeds ex-post.** For the economic analysis of the project, speed measurements are not available in the ex-ante situation; only speed estimations are available in the ex-post situation (2017). The estimated daily average speed in 2017 for each subsection is: (i) 50 km/h for Subsections Ia and Ib, (ii) 70 km/h for Subsections II to IV, and (iii) 90 km/h for the Subsection V. For the ex-post scenario, the HDM-4 is calibrated for these speeds, which determined the following XFRI values: 0.46 for Subsections Ia and Ib, 0.65 for Subsection II, 0.56 for Subsections III and IV; and 0.73 for Subsection V.
- 7.5 **Speeds ex-ante.** The project involves the construction of shoulders and, partially, the construction of bicycle lines and footpaths for pedestrians; this normally increases the real capacity of a road, which implies an increase of the XFRI (lateral friction is reduced and speed is increased). Consequently, according to the experience of the Consultant, for the ex-ante situation it is possible to reduce the ex-post XFRI values by 10%; then, the following XFRI values are adopted for the ex-ante situation: 0.41 for Subsections Ia and Ib, 0.59 for Subsection II, 0.50 for Subsections III and IV; and 0.66 for Subsection V. These XFRI values, for the different subsections, involve the following ex-ante speeds: 43 km/h for Subsections Ia and Ib, 59 km/h for Subsection II, 56 km/h for Subsections III to IV, and 74 km/h for the Subsection V.

- 7.6 **Traffic pattern.** So that the calibration with the speed data is correct, the cited model must run with a traffic flow pattern similar to the real one. For these projects, the standard flow pattern considered most suitable for each type of road has been adopted, as there are no studies to determine the traffic flow patterns in Suriname, which would have made it possible to calibrate HDM-4 more accurately; in this sense, considering that the project refers to a partial suburban use and partial rural use route, the following patterns were applied: (i) the standard "Commuter" pattern for modeling circulation in Subsections I and II; (ii) the standard "Interurban" pattern for modeling circulation in Subsections III, IV and V.
- 7.7 **Maximum admissible speed.** Once fed the HDM-4 with the technical-economic parameters (infrastructure and vehicles) and calibrated with the methodology that was previously exposed, it remains to establish the hypothesis regarding the regulatory restrictions on the maximum speed that will condition the vehicular circulation in the infrastructure object of analysis.
- 7.8 In this sense, without prejudice to the topography and geometry of the route, it is assumed that a maximum speed of 90 km/h is established for the road. For modeling, a tolerance of 10% is foreseen for breach of this limit; with this, the HDM-4 can model breaches of this maximum speed by a part of the users (where the physical conditions and of flow allow doing it).
- B. EVOLUTION OF ROAD CORRIDOR QUALITY.
- 7.9 **Pavement quality.** Considering the conditions of investment, reinvestment and maintenance planned for the 'With Project' scenario, the modeling with the HDM-4 makes it possible to foresee the evolution of pavement quality (IRI of the pavement surface) throughout the analysis.
- 7.10 For Subsections Ib, II, III, IV and V (132.26 km) the new pavement structure behaves appropriately, evolving from IRI=2 mm/m to a maximum of IRI=4 mm/m; for these subsections, the IRI is below 4 mm/m (the maximum limit adopted for this trunk road corridor) during the entire period of analysis, without the need to foresee the placement of an asphalt layer.
- 7.11 For Subsection Ia (5.60 km), the existing pavement structure is insufficient to support the expected traffic with the determined quality level (IRI below 4.0 mm/m). In this subsection the project works (pavement layers) have not been completed (§2.9) and, precisely, the modeling with the HDM-4 indicates the need to place an asphalt overlay in the year 2022;<sup>25</sup> in other words, with the assumptions adopted, an IRI=4.0 mm/m would already be reached in this subsection by 2022. Under this circumstance, the Consultant considers it advisable to complete the project works as soon as possible. The following Figure VII-1 presents the graphic evolution of the IRI on the Subsection Ia.
- 7.12 **Capacity.** The AADT corresponding to Subsections Ia, Ib and II (20.5 km) is high; with the predicted traffic growth rate, for light vehicles, the initial average speed is

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<sup>25</sup> This estimation is based on very conservative premises regarding the current state of the pavement in Subsection Ia (for the purposes of economic analysis); therefore, considering that the state of the current pavement may be of lower quality, it is very likely that the IRI=4 mm/m is reached before that year.

approximately 50 km/h in 2015, but falls quickly reaching 40 km/h in 2027; that is, these subsections will soon show symptoms of congestion.

- 7.13 The conditions of congestion appear in the short term: in 2024 the 'Period 1' (occupies 14 minutes/day) will be saturated, in 2025 will be saturated the 'Period 2' (occupies 58 minutes/day), in 2028 the 'Period 3' (occupies 101 minutes/day) is also saturated; this situation implies that in 2025 there will be saturation for more than 1 hour/day and in 2028 there will be saturation for a period of practically 3 hours/day. This level of congestion will force users to waste time that implies costs but will also force to modify the travel routines that will imply high social costs. The Consultant considers advisable to initiate studies for the expansion of the capacity of the road in these subsections. The following Figure VII-2 presents the graphic evolution of the Volume/Capacity ratios for traffic flow on the Subsections Ia, Ib and II.

Figure VII-1

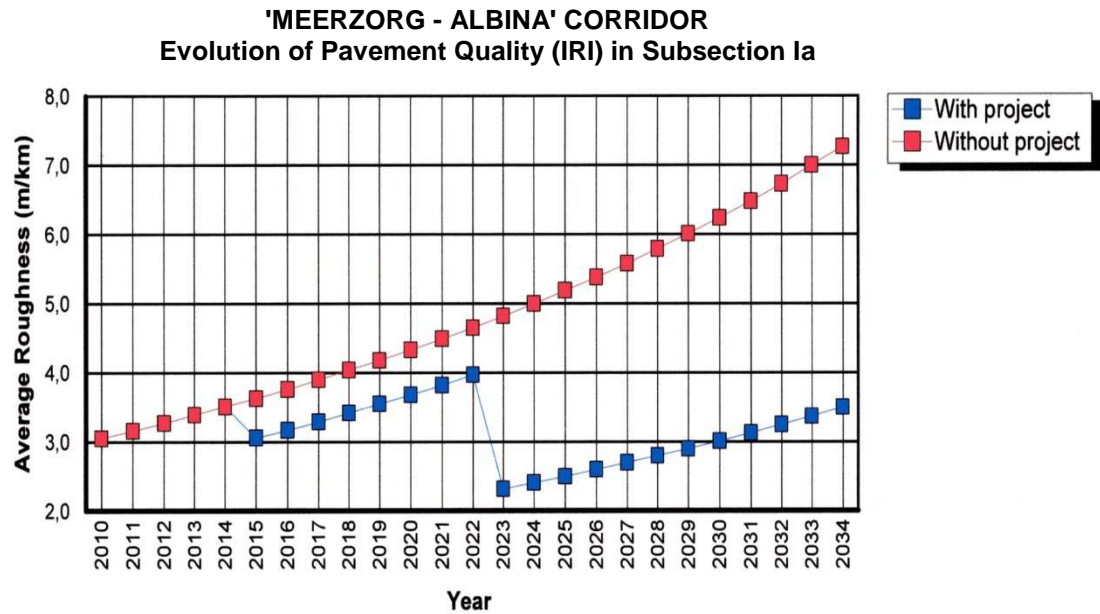
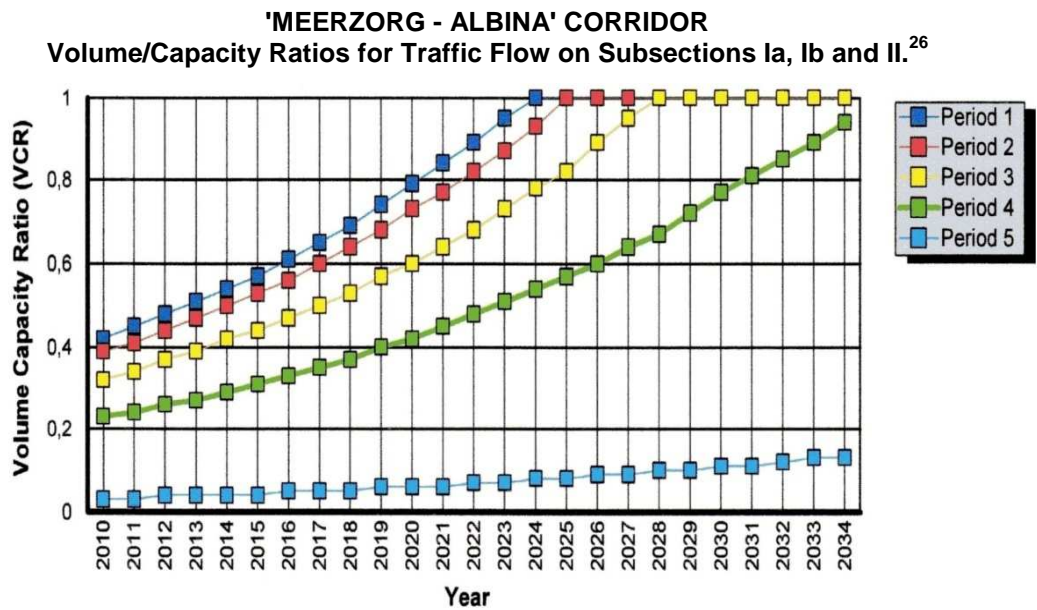


Figure VII-2



<sup>26</sup>

For the "Commuter" traffic pattern, we have: 'Period 1' (14 minutes/day), 'Period 2' (58 minutes/day), 'Period 3' (101 minutes/day), 'Period 4' (490 minutes/day) and 'Period 5' (778 minutes/day).

C. EX-POST ECONOMIC ANALYSIS OF THE PROJECT.

- 7.14 For the ex-post economic evaluation of the project, a period of analysis based on the usual criteria of the Bank's analyzes is proposed; this implies a total lapse of 25 years, which is constituted by 5 years of execution of the works (2010-2014) plus 20 years of use of the them (2015-2034).<sup>27</sup>
- 7.15 **Results of the evaluation.** The results of the economic feasibility analysis of the project are presented in the following two tables (obtained by combining various reports of the HDM-4): (i) Table VII-1 includes flows of the economic costs 'Without Project' and 'With Project' for each type of cost, the net economic flow, plus the feasibility indicators such as the Economic Net Present Value (ENPV), the Economic Internal Rate of Return (EIRR) and others; (ii) Table VII-2 shows the summary of the Incremental Costs of the State and the Benefits of Users, according to the standard format.
- 7.16 The results of the HDM-4 determine that, under the proposed assumptions, the profitability indicators shown an ENPV (discount rate of 12%) of US\$ 17.3 million and an EIRR of 13.5%, while the Benefit/Cost ratio is 1.16 and the ENPV/Investment ratio is 0.12. The ENPV is positive and the EIRR is above the cut rate of 12.0% with acceptable value, while the Benefit/Cost ratio and ENPV/Investment ratio are also satisfactory. For these reasons, it is considered that the project is profitable from the economic point of view.

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<sup>27</sup> The execution period of the works is different in each subsection and, therefore, this has been considered for the economic analysis (periods of concentration of investments): (i) Subsection I: 2014; (ii) Subsection II: 2012-2013; (iii) Subsection III: 2010-2012; (iv) Subsection IV: 2010-2012; (v) Subsection V: 2010-2012.

Table VII-1

**ROAD REHABILITATION OF THE 'MEERZORG - ALBINA' CORRIDOR**  
**Flow of Costs (Million US\$) and Feasibility Indicators**

PERIOD	FLOW OF ECONOMICS COSTS WITHOUT PROJECT								FLOW OF ECONOMICS COSTS WITH PROJECT								BGT	NET FLOWS		
YEAR	Works	Capital	Recurrent	STATE	Operating MT	Time MT	USERS	TOTAL	Works	Capital	Recurrent	STATE	Operating MT	Time MT	USERS	TOTAL	Op./Time GT	STATE	USERS	TOTAL
2010	OVERLAY Ib OVERLAY II-III-IV	0,000	0,755	0,755	56,337	12,681	69,018	69,773	PROJECT	28,258	0,559	28,817	56,337	12,681	69,018	97,835	0,000	-28,062	0,000	-28,062
2011		0,000	0,583	0,583	60,535	13,655	74,190	74,773	PROJECT	56,517	0,561	57,078	60,084	13,591	73,675	130,753	0,000	-56,495	0,515	-55,980
2012		0,000	0,596	0,596	65,160	14,742	79,902	80,498	PROJECT	33,065	0,542	33,607	64,130	14,582	78,712	112,319	0,000	-33,011	1,190	-31,821
2013		0,000	0,617	0,617	70,129	15,938	86,067	86,684	PROJECT	9,760	0,548	10,307	62,032	13,803	75,835	86,142	0,000	-9,690	10,232	0,542
2014		0,400	0,627	1,027	75,457	17,250	92,707	93,734	PROJECT	12,364	0,503	12,867	63,880	14,103	77,984	90,850	0,000	-11,839	14,724	2,884
2015		6,936	0,652	7,588	80,342	18,628	98,970	106,557	OVERLAY Ia	0,000	0,503	0,503	65,868	14,245	80,113	80,616	0,000	7,085	18,857	25,941
2016		0,000	0,660	0,660	79,158	18,756	97,914	98,574		0,000	0,503	0,503	70,073	15,265	85,338	85,840	0,000	0,157	12,577	12,733
2017		0,000	0,679	0,679	84,820	20,164	104,984	105,663		0,000	0,503	0,503	74,561	16,367	90,928	91,431	0,000	0,176	14,056	14,232
2018		0,000	0,696	0,696	90,913	21,698	112,612	113,308		0,000	0,503	0,503	79,374	17,560	96,934	97,437	0,000	0,193	15,677	15,871
2019		0,000	0,735	0,735	97,527	23,376	120,903	121,637		0,000	0,503	0,503	84,540	18,854	103,395	103,898	0,000	0,232	17,508	17,740
2020		0,000	0,764	0,764	104,651	25,223	129,874	130,637		0,000	0,503	0,503	90,052	20,268	110,320	110,823	0,000	0,261	19,554	19,815
2021		0,000	0,803	0,803	112,374	27,265	139,640	140,442		0,000	0,503	0,503	95,952	21,816	117,767	118,270	0,000	0,300	21,872	22,172
2022		0,000	0,832	0,832	120,801	29,526	150,327	151,159		0,548	0,503	1,051	102,325	23,509	125,834	126,885	0,000	-0,220	24,493	24,274
2023		0,000	0,861	0,861	130,072	32,090	162,163	163,023		0,000	0,503	0,503	108,801	25,443	134,243	134,746	0,000	0,358	27,919	28,277
2024		0,000	0,884	0,884	140,438	35,132	175,571	176,454		0,000	0,503	0,503	116,416	27,859	144,275	144,778	0,000	0,381	31,295	31,677
2025		0,000	0,950	0,950	150,575	38,270	188,845	189,795		0,000	0,503	0,503	123,761	30,472	154,233	154,736	0,000	0,447	34,612	35,059
2026		3,856	0,964	4,821	160,812	41,255	202,067	206,888		0,000	0,503	0,503	130,759	32,574	163,333	163,836	0,000	4,318	38,735	43,052
2027		0,000	0,983	0,983	167,472	43,590	211,062	212,045		0,000	0,503	0,503	138,589	35,237	173,826	174,329	0,000	0,480	37,236	37,716
2028		6,936	0,949	7,885	179,437	47,439	226,876	234,762		0,000	0,504	0,504	147,797	38,651	186,449	186,952	0,000	7,382	40,428	47,809
2029		0,000	0,973	0,973	176,488	48,361	224,849	225,822		0,000	0,504	0,504	156,487	41,184	197,671	198,175	0,000	0,469	27,178	27,646
2030		0,000	0,979	0,979	187,672	51,587	239,259	240,238		0,000	0,505	0,505	165,562	43,777	209,339	209,844	0,000	0,475	29,920	30,394
2031		0,000	1,005	1,005	199,507	55,018	254,524	255,529		0,000	0,505	0,505	175,118	46,522	221,640	222,145	0,000	0,499	32,885	33,384
2032		0,000	1,033	1,033	212,175	58,779	270,954	271,987		0,000	0,506	0,506	185,301	49,521	234,822	235,327	0,000	0,527	36,132	36,660
2033		0,000	1,065	1,065	225,352	62,922	288,274	289,339	RESIDUAL V.	0,000	0,506	0,506	195,764	52,820	248,584	249,090	0,000	0,559	39,690	40,249
2034		0,000	1,101	1,101	241,441	69,031	310,473	311,574		-41,509	0,506	-41,003	209,516	58,924	268,439	227,436	0,000	42,104	42,033	84,138

MT: Motorized Traffic; GT: Generated Traffic; BGT: Benefits of Generated Traffic.

Source: Prepared by the Consultant.

ENPV	12%	17,300
EIRR		13,52
B/C		1,16
NPV/Inv		0,12



Table VII-2

**ROAD REHABILITATION OF THE 'MEERZORG - ALBINA' CORRIDOR**  
**Incremental Cost of the State and Users Benefits (Millions US\$)**

PERIOD	STATE INCREMENTAL COST			BENEFITS FOR USERS					NET FLOWS
YEAR	CAPITAL	MAINTENANCE	SUBTOTAL	OPERATING MT	TIME MT	OPERATING GT	TIME GT	SUBTOTAL	TOTAL
2010	28,258	-0,196	28,062	0,000	0,000	0,000	0,000	0,000	-28,062
2011	56,517	-0,022	56,495	0,451	0,064	0,000	0,000	0,515	-55,980
2012	33,065	-0,054	33,011	1,030	0,160	0,000	0,000	1,190	-31,821
2013	9,760	-0,070	9,690	8,096	2,135	0,000	0,000	10,232	0,542
2014	11,964	-0,125	11,839	11,576	3,147	0,000	0,000	14,724	2,884
2015	-6,936	-0,149	-7,085	14,474	4,383	0,000	0,000	18,857	25,941
2016	0,000	-0,157	-0,157	9,085	3,491	0,000	0,000	12,577	12,733
2017	0,000	-0,176	-0,176	10,259	3,797	0,000	0,000	14,056	14,232
2018	0,000	-0,193	-0,193	11,539	4,138	0,000	0,000	15,677	15,871
2019	0,000	-0,232	-0,232	12,986	4,522	0,000	0,000	17,508	17,740
2020	0,000	-0,261	-0,261	14,599	4,955	0,000	0,000	19,554	19,815
2021	0,000	-0,300	-0,300	16,423	5,450	0,000	0,000	21,872	22,172
2022	0,548	-0,329	0,220	18,476	6,017	0,000	0,000	24,493	24,274
2023	0,000	-0,358	-0,358	21,272	6,648	0,000	0,000	27,919	28,277
2024	0,000	-0,381	-0,381	24,022	7,273	0,000	0,000	31,295	31,677
2025	0,000	-0,447	-0,447	26,815	7,797	0,000	0,000	34,612	35,059
2026	-3,856	-0,461	-4,318	30,054	8,681	0,000	0,000	38,735	43,052
2027	0,000	-0,480	-0,480	28,883	8,353	0,000	0,000	37,236	37,716
2028	-6,936	-0,446	-7,382	31,640	8,788	0,000	0,000	40,428	47,809
2029	0,000	-0,469	-0,469	20,001	7,177	0,000	0,000	27,178	27,646
2030	0,000	-0,475	-0,475	22,110	7,809	0,000	0,000	29,920	30,394
2031	0,000	-0,499	-0,499	24,389	8,496	0,000	0,000	32,885	33,384
2032	0,000	-0,527	-0,527	26,875	9,258	0,000	0,000	36,132	36,660
2033	0,000	-0,559	-0,559	29,587	10,103	0,000	0,000	39,690	40,249
2034	-41,509	-0,595	-42,104	31,925	10,108	0,000	0,000	42,033	84,138
<b>ENPV (12%)</b>	<b>111,569</b>	<b>-1,766</b>	<b>109,803</b>	<b>96,599</b>	<b>30,504</b>	<b>0,000</b>	<b>0,000</b>	<b>127,103</b>	<b>17,300</b>

MT: Motorized Traffic; GT: Generated Traffic.

Source: Prepared by the Consultant.

- 7.17 **Changes in Operating Costs and Time Costs 2010-2015 (in the Economic Analysis hypothesis).** For the evaluation setting of the scenario "Without Project" (in 2010) it is adopted the hypothesis that the road is maintained; it is assumed that minimum works will be carried out in order to ensure the reasonable transitivity. This hypothesis represents the actual policy that should be applied if the route is not improved and implies a better condition for the road than the current situation. Consequently, it is a conservative hypothesis for economic analysis.
- 7.18 Under this hypothesis, in the first year of use of the works for the total project (2015), it is expected to register savings in operating costs and travel times, as compared to the year the execution of the works begins (2010). The economic operating costs and travel time variations between 2010 and 2015, for the different types of vehicles, are presented in the following tables VII-3.1a and VII-3.1b.

**Table VII-3.1a**  
**'MEERZORG - ALBINA' CORRIDOR**  
**Average Operating Costs (US\$/veh.km)**

Condition	Motorcycle	Car	Pick-up	Bus I < 30 pass	Bus II > 30 pass	Light Truck < 5 ton	Medium Truck	Heavy Truck
Without Project (2010)	0,084	0,226	0,431	0,365	0,582	0,955	1,435	1,725
With Project (2015)	0,079	0,208	0,369	0,320	0,490	0,758	1,175	1,452

Source: Prepared by the Consultant.

**Table VII-3.1b**  
**'MEERZORG - ALBINA' CORRIDOR**  
**Average Travel Times (Hours:Minutes)**

Condition	Motorcycle	Car	Pick-up	Bus I (1) < 30 pass	Bus II (1) > 30 pass	Light Truck < 5 ton	Medium Truck	Heavy Truck
Without Project (2010)	02:04	02:15	01:57	02:21	02:09	02:19	03:07	02:41
With Project (2015)	01:44	01:49	01:37	01:57	01:48	01:56	02:34	02:13

(1): Without stopping times (bus stop).

Source: Prepared by the Consultant.

- 7.19 **Changes in Operating Costs and Time Costs 2008-2015 (with measured data of 2008).** The real variation in operating costs and travel times, between the condition "Without Project" (2008) and "With Project" (2015) verified the execution of works, is calculated taking the measurements of traffic conditions in 2008 (average speed 35 km/h or 4:00 hours of total travel).
- 7.20 In the first year of use of the works for the total project (2015), savings in operating costs and travel times are calculated, in comparison with the year in which the preconditions for operation on the road were measured (2008). The economic operating costs and travel time variations between 2008 and 2015, for the different types of vehicles, are presented in the following tables VII-3.2a and VII-3.2b.

**Table VII-3.2a**  
**'MEERZORG - ALBINA' CORRIDOR**  
**Average Operating Costs (US\$/veh.km)**

Condition	Motorcycle	Car	Pick-up	Bus I < 30 pass	Bus II > 30 pass	Light Truck < 5 ton	Medium Truck	Heavy Truck
Without Project (2008)	0,079	0,255	0,460	0,397	0,618	1,013	1,493	1,805
With Project (2015)	0,079	0,208	0,369	0,320	0,490	0,758	1,175	1,452

Source: Prepared by the Consultant.

**Table VII-3.2b**  
**'MEERZORG - ALBINA' CORRIDOR**  
**Average Travel Times (Hours:Minutes)**

Condition	Motorcycle	Car	Pick-up	Bus I (1) < 30 pass	Bus II (1) > 30 pass	Light Truck < 5 ton	Medium Truck	Heavy Truck
Without Project (2008)	04:00	04:00	04:00	04:00	04:00	04:00	04:00	04:00
With Project (2015)	01:44	01:49	01:37	01:57	01:48	01:56	02:34	02:13

(1): Without stopping times (bus stop).

Source: Prepared by the Consultant.

## **8. Summary of the Economic Feasibility Analysis.**

8.1 The ex post technical-economic analysis of the rehabilitation project for the 'Meerzorg-Albina' Corridor determines the following results:

- (1) The project has proved economically profitable; in that sense, the profitability indicators are satisfactory, with a ENPV of US\$ 17.3 million and an EIRR of 13.5%; this, under conservative premises for analysis.
- (2) The modelling performed allows predicting the future behavior of this road corridor during the analysis period; in this sense, the expected evolution of the transit in the real infrastructure determines that:
  - (a) It is expected that the first section (5.60 km) of the Meerzorg-Tamansari subsection will become rapidly deteriorated, due to the planned works for the project were not completed (¶2.9), since it is estimated that in the short term (2022 or before) it will require an asphalt overlay to maintain the quality level of a trunk road corridor.
  - (b) The Meerzorg-Tamanredjo section (20.5 km) supports high traffic and in the short and medium term there will be sensitive congestion problems that will raise user costs. Precisely, the start of congestion is expected in 2024, while in 2027-2028 the effects of congestion will be sensitive for the users with saturation of vehicles for almost 3 hours/day and the average daily speed falling to an order of 40 km/h.

8.2 Based on the previously expressed, the Consultant suggests:

- (1) To complete the project works as soon as possible on the Meerzorg-Tamansari subsection, to avoid the expected deterioration of pavement quality in the short term.
- (2) To initiate preliminary studies for the expansion of the capacity of the road in the Meerzorg-Tamanredjo section, to avoid or alleviate congestion conditions that will reduce speed and increase the operating costs of vehicles in the short and medium term.

## Appendix I

### ROAD REHABILITATION OF THE 'MEERZORG - ALBINA' CORRIDOR HDM-4 Parameters and Economic Costs of Road Works

Work	Unit	Costs		Trigger	Effects
		Financial (1) US\$/Unit	Economic US\$/Unit		
Miscellaneous works in a 2 lane road	km	4,290	3,647	Annual	Annual
Patching	m2	17.0	13.0	When there are more than 0 potholes per km	100% repaired potholes in two weeks
Crack sealing	m2	2.0	1.6	When there is more than 0% of cracked area	100% repaired wide cracks
Edge repair	m2	15.0	12.0	When there are more than 10m2 of edge breaks per km	100% repaired edges
Overlay asphalt of 4.0 cm of thickness	m2	17.0	13.6	When IRI is over 4 mm/m with project and 11mm/m without project	New IRI given by HDM

Source: Prepared by the Consultant, based on "The update of the economic analysis and the traffic count of Meerzorg-Albina Corridor Rehabilitation Project"; G. Delanoë - ACE Consultancy, 2012.

## Annex I – Borrower Evaluation



### Inter-American Development Bank Project Completion Report – PCR Bank Evaluation

Project Name: Meerzorg - Albina Corridor Rehabilitation Project 2062/BL-SU; 2063/OC-SU and 2887/OC-SU

Executing Agency: MINISTRY OF PLANNING AND DEVELOPMENT COOPERATION

Borrower: Government of Suriname

Date of Board Approval: 25 Nov 2008

Date of Loan Contract Effectiveness: 29 May 2009

Date of Bank evaluation:

Expected date for PCR seminar:

#### Summary of Borrower Performance Rating

<b>DO</b>	<input type="checkbox"/> Highly Probable (HP)	<input checked="" type="checkbox"/> Probable (P)	<input type="checkbox"/> Low Probability (LP)	<input type="checkbox"/> Improbable (I)
<b>IP</b>	<input type="checkbox"/> Very Satisfactory (VS)	<input checked="" type="checkbox"/> Satisfactory (S)	<input type="checkbox"/> Unsatisfactory (US)	<input type="checkbox"/> Very Unsatisfactory (VU)
<b>SU</b>	<input type="checkbox"/> Highly Probable (HP)	<input type="checkbox"/> Probable (P)	<input checked="" type="checkbox"/> Low Probability (LP)	<input type="checkbox"/> Improbable (I)

**DO:** Development Objectives (degree to which planned targets were met)

**IP:** Implementation Performance (degree to how efficient the project was implemented)

**SU:** Sustainability degree to which the maintenance plan is executed and level of increased institutional capacity)

#### Comments:

The responsible ministries responsible for the project were, the ministry of Finance, Public works and the NIMOS. The MACR project was being executed by the Ministry of PLOS, currently the ministry of Finance through the PIU, headed by the General Coordinator. Due to several circumstances within the project execution by the PIU some of the planned activities were not implemented satisfactorily and on a timely basis.

The maintenance of the MACR Road is a responsibility of the ministry of public works, transport and communications.

#### Borrower Performance

Please evaluate your own performance during Project preparation and execution:

<input type="checkbox"/> Very Satisfactory (VS)	<input checked="" type="checkbox"/> Satisfactory (S)	<input type="checkbox"/> Unsatisfactory (US)	<input type="checkbox"/> Very Unsatisfactory (VU)
---	--	--	---

Comments: Although the change of the ministry of Planning and Development Cooperation to the ministry of Finance we succeeded to complete the project

#### Bank Performance

<input type="checkbox"/> Very Satisfactory (VS)	<input checked="" type="checkbox"/> Satisfactory (S)	<input type="checkbox"/> Unsatisfactory (US)	<input type="checkbox"/> Very Unsatisfactory (VU)
---	--	--	---

Comments: The Bank supported throughout the implementation of the project especially during the change within the mentioned ministries

Additional Recommendation to improve future Bank performance
--

Comments/recommendations to improve future Bank performance:
--

**TJONG A HUNG**  
Accountants N.V.

certified member firm of



**MINISTRY OF FINANCE  
GOVERNMENT OF THE REPUBLIC OF SURINAME**

**MEERZORG-ALBINA CORRIDOR REHABILITATION PROJECT  
IDB Loan Agreement Nos. 2887/OC-SU**

**AUDITED FINANCIAL STATEMENTS**

**FOR THE YEAR ENDED DECEMBER 31, 2016**



Ministry of Finance - Government of the Republic of Suriname  
Meerzorg-Albina Corridor Rehabilitation Project

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Ministry of Finance - Government of the Republic of Suriname  
Meerzorg-Albina Corridor Rehabilitation Project

### **INDEPENDENT AUDITOR'S REPORT**

To: The Ministry of Finance – Government of Suriname  
Financial Executing Agency  
Meerzorg-Albina Corridor Rehabilitation Project

#### **Report on the financial statements**

We have audited the accompanying financial statements, which comprises the Statement of Cash Flows, the Statement of Cumulative Disbursements and a summary of significant accounting policies and other explanatory information for the Meerzorg-Albina Corridor Rehabilitation Project, executed by the Ministry of Finance (Financial Executing Agency) and the Ministry of Public Works (Technical Executing Agency) – Government of Suriname, and financed with funds from the Inter-American Development Bank (IDB) Loan Agreement Numbers 2062/BL-SU, 2063/OC-SU and 2887/OC-SU and local counterpart funds from the Government of Suriname, European Development Fund and French Development Agency as at and for the year then ended December 31, 2016.

#### **Project management's responsibility for the financial statements**

The Project management of the Meerzorg-Albina Corridor Rehabilitation Project is responsible for the preparation and fair presentation of these financial statements in accordance with Cash Basis Accounting and specific requirements of the IDB, and for such internal control as management determines is necessary to enable the preparation of the financial statements that are free from material misstatement, whether due to fraud or error.

#### **Auditor's responsibility**

Our responsibility is to express an opinion on the accompanying financial statements based on our audit. We conducted our audit in accordance with International Standards on Auditing, and specific requirements of the IDB. Those standards require that we comply with ethical requirements, and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the agency's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the agency's internal control. An audit also includes assessing the accounting policies used and the reasonableness of significant estimates made by Project management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

**Opinion**

In our opinion, the financial statements referred to above present fairly, in all material respects, the cash flows and cumulative investments of the Meerzorg-Albina Corridor Rehabilitation Project as at and for the year ended December 31, 2016, in accordance with the accounting policies described in Note 2.

**Report on other legal and/or regulatory requirements**

We did not observe any situations suggesting non-compliance with the financial clauses in Inter-American Development Bank Loan contract nos. 2062/BL-SU, 2063/OC-SU and 2887/OC-SU during the period audited by us.

**Restriction on use and distribution**

We draw attention to Note 2 of the Notes to the Financial Statements which describes the basis for accounting. The accompanying financial statements are prepared to comply with the specific reporting requirements of the IDB. As a result, the accompanying financial statements may not be suitable for another purpose. Our opinion is not qualified in respect of this matter. The accompanying financial statements and our auditor's report thereon are intended solely for the Ministry of Finance of the Republic of Suriname, Project Executing Unit, Ministry of Public Works and the Inter-American Development Bank and should not be used for other purposes.

Paramaribo, April 18, 2017

Tjong A Hung Accountants N.V.



drs. J.D. Kortram RA  
Partner

Ministry of Finance - Government of the Republic of Suriname  
Meerzorg-Albina Corridor Rehabilitation Project

**STATEMENT OF CASH FLOWS FOR THE YEAR ENDED DECEMBER 31, 2016**  
(Expressed in US Dollars)

	Notes	2016		2015	
		IDB	LOCAL	IDB	LOCAL
		USD	USD	USD	USD
<b>Cash received</b>					
Accumulated cash received as at January 1		96,019,557	64,979,716	91,984,781	60,120,867
Activities during the year					
- Revolving fund disbursement ADF				-	-
- Replenishment of the revolving fund				-	-
- Direct payments		2,492,277	1,575,191	4,034,776	4,463,995
- Foreign exchange gain		-	67	-	-
- Others – financing costs		-	374,583	-	394,854
Total cash received during year	9	2,492,277	1,949,841	4,034,776	4,858,849
<b>Total cash received as at December 31</b>		<b>98,511,834</b>	<b>66,929,557</b>	<b>96,019,557</b>	<b>64,979,716</b>
<b>Disbursements made</b>					
Accumulated disbursements as at January 1		96,021,702	64,677,411	91,986,926	59,818,527
Activities during year					
- Civil works and resettlement		1,791,138	1,575,191	2,939,928	4,463,995
- Supervision		379,013	-	1,083,978	-
- PEU costs		3,111	-	-	-
- Institutional strengthening		280,825	-	2,120	-
- Financial audit, monitoring and evaluation		38,190	-	8,750	-
- Foreign exchange losses		-	134	-	35
- Financing costs		-	374,583	-	394,854
Total disbursements made during year		2,492,277	1,949,908	4,034,776	4,858,884
<b>Total disbursements made as at December 31</b>		<b>98,513,979</b>	<b>66,627,319</b>	<b>96,021,702</b>	<b>64,677,411</b>
Available cash balance as at December 31	3	-2,145	302,238	-2,145	302,305
<b>The accompanying notes form an integral part of the financial statement.</b>					

Ministry of Finance - Government of the Republic of Suriname Meerzorg-Albina Corridor Rehabilitation Project

**STATEMENT OF CUMULATIVE DISBURSEMENTS AS AT DECEMBER 31, 2016**  
(Expressed in US Dollars)

	Cumulative as at January 1, 2016			Movement during 2016			Cumulative as at December , 2016		
	IDB	LOCAL	TOTAL	IDB	LOCAL	TOTAL	IDB	LOCAL	TOTAL
	USD	USD	USD	USD	USD	USD	USD	USD	USD
<b>Meerzorg-Albina Corridor Rehabilitation</b>	85,341,393	57,674,622	143,016,015	1,791,138	1,575,191	3,366,329	87,132,531	59,249,813	146,382,344
Civil works and resettlement plan	85,341,393	57,674,622	143,016,015	1,791,138	1,575,191	3,366,329	87,132,531	59,249,813	146,382,344
<b>Implementation support</b>	10,450,934	3,588,670	14,039,604	382,124	-	382,124	10,833,058	3,588,670	14,421,728
- Supervision,	9,848,112	3,586,805	13,434,917	379,013	-	379,013	10,227,125	3,586,805	13,813,930
- PEU costs	602,822	1,865	604,687	3,111	-	3,111	605,933	1,865	607,798
<b>Institutional Strengthening</b>	94,700	-	94,700	280,825	-	280,825	375,525	-	375,525
Financial audit, monitoring and evaluation	134,675	-	134,675	38,190	-	38,190	172,865	-	172,865
Foreign exchange losses	-	2,935	2,935	-	134	134	-	3,069	3,069
Financing costs	-	3,411,184	3,411,184	-	374,583	374,583	-	3,785,767	3,785,767
- Interest	-	3,026,090	3,026,090	-	350,611	350,611	-	3,376,701	3,376,701
- Credit fee	-	385,094	385,094	-	23,972	23,972	-	409,066	409,066
<b>Total</b>	<b>96,021,702</b>	<b>64,677,411</b>	<b>160,699,113</b>	<b>2,492,277</b>	<b>1,949,908</b>	<b>4,442,185</b>	<b>98,513,979</b>	<b>66,627,319</b>	<b>165,141,298</b>

The accompanying notes form an integral part of the financial statement.

Ministry of Finance - Government of the Republic of Suriname  
Meerzorg-Albina Corridor Rehabilitation Project

**NOTES TO THE FINANCIAL STATEMENTS  
FOR THE YEAR ENDED DECEMBER 31, 2016**

**NOTE 1 – PROJECT DESCRIPTION**

Project scope and objectives

The Government of Suriname has initiated a project under the direction of the Ministry of Planning and Development, since 2010 the Ministry of Finance (Financial Executing Agency) and the Ministry of Public Works (Technical Executing Agency) for the rehabilitation of the Meerzorg-Albina road or known as Meerzorg-Albina Corridor Rehabilitation Project (the Project).

The main objectives of the Project are to improve access to important economic zone; facilitate tourism and integration of the country; lower transportation costs; and improve road safety.

The components of the Project include the following:

- (i) Civil works related to the reconstruction and rehabilitation of the road;
- (ii) Implementation support; and
- (iii) Institutional strengthening.

The reconstruction and rehabilitation of the road has been divided into 6 lots, as follows:

- 1. Lot 1A – Meerzorg to Tamansari (10.50 kilometers);
- 2. Lot 1B – Tamansari to Tamanredjo (10.0 kilometers);
- 3. Lot 2A – Tamanredjo to Wanhati (43.6 kilometers);
- 4. Lot 2B – Wanhati to Moengo (31.5 kilometers);
- 5. Lot 2C – Rehabilitation of Stolkertsijver Bridge; and
- 6. Lot 3 – Moengo to Albina (42.3 kilometers).

Project costs financing structure

In 2009, the Government of Suriname through its Ministry of Finance acquired financing from the Inter-American Development Bank (IDB), the Agence Francaise de Development (AFD), and the European Union (EU) to finance the costs of the Project.

Please find below the financing plan of the Project:

Category	Original Funding			Supplementary Funding			Consolidated Budget		
	IDB	GOS	TOTAL	IDB	GOS	TOTAL	IDB	GOS	TOTAL
<b>1. Meerzorg–Albina Corridor Rehabilitation</b>	<b>56,00</b>	<b>56,65</b>	<b>112,65</b>	<b>35,20</b>	<b>12,40</b>	<b>47,61</b>	<b>91,20</b>	<b>69,05</b>	<b>160,25</b>
Civil Works	56,00	56,65	112,65	35,20	12,40	47,61	91,20	69,05	160,25
<b>2. Implementation Support</b>	<b>6,00</b>	<b>0,25</b>	<b>6,25</b>	<b>4,47</b> **)	<b>1,40</b>	<b>5,87</b>	<b>10,47</b>	<b>1,65</b>	<b>12,12</b>
Supervision	5,25	-	5,25	4,47	1,40	5,87	9,72	1,40	11,12
PEU Costs	0,75	0,25	1,00	-	-	-	0,75	0,25	1,00
<b>3. Inst. Strengthening</b>	<b>0,20</b>	<b>0,30</b>	<b>0,50</b>	<b>0,28</b> ) *	<b>-</b>	<b>0,28</b>	<b>0,48</b>	<b>0,30</b>	<b>0,78</b>
<b>4. Financial audit M&amp;E</b>	<b>0,30</b>	<b>-</b>	<b>0,30</b>	<b>0,05</b> ) **	<b>-</b>	<b>0,05</b>	<b>0,35</b>	<b>-</b>	<b>0,35</b>
<b>5. Contingencies</b>	<b>-</b>	<b>3,60</b>	<b>3,60</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3,60</b>	<b>3,60</b>
<b>6. Price Escalation</b>	<b>-</b>	<b>3,60</b>	<b>3,60</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3,60</b>	<b>3,60</b>
<b>TOTAL</b>	<b>62,50</b>	<b>64,40</b>	<b>126,90</b>	<b>40,00</b>	<b>13,80</b>	<b>53,80</b>	<b>102,50</b>	<b>78,20</b>	<b>180,70</b>

**\*) Budget transfer 1**

On request of the Financial Executing Agency budget transfers have taken place in August 2015 between the categories 2, (implementation support) and 4, (financial audit M&E).

**\*\*) Budget transfer 2**

On request of the Financial Executing Agency budget transfers have taken place in December 2016 between the categories 2 Implementation support, 3 Institutional Strengthening and 4 Financial Audit M&E.

The total cost of the Project was initially budgeted at USD 126.9 million which is financed by the IDB for USD 62.5 million (loan agreement no. 2062/BL-SU for USD 21.7 million and 2063/OC-SU for USD 40.8 million) and the local counterpart fund from the Government of Suriname (GOS) for USD 64.4 million. However, on December 31, 2012, an IDB loan agreement number 2887/OC-SU for an amount of USD 40 million with a local counterpart requirement of USD 13.8 million which is financed thru loan from OPEC Fund for International Development (OFID). Thus, total budget of the Project costs is raised to USD 180.70 million (IDB – USD 102.5 million and GOS – USD 78.20 million).

The local counterpart fund from the GOS is financed as follows:

<u>Sources</u>	<u>Amount</u>
1. EU Grant – Project No. 10.ACP.SUR.002	Euro 14,500,000*)
2. AFD – Financing Agreement No. CSR 6001 01 C	Euro 25,000,000
3. GOS – Ministry of Public Works ‘Landelijk Asfalteringsproject’	Euro 3,000,000
4. GOS - SURALCO ‘Adjoema Hill Fund’	USD 300,000
5. OFID loan thru loan number 1492PB	USD 13,800,000

\*) The EU grant originally amounted to Euro17.5 million. An amendment letter was received from the EU at February 20, 2015. A de-commitment was made for an amount of Euro 3,000,000.

**Project Executing Unit (PEU) Structure**

The composition of the PEU during the year ended December, 2016:

General coordinator	: S. Amat *)
Contract manager	: L. Krishnadath
Highway engineer	: S. Soman
Assistant highway engineer	: S. Mohan
Financial expert (IDB and AFD)	: P. Punwasi
Environmental expert	: Q. Tjong A Kon
Financial Expert EU funds	: G. Kartodimedjo
Project officer	: J. Mahabali
Project officer	: A. Mahepal *)

\*) The General coordinator officially resigned as of July 2016.

\*) Miss A. Mahepal is no longer part of the PEU structure as of May 2016.

**NOTE 2 – SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES**

**Cash Basis of Accounting**

The financial statements of the Project as at and for the year ended December 31, 2016 have been prepared using the cash basis of accounting, which recognizes transactions and acts only when the cash and or its equivalent is received or disbursed by the entity, and not when they give rise to accrue or originate rights or obligations.

**Functional and Presentation currency**

The Projects accounting records are kept in US Dollars (USD) because its main financing source which is from IDB is denominated in USD and furthermore most of the contracts are denominated in USD. The financial statements are also presented in USD rounded-off to the nearest whole US dollar value.

	<u>31-12-2016</u>	<u>31-12-2015</u>
	SRD	SRD
US\$ 1	7.35	3.96

**Transactions denominated other than USD**

Cash receipts and cash disbursements denominated in the currency other than the USD were recorded in USD translated using the applicable rate of the Central Bank of Suriname at the date of the transaction.

**NOTE 3 – AVAILABLE CASH BALANCE**

The composition of the available cash balance as at December 31 is as follows:

	<u>2016</u>	<u>2015</u>
	USD	USD
<b>Account name and number:</b>		
Meerzorg-Albina Corridor Rehabilitation Project–Suralco USD		
Account no. 0313100-001-066-840	300,000	300,000
Petty cash - SRD	93	160
	<u>300,093</u>	<u>300,160</u>

**NOTE 4 – REVOLVING FUND**

In accordance with loan agreement 2887/OC-SU no revolving fund is held.

**NOTE 5 – LOCAL COUNTERPART FUNDS**

The Government of Suriname has committed to contribute the sum of USD 78.2 million. As at December 31, 2016, the total contributed local counterpart funds amounted to USD 66,6 million which is equal to 85 % of the total committed funds.



**NOTE 6 – PROCUREMENT OF WORKS, GOODS AND SERVICES**

Contractor	Description	Signing date	Amount		SRD	Total
			Euro	USD		
WORKS *)						
Baitali N.V.	Construction Meerzorg	20-May-09	17,280,067	-	-	20,908,881
MNO Vervat	Lot 2A-Tamanredjo-Wanhatti 43.6Km	26-Aug-09	-	34,164,433	-	34,164,433
MNO Vervat	Lot 2B-Tamanredjo-Wanhatti 31.5Km	26-Oct-09	-	27,879,125	-	27,879,125
Dalian	Lot 3-Moengo-Albina 42.3Km	28-Oct-09	-	31,250,000	-	31,250,000
Baitali N.V.	Lot 1A construction works	14-Nov-13	-	-	44,826,250	13,792,692
MNO Vervat	Lot 2A-Escalation	11-Dec-14	-	3,081,069	-	3,081,069
MNO Vervat	Lot 2B-Escalation	11-Dec-14	-	2,575,000	-	2,575,000
Dalian	Lot 3-Escalation	2014-2016	-	5,668,100	-	5,668,100
			17,280,067	93,293,558	44,826,250	139,319,300*)
SERVICES						
Egis Firm Engineering	Supervisor	20-Aug-09	1,165,040	3,125,410	-	4,535,108
Lutchman & Co	External audit	26-Aug-09	-	78,600	-	78,600
J. de Rijp	Exact software	5-Oct-09	-	75,000	-	75,000
A. Waterberg	Front office manager	14-Oct-09	-	6,000	-	6,000
H. Dihal	House keeper	26-Nov-09	-	2,400	-	2,400
AP&G consultancy	Consulting	15-Jan-10	-	26,580	-	26,580
Chetskeys advertising promotional and production	Media consultancy	25-Feb-10	-	55,342	-	55,342
Sewcharan Lawyers	Consulting services	19-Mar-10	-	5,617	-	5,617
AP&G consultancy	Consulting Lot 2A and 2B	5-May-10	-	27,450	-	27,450
Ace Consultancy	Strengthening Commewijne Bridge	18-May-10	-	100,000	-	100,000
Biomedical Systems	Consulting	19-May-10	70,000	-	-	84,700
Egis Bceom International /Firm Engineering	Consulting services	21-Jun-10	21,000	125,000	-	193,350
Agua Pavement & Geotechnical	Consulting Lot 1	30-Aug-10	-	20,700	-	20,700
Consultancy N.V.	Lot 1, 2A, 2B, 3Addendum 4	12-Jun-11	812,443	2,203,595	-	3,186,651
Egis Firm Engineering	Lot 1 Relocation of obstacles	23-Nov-11	-	735,000	-	735,000
Baitali	Consulting services	30-Jan-12	-	60,320	-	60,320
G. Delanoe			2,068,483	6,647,014	-	9,192,818
Carry forward						

Contractor	Description	Signing date	Amount		Total	
			Euro	USD	SRD	%
To carry forward			2,068,483	6,647,014	-	9,192,818
Acfinsol	Quickbooks software	13-Feb-12	-	6,270	-	6,270
OPUSS	Consulting services	13-Feb-12	-	9,600	-	9,600
Lutchman & Co	External audit	2-Mar-12	-	29,475	-	29,475
Egis Firm Engineering	Lot 1, 2A, 2B, 3, addendum 5	22- Apr-13	586,026	1,943,447	-	2,619,000
J. Campbell	Evaluation and management support	21 May 12	-	16,260	-	16,260
G. Taft	Consulting services	25-Nov-12	-	26,750	-	26,750
G. Taft	Services for review of currency effects	1-Feb-13	-	25,000	-	25,000
S. Amat	Consulting services	8-Apr-13	-	24,880	-	24,880
F. Bernard	Develop environmental manual	20-May-13	-	73,500	-	73,500
Tjong A Hung Accountants	External audit	5-Jun-13	-	35,000	-	35,000
C. Toppin-Allahar	Consulting services	15-Nov-13	-	21,200	-	21,200
Prolusion B.V.	Consulting Services	2-Feb-14	-	396,340	-	396,340
S. Amat	Consulting Services	7 Jul - 14	-	68,420	-	68,420
Emanuel	Social Engaged Plan	Nov 2014	-	11,850	-	11,850
Egis Firm Engineering	Lot1,2,3 and core team, Addendum 6	Dec 2016	583,086	1,313,360	-	1,912,182
CRITI	Translation EA Nimos Guidelines	Dec 2016	-	2,848	-	2,848
Multiform	Printing EA Nimos Guidelines	Dec 2016	-	-	5,750	787
SRK engineering	ITtransport Ltd	Dec 2016	-	277,189	-	277,189
James Campbell	Final Evaluation	Dec 2016	-	22,150	-	22,150
Tjong A Hung Accountants	External Audit	Dec 2016	-	-	53,479	7,290
			<b>3,237,595</b>	<b>10,950,553</b>	<b>59,229</b>	<b>14,778,809</b>
						<b>10.0</b>

Contractor	Description	Signing date	Amount		SRD	Total	
			Euro	USD		USD	%
<b>GOODS</b>							
Hasnoe	Building rent	31-Aug-09	-	48,000	-	48,000	
DSTN N.V.	Laptops	9-Oct-09	-	12,145	-	12,145	
H.J. de Vries Motors N.V.	SUV cars	21-Oct-09	-	-	237,000	72,923	
Fernandes	Purchase SUV car	1-Apr-10	-	55,990	-	55,990	
Digicel	Blackberry service	6-Oct-10	-	2,534	-	2,534	
			-	<b>118,669</b>	<b>237,000</b>	<b>191,592</b>	-
			<b>20,517,662</b>	<b>104,362,780</b>	<b>45,122,479</b>	<b>154,289,701</b>	

\*) The contractors for the works are Baitali N.V., MNO Vervat and Dalian. In the total amount of USD 139,319,300 are not taken into account the variation orders, which have also been paid during the project period for a total of USD 7 million. Most part of these payments are payments outside the contract due to changes within the scope of the works.

**NOTE 7 – DISBURSEMENT CATEGORIES AND DISBURSEMENTS MADE BY IDB AND LOCAL**

The following is the cumulative disbursements per category as at December 31, 2016

	December 31, 2016 USD	December 31, 2015 USD
<b>Meerzorg-Albina Corridor Rehabilitation</b>	<b>146,382,344</b>	<b>143,016,015</b>
Civil works and resettlement plan	146,382,344	143,016,015
<b>Implementation support</b>	<b>14,421,728</b>	<b>14,039,604</b>
- Supervision, studies and design	13,813,930	13,434,917
- PEU costs	607,798	604,687
<b>Institutional Strengthening</b>	<b>375,525</b>	<b>94,700</b>
<b>Financial audit, monitoring and evaluation</b>	<b>172,865</b>	<b>134,675</b>
<b>Foreign exchange losses</b>	<b>3,069</b>	<b>2,935</b>
<b>Financing costs</b>	<b>3,785,767</b>	<b>3,411,184</b>
- Interest	3,376,701	3,026,090
- Credit fee	409,066	385,094
<b>Total</b>	<b>165,141,298</b>	<b>160,699,113</b>

**Meerzorg-Albina Corridor Rehabilitation**

The payments for this component relate to the civil works and resettlement plan for the following lots:

1. Lot 1B – Tamansari to Tamanredjo (10.0 kilometers);
2. Lot 2A – Tamanredjo to Wanhati (43.6 kilometers);
3. Lot 2B – Wanhati to Moengo (31.5 kilometers);
4. Lot 2C – Rehabilitation of Stolkertsijver Bridge; and
5. Lot 3 – Moengo to Albina (42.3 kilometers).

**Implementation support**

The payments for this component relate to supervision and the PEU general coordinator for the rehabilitation from Meerzorg to Albina.

**Institutional strengthening**

The payments for this component relate to trainings and other capacity development activities for the Project implementation.

**Financial audit**

The payments contains the fee for the financial audits performed and the fee for the consultant of the final evaluation.

**Financing costs**

The payments relate to the interest and credit fees paid by the Government of the Republic of Suriname for the IDB loan (2887/OC-SU) which are used to finance this Project.

**NOTE 8 – RECONCILIATION BETWEEN THE STATEMENT OF CASH FLOW AND THE STATEMENT OF CUMULATIVE DISBURSEMENTS**

	<b>IDB</b> <b>(in USD)</b>	<b>LOCAL</b> <b>(in USD)</b>	<b>Total</b> <b>(in USD)</b>
<b>Per statement of cash flows</b>			
Cumulative cash received as at December 31, 2016	98,511,834	66,929,557	165,441,391
<b>Per statement of cumulative disbursements</b>			
Cumulative disbursements as at December 31, 2016	98,513,979	66,627,319	165,141,298
Cash available balance	-2,145	302,238	300,093

**NOTE 9 – RECONCILIATION BY DISBURSEMENT CATEGORIES BETWEEN THE PROJECT'S RECORDS AND THE IDB'S RECORDS**

IDB Loan No. 2887/OC-SU

Component	Budget after transfer	Disbursed according to Financial Records	Disbursed according to IDB record's LMS	Difference
01.00 Meerzorg Albina Corridor Rehabilitation	35,200,000	1,791,138	1,791,138	-
01.01 Civil Works and Resettlement	35,200,000	1,791,138	1,791,138	-
02.00 Implementation Support	4,470,050	382,124	382,124	-
02.01 Supervision, Studies and Design	4,470,050	382,124	382,124	-
03.00 Institutional Strengthening	282,950	280,825	280,825	-
04.00 Financial Audit	47,000	38,190	38,190	-
Total	40,000,000	2,492,277	2,492,277	-

**NOTE 10 – OVERVIEW OF DISBURSEMENT REQUESTS ACCORDING TO IDB RECORDS**

During 2016 a total of 21 disbursement requests were submitted and processed for a total value of USD 2,492,277. Up till December 2016 USD 2,492,277 was approved.

For Component 1 Civil works for the year 2016, a total amount of USD 1,791,138, was approved, For Lot 3 USD 554,619; For Lot 2B USD 1,137,434 and USD 99,085 for Lot 2C.

For Component 2 Implementation support A total amount of USD 382,124 was approved; USD 3,110 was paid to the General Coordinator and USD 379,013 was paid to the Supervisor.

For the Component 3 Institutional Strengthening a total amount of USD 280,825 was approved.

For the consultant CARDNO SRK USD 277,190, The "EA Guidelines Volume VIII Road Projects "of Nimos are translated and printed for and amount of USD 3,635.

For the component 4 Financial Audit Monitoring and Evaluation an total amount of USD 38,190 was requested; USD 22,150, for the consultant regarding the final evaluation and draft project's completion report and USD 16,040 for the audit of the project.

The following is the summary of the disbursement requests approved amounts during 2016:

Type of disbursement request	2887/OC-SU USD	Total USD
Direct payment system	2,492,277	2,492,277
Request for revolving fund*)	-	-
<b>Total</b>	<b>2,492,277</b>	<b>2,492,277</b>

\*) See note 4

Disbursement request types are defined as follows:

Direct payment system (DPS) pertains to disbursement request to IDB whereby IDB is requested to pay directly to the supplier and or contractor of the Project.

Advance of funds justification (AFJ) whereby PEU sends disbursement request to IDB to justify payments made out of the revolving fund.

Request for revolving fund (RRF) pertains to disbursement request to IDB whereby the Project receives cash as additional revolving fund or replenishment of fund.

**List of Disbursements Requests sent to and processed by IDB with regard to Loan No. 2887/OC-SU**

Disbursement Request number		Amount requested	Amount approved	Difference	Value date	Type
Original	As processed by IDB					
84	84	8,750	8,750	-	July 22, 2016	DPS
85)*	87	99,085	99,085	-	October 31, 2016	DPS
86	86	554,619	554,619	-	October 7, 2016	DPS
85-1	85-1	83,157	83,157	-	December 8, 2016	DPS
85-2	85-2	27,719	27,719	-	December 8, 2016	DPS
85-3	85-3	69,297	69,297	-	December 8, 2016	DPS
85-4	85-4	41,578	41,578	-	December 2016	DPS
85-5	85-5	55,438	55,438	-	December 2016	DPS
88	88	1,137,434	1,137,434	-	December 12, 2016	DPS
89	89	3,111	3,111	-	December 15, 2016	DPS
90	90	1,823	1,823	-	December 20, 2016	DPS
91	91	2,848	2,848	-	December 20, 2016	DPS
92	92	6,645	6,645	-	December 20, 2016	DPS
93	93	787	787	-	December 20, 2016	DPS
94	94	89,167	89,167	-	December 20, 2016	DPS
95	95	247,086	247,086	-	December 20, 2016	DPS
96	96	8,860	8,860	-	Dec 20 2016	DPS
97	97	6,645	6,645	-	Dec 20 2016	DPS
98	98	5,468	5,468	-	Dec 20 2016	DPS
99	99	21,232	21,232	-	Dec 20 2016	DPS
100	100	21,528	21,528	-	Dec 20 2016	DPS
<b>Total</b>		<b>2,492,277</b>	<b>2,492,277</b>	<b>-</b>		

\*) DR 85, regards the 3rd Payment to Prolusion is paid as DR 87, because DR 85 was committed for the payments of SRK. The payments of SRK are DR85-1 up till DR85-5.

## NOTE 11 – Subsequent events

At the end of April 2017 an exit meeting with all involved parties will be held to present the outcomes of the project.

### 11.1 Accounts payable as at December, 2016

The list of outstanding payable as at December 31, 2016 is as follows:

Description	
EU remaining amount Lot 1 B Final Payment	Euro 198,059
OFID Lot 1 A Final Payment	USD 451,230

In 2017 the payables have been paid with funds of the EU and OFID.

### 11.2 Approval of the financial statements

The financial statements of the Meerzorg-Albina Corridor Rehabilitation Project as at and for the year ended December 31, 2016 were approved by the Financial Executing Agency on March 28, 2017.

## NOTE 12 – Overview of budget-actual

### Budget – actual variance analysis of Loan 2887/OC-SU

Component	Budget	Actual	Variance	Variance
		(in million USD)		%
01.00 Meerzorg-Albina Corridor Rehabilitation	35,20	31,24	3,96	11,25
01.01 Civil Works and Resettlement	35,20	31,24	3,96	11,25
02.00 Implementation Support	4,47	4,45	0,02	-
02.01 Supervision	4,47	4,45	0,02	-
03.00 Institutional Strengthening	0,28	0,28	-	-
04.00 Financial Audit, Monitoring & Evaluation	0,05	0,05	-	-
Total	40,00	36,02	3,98	9,95

There are activities for components 01.00 Civil Works and 04.00 Financial Audit, Monitoring & Evaluation.

**NOTE 13 – Overview of the financing plan compared to actual disbursements**

Category	Financing Plan			Actual			Variance		
	IDB	LOCAL	TOTAL	IDB	LOCAL	TOTAL	IDB	LOCAL	TOTAL
<b>(IN MILLION USD)</b>									
<b>1. Meezorg–Albina Corridor Rehabilitation</b>	<b>91,20</b>	<b>69,05</b>	<b>160,25</b>	<b>87,13</b>	<b>59,25</b>	<b>146,38</b>	<b>4,07</b>	<b>9,80</b>	<b>13,87</b>
Civil Works and resettlement	91,20	69,05	160,25	87,13	59,25	146,38	4,07	9,80	13,87
<b>2. Implementation Support</b>	<b>10,47</b>	<b>1,65</b>	<b>12,12</b>	<b>10,84</b>	<b>3,59</b>	<b>14,43</b>	<b>-0,37</b>	<b>-1,94</b>	<b>-2,31</b>
Supervision	9,72	1,40	11,12	10,23	3,59	13,82	-0,52	-2,19	-2,71
PEU Costs	0,75	0,25	1,00	0,61	-	0,61	0,15	0,25	0,40
<b>3. Inst. Strengthening</b>	<b>0,48</b>	<b>0,30</b>	<b>0,78</b>	<b>0,38</b>	<b>-</b>	<b>0,38</b>	<b>0,10</b>	<b>0,30</b>	<b>0,40</b>
<b>4. Financial audit and M&amp;E</b>	<b>0,35</b>	<b>-</b>	<b>0,35</b>	<b>0,17</b>	<b>-</b>	<b>0,17</b>	<b>0,18</b>	<b>-</b>	<b>0,18</b>
<b>5. Contingencies</b>	<b>-</b>	<b>3,60</b>	<b>3,60</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3,60</b>	<b>3,60</b>
<b>6. Price Escalation</b>	<b>-</b>	<b>3,60</b>	<b>3,60</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3,60</b>	<b>3,60</b>
<b>7. Financing cost</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3,79</b>	<b>3,79</b>	<b>-</b>	<b>-3,79</b>	<b>-3,79</b>
<b>TOTAL</b>	<b>102,52</b>	<b>78,20</b>	<b>180,70</b>	<b>98,52</b>	<b>66,63</b>	<b>165,15</b>	<b>3,98</b>	<b>11,57</b>	<b>15,55</b>
<b>*Percentages (in %)</b>	<b>57%</b>	<b>43%</b>	<b>100%</b>	<b>54%</b>	<b>37%</b>	<b>91%</b>	<b>2%</b>	<b>7%</b>	<b>9%</b>

\* Percentages are computed using the total financing plan of USD 180.7 million as the denominator.

The financing plan is based on the financing plan included in the loan agreements with IDB.

Category	Financing Plan			Actual			Variance		
	IDB	LOCAL	TOTAL	IDB	LOCAL	TOTAL	IDB	LOCAL	TOTAL
<b>(IN MILLION USD)</b>									
<b>1. Meezorg–Albina Corridor Rehabilitation</b>	<b>91,20</b>	<b>69,05</b>	<b>160,25</b>	<b>87,13</b>	<b>59,25</b>	<b>146,38</b>	<b>4,07</b>	<b>9,80</b>	<b>13,87</b>
Civil Works	91,20	69,05	160,25	87,13	59,25	146,38	4,07	9,80	13,87
<b>2. Implementation Support</b>	<b>10,47</b>	<b>1,65</b>	<b>12,12</b>	<b>10,84</b>	<b>3,59</b>	<b>14,43</b>	<b>-0,37</b>	<b>-1,94</b>	<b>-2,31</b>