

Output and Performance Based Contracting for Roads Development

Application in LIBERIA ROAD ASSET MANAGEMENT PROJECT

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Content

- **Introduction to Output & Performance Based Contracting**
 - **Salient Points of Liberia Asset Management Contract
(OPRC contract format)**
 - **Level of Service & Compliance Mechanism**
 - **Payment Scheme**
 - **Risk mitigation plan**

Commonly used Acronyms

- **PPP**– Public Private Participation
- **DBMOT**– Design Build Maintain Operate Transfer
- **DBT**– Design Build Transfer
- **DBFO**– Design Build Finance Operate

- **OPRC**– Output and Performance Based Contracts
- **CREMA**–Performance Contracts for road rehabilitation and maintenance (Argentina)
- **PMMR**– Performance–based Management and Maintenance of Roads
- **FIDIC**–International Federation of Consulting Engineers

What is a Output and Performance based Road Contract Format (OPRC) ?

- ▶ **Focus on outputs not inputs** –
 - Thus eliminate risks of clients to pay on completion of works even if outcome is unfit for clients needs
- ▶ **Measure outputs based on actual performance**
 - What is achieved rather than What is done
- ▶ **Profit sharing**–
 - Aligns the motivation and performance of contractors with client's needs and goals

What is Output and Performance based Road Contract (OPRC) ?

- ▶ **Contractors become stakeholders**
 - Direct reward for value they achieve for Client
- ▶ **Flexibility and cost effective operation**
 - Comparing to the traditional FIDIC contract that are
 - uneconomical (too much works) , inadequate (too little works) , inappropriate (wrong works)
- ▶ **Equitable Risk Sharing**
 - Risk are defined and shared equitably between parties
- ▶ **Life Cycle of Road Asset – Asset Management**
 - All interventions between two major events included in single contract– Rehabilitation, Maintenance, Operation
Overall Cost saving, Better Governance. Use DBMOT.

BASIC CONCEPTS

Challenge is to transform a Works contract into Service and Management Contract

Service Level

Defines the desired road performance standards mainly from road user's perspective (Operational condition of a road).

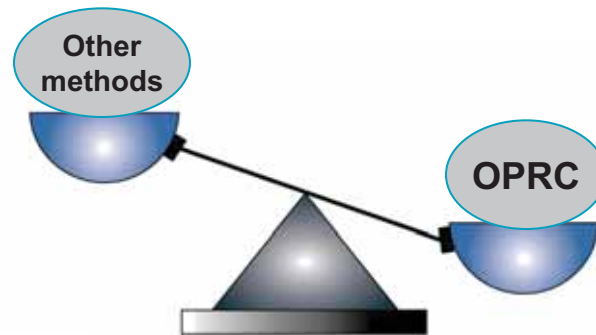
Performance Criteria

- Should cover all aspects of the contract; and
- within contract period, might require different Service Levels

Most Important– what Service level can be afforded and economically justified for Recipient?

What is so special about OPRC?

- ✓ New way -- Road Works Contracting
- ✓ New way -- Road Asset Management
- ✓ New way -- PPP



OPRC
OPRC

OPRC : Comparison with Other modes of Contracting

FIDIC(input contracts):

- Pay in accordance with work progress measured by input
- Each intervention (design, construction, supervision, maintenance, etc.) needs separate contract
- *Need large pool of experienced and professional staff (Employer) with multi-disciplinary team to evaluate and decide*
- Require close and full scale day-to-day site supervision/ management
- All Risks on Employer

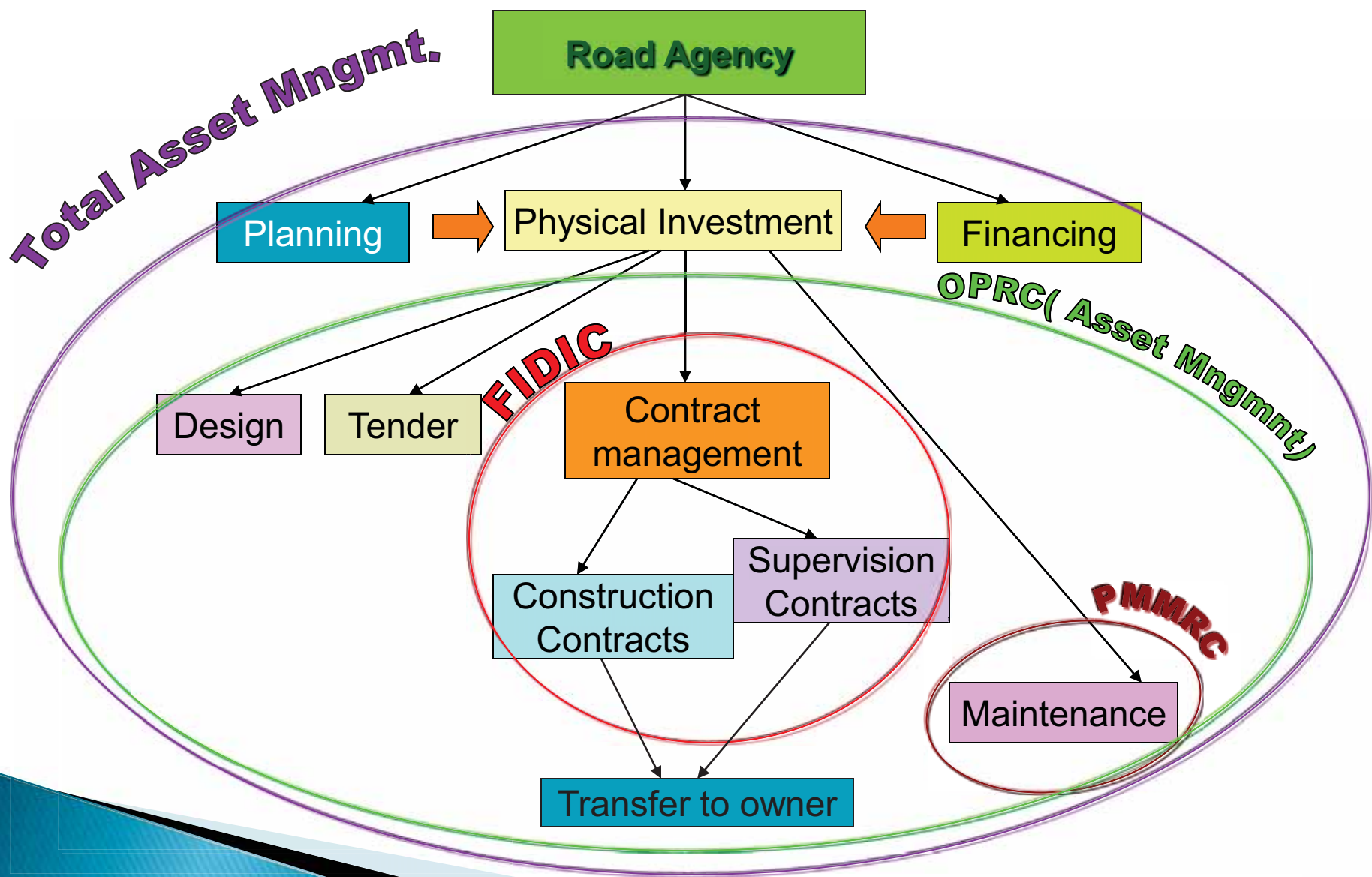
PMMRC (long term maintenance contract)

- Pay in accordance with the approved level of service (quality and quantity) of the facility
- Development/Rehabilitation work must be completed
- Deal only with maintenance works for single facility or area wide
- Relatively small operation requiring small contractors
- *Need large pool of experienced and professional staff (Employer) to control the contracts*
- Only Risks related to maintenance on contracting entity

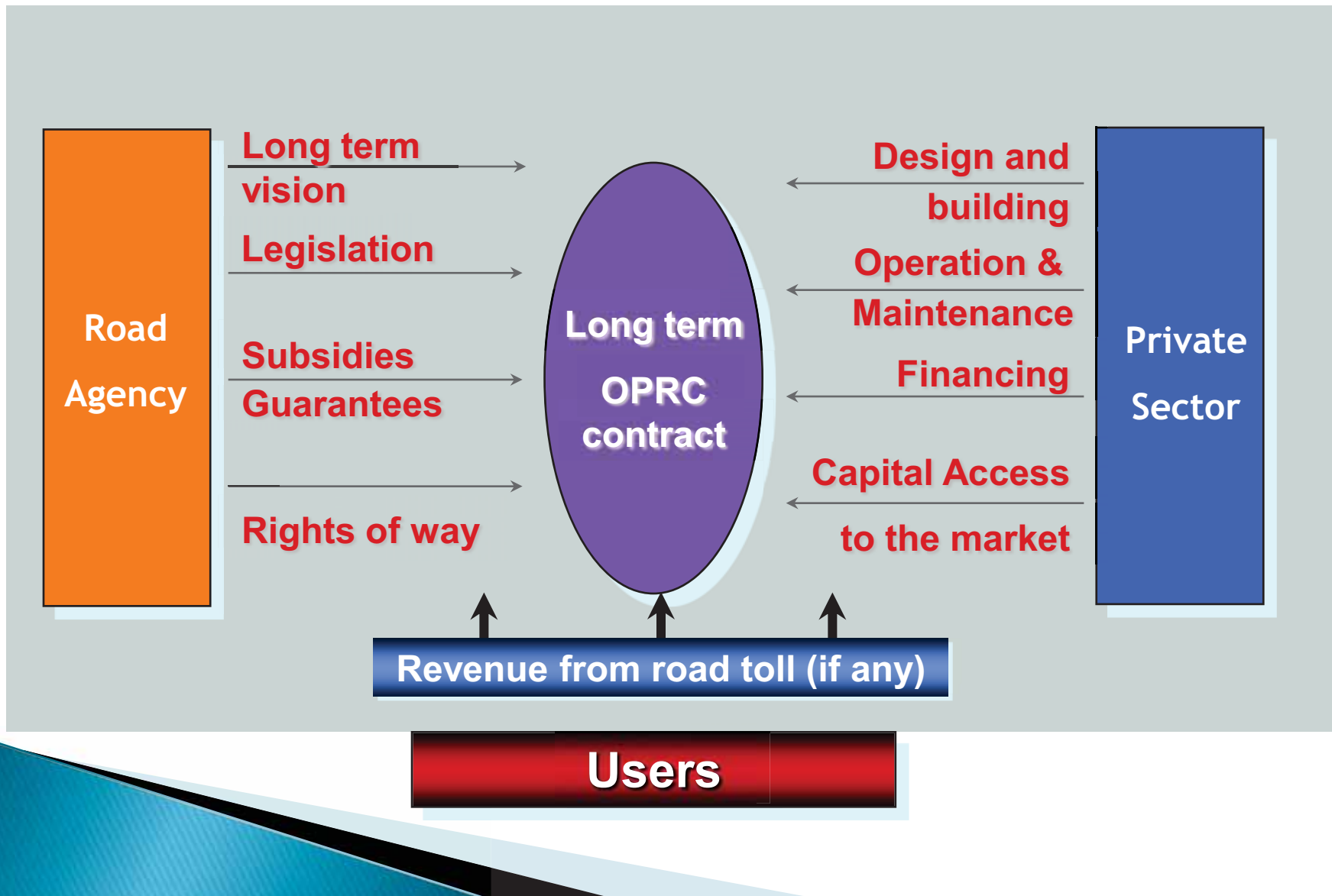
OPRC:

- Reduced number of transactions, better governance and less potential failed contracts within life-span
- *Need smaller number of staff with higher skills and experience*
- Pay in accordance with approved level of service (quality and quantity) of the facility
- **Development and maintenance works in single- output based contract (also called Design, Build, Maintain, Operate, and Transfer – DBMOT contract)**
- One contracting entity provide everything from design to implementation, full control of right of way within given period of time
- Transfer of facility to Employer under agreed terms
- Risks shared between contracting entity and Employer

OPRC : DBOMT Methodology



What can Public and Private Entities bring to OPRC contracts ?



Main Benefits of OPRC – use of DBMOT

Introducing innovation and expertise

- The Private sector has strong incentives to implement new and advanced technologies

On-Time and On-Budget Delivery

- Strong incentives for the Private partner to complete the project on-time and on-budget

Optimal Risk Allocation

- Comprehensive risk identification
- Allocation of each risk to the partner who can best manage it

Cost Savings in Construction and in Life-cycle Costs

- Integration between the construction and the operation, optimizing life cycle costs in design, construction and operation and maintenance

Strong Customer Service Orientation

- Strong linkage between quality of service and payments

Public Sector Focus on Outcomes and Core Business

- Enables governments to focus on outcomes instead of inputs

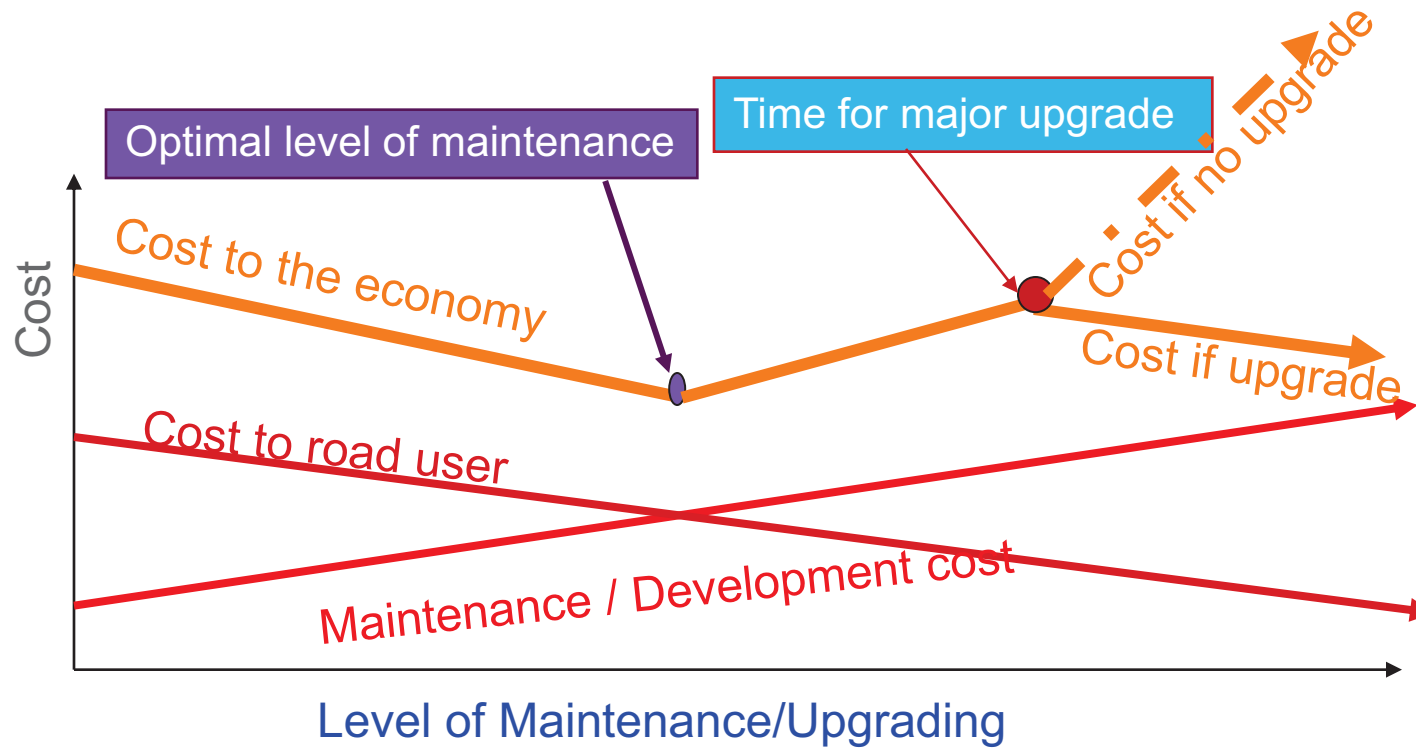
Critical elements for planning successful OPRC

- ▶ OPRC can serve to **enlarge public resource envelop** by engaging private resource through a PPP scheme

- ▶ A few critical elements to make OPRC successful include:
 - Ensure that Government gets Value for Money from private participation,
 - Allocate and Share Risks appropriately between public and private parties,
 - Establish necessary Guarantees ,
 - Provide Legal, Regulatory and Institutional Frameworks

Value for Money

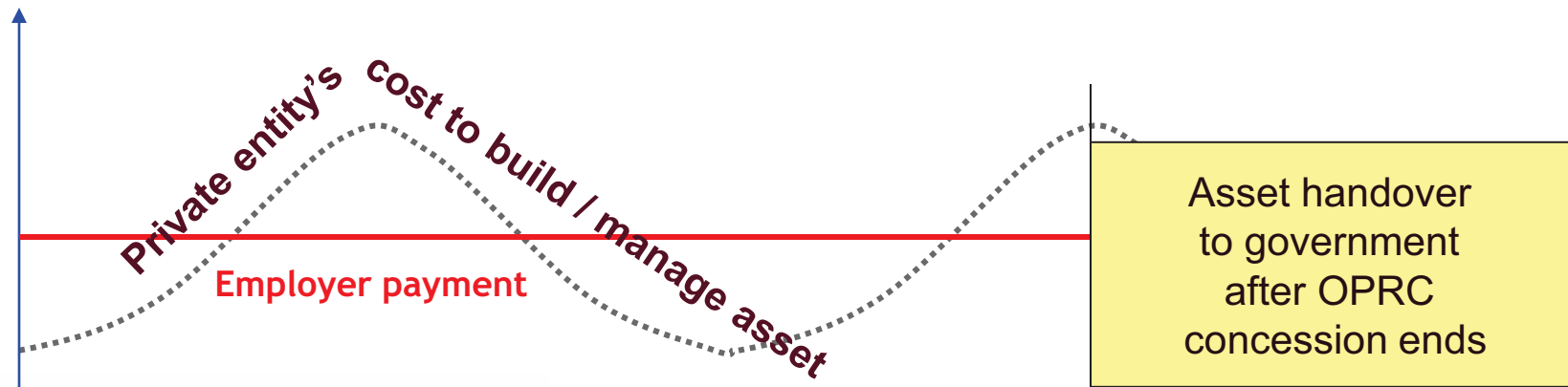
Requires realistic assessment on optimal level of intervention



Value for Money

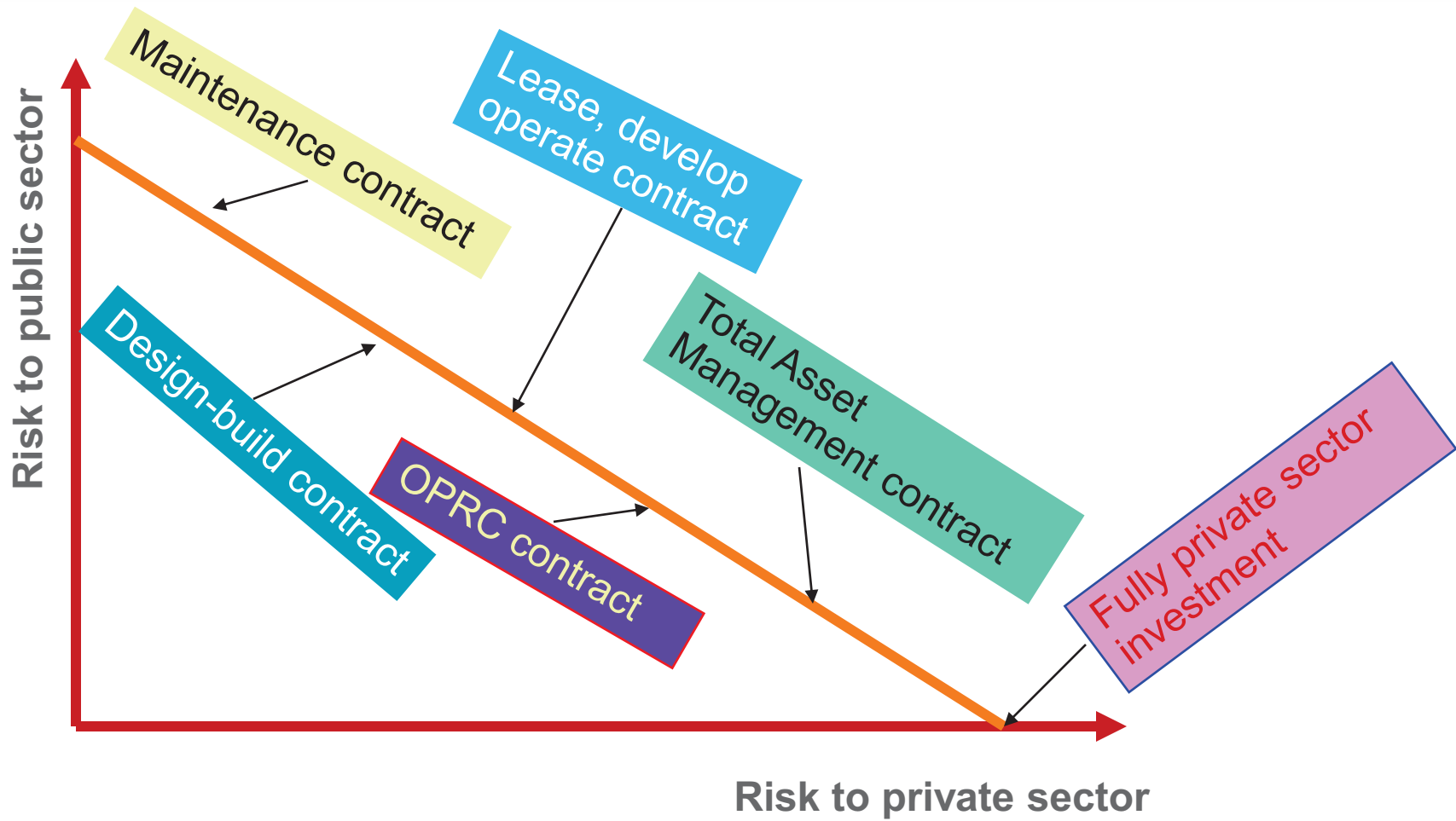
- Cost to Economy is optimized through participation of private sector
- Questions to be answered:
 - ✓ Is private sector more efficient than public sector?
 - ✓ Is private capital cheaper than public capital?
 - ✓ Have deferred payments taken into account (Financial Model)?

TYPICAL FINANCIAL/PAYMENT MODEL

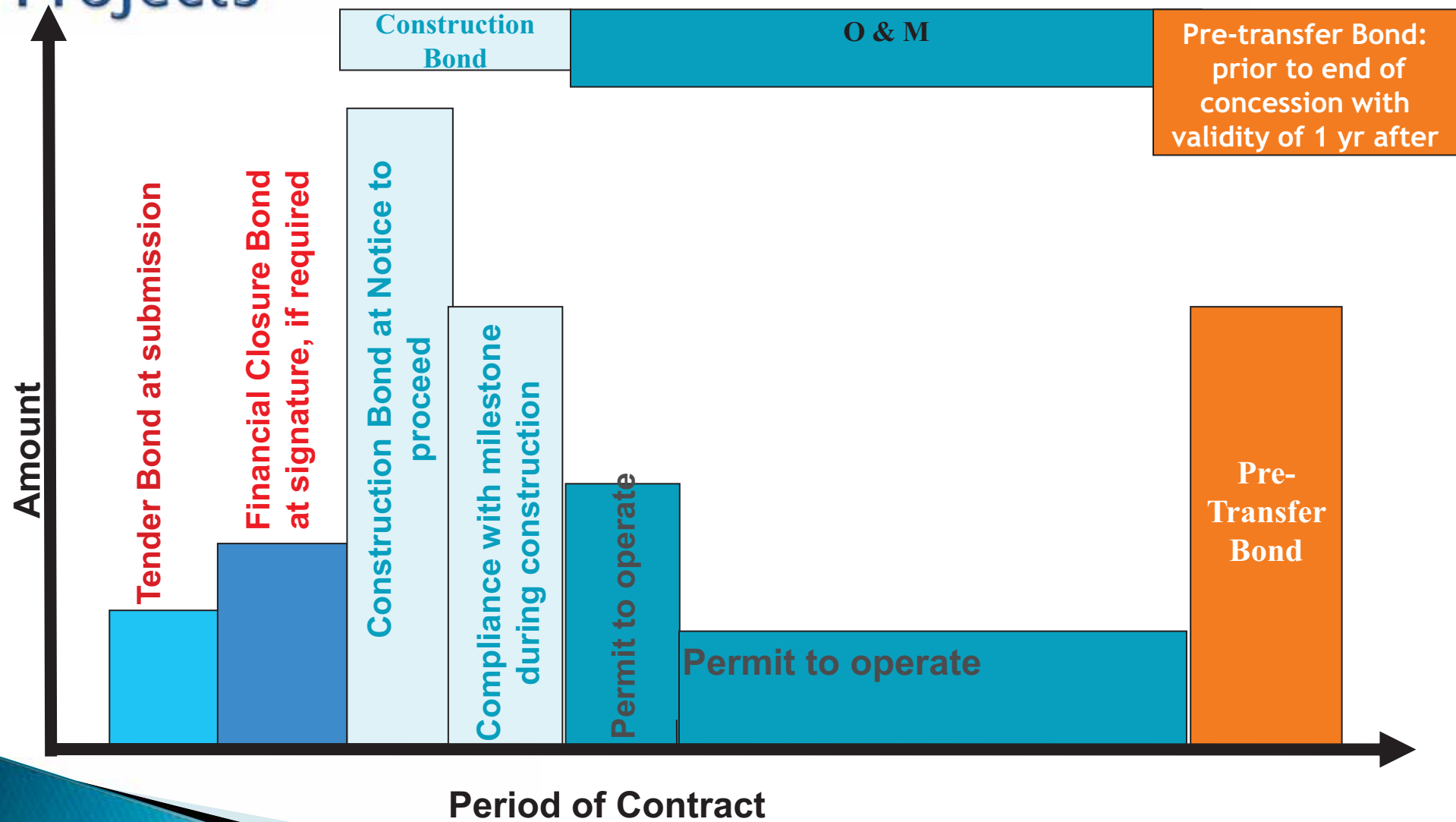


Benefits derive from predictable payments and fixed public budget allocation

Risk Transfer in Various Road Contract Options



Typical Guarantee Structure for OPRC Projects



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Liberia

CLIMATE

- Tropical average temperatures ~27°C
- Dry season from November to April
- Wet season from May to October
 - average humidity 78%
- Annual rainfall 1,600 to 4,000 mm
 - High intensity



HYDROLOGY

Lies in the northeastern plateau of the country.

Major Rivers: The Lai river, Konola river, Weala River, Mechlin River, and St John River

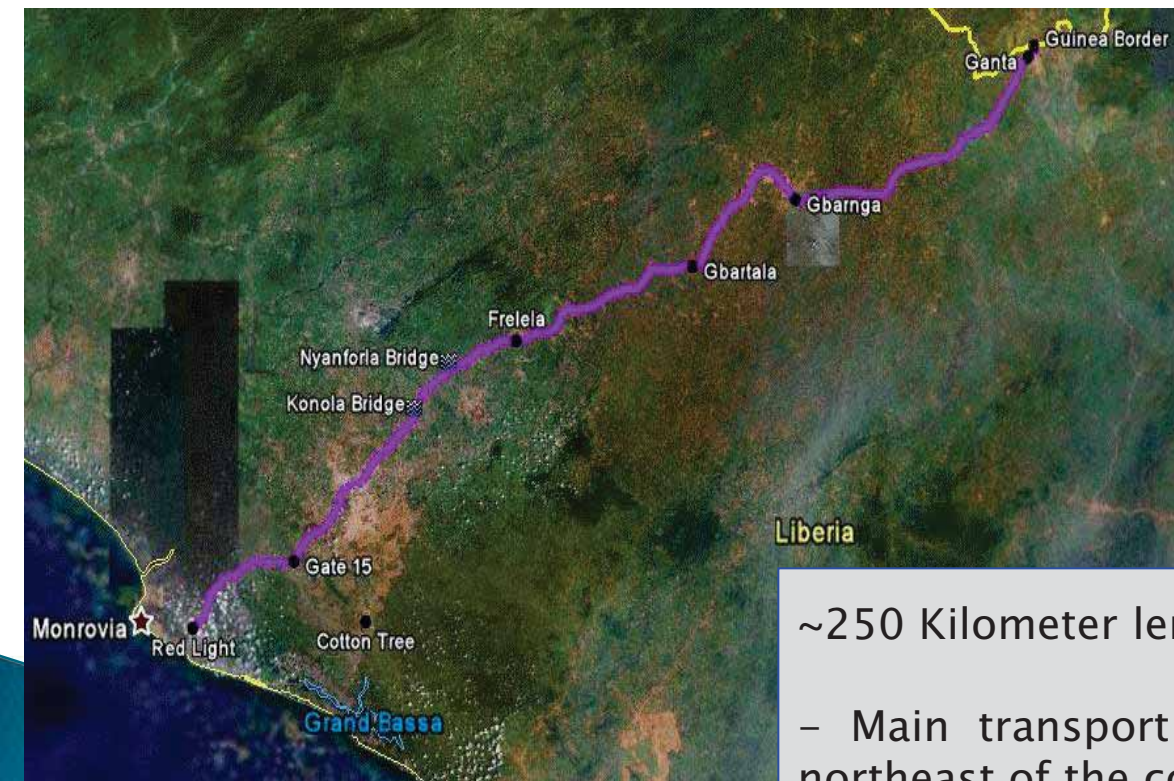


GEOTECHNICAL

- Reddish and yellow residual soils
 - silty and sandy clayey soils with medium to high plasticity.
- Estimated average CBR of 6,0
- Average resilient modulus of 60Mpa.

LIBRAMP

Monrovia- Gbarnga - Ghanta Road



~250 Kilometer length

- Main transport corridor towards the northeast of the country

Liberia OPRC– Key features

| <i>Project name</i> | Road length (KM) | Rehabilitation Period (including 6 months mobilization) | Maintenance period (after Rehabilitation period) | Periodic maintenance |
|--|------------------|---|--|--|
| Monrovia to Gbarnga Lot 1 | 180 | 36 months | 7 years | At the 8 th year of the project |
| Gbarnga to Ghanta Guinea border Lot 2 | 69 | 18 months | 8.5 years | At the 8 th year of the project |

Total Duration 10 years with handing over under agreed conditions

Key features– Conceptual Designs

- ROW defined.
- Key geometric and physical design parameter provided as related to category
- Environmental, Social and Legal frameworks are developed.
- Minimal design parameters of the pavement based on current and predicted traffic, climate and other conditions.
- Pavement residual life at all the time minimum 10 years and at handing over(design life about 20 years)
- Minimum acceptable Design
- Mitigate Winner's curse

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Service Level Requirements

Four Overall Criteria Levels Groups

1. Usability of the Road.
2. Road User Comfort.
3. Durability Measures.
4. Other elements.

Service Levels– Road Usability

Usability of the Road

1. Road is trafficable at all times.
2. No interruptions



Service Levels– Road Comfort

Road Comfort

International Roughness Index (IRI) < 3.0



1.Pavement Surface Defects

- **Potholes** (max dimension < 150mm), max no 5/km)
- **Cracks** (<3mm wide)
- **Rutting** (max <20mm, <10mm in 5% area)
- **Edge failure**

2.Shoulders (drop < 4cm)

3.Road Roughness

- Max IRI 4 .0 m
- Avg IRI 3.0 m

ROAD SURFACE PROFILER: Calibrated equipment - High-speed inertial profilers (Class 1 precision and bias specifications as defined by ASTM 950

Service Levels– Road Durability

Durability

Threshold Deflection Value
0.7 mm



Deflection <
0.70 mm

Service Levels– Other Elements

Other Elements

1. Signaling
2. Road Safety
3. Drainage Structures
4. Vegetation
5. Structures
6. Slopes



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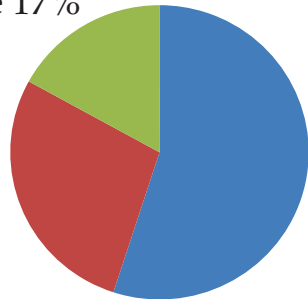
Financial and Associated Payment Models

The price proposal split to elements based on predetermined weights

Lump-sum price proposal in any of 3 major currencies (preferable in US\$)

Periodic

Maintenance 17%



Rehabilitation
55%

Routine
Maintenance 28%

- Frequent Milestone Payments for Rehabilitation works
- 80% of cost will be paid upon completion of predetermined milestones (5 km sections) 20% paid in installments during maintenance phase

Lot 1 Red Light to Gbarnga 189 kms

Lump-sum Price = \$166 M

Rehabilitation
Price

\$92M

Routine
Maintenance
Price

\$44.8M

Periodic
Maintenance
Price

\$29.2M

- Quarterly Routine Maintenance Payments
- 28 quarterly payments (7 years maintenance period) of \$1.6 M (\$44.8M divided by 28)

Payment Structure

Advance Payments – 20% of the work to be done at each stage

Rehabilitation Phase

- Frequent Milestone Payments
- Collar imposed on Total payout
- Part of payments (20%) are integrated in aintenance payments

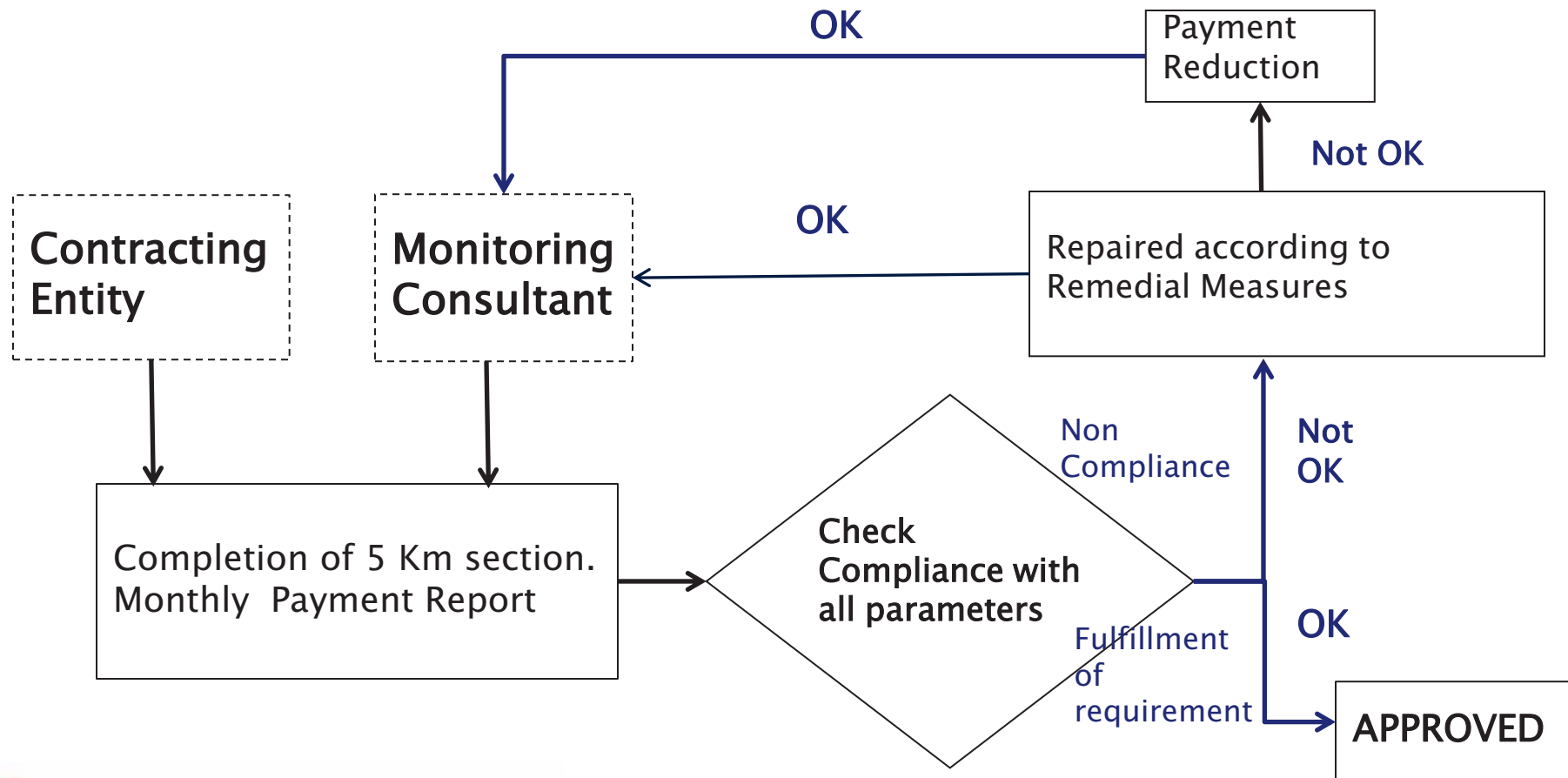
Maintenance Phase

- Quarterly Payments

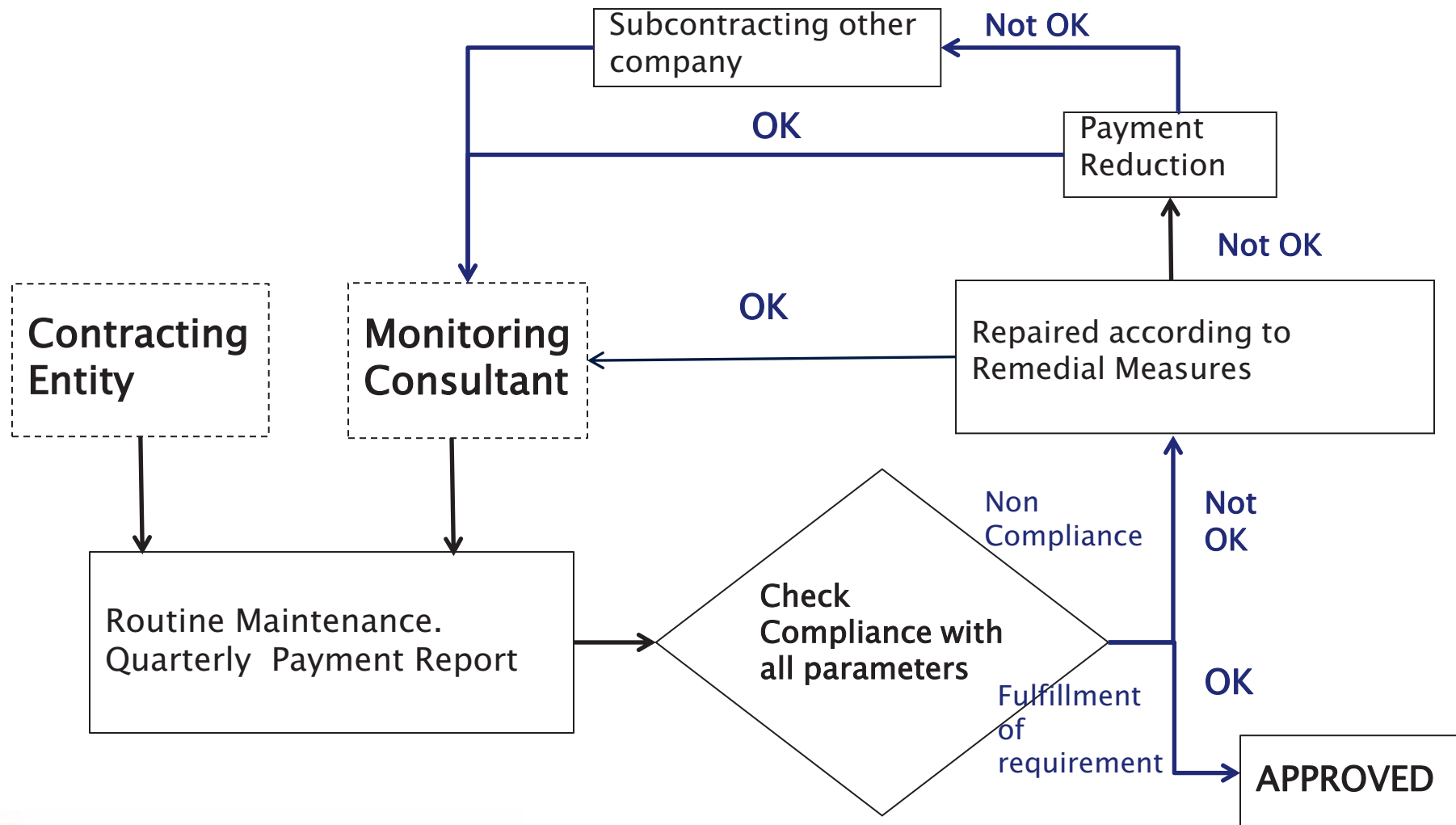
Periodic Renewal Ph

- Frequent Milestone Payments

Output based Rehabilitation Measurement Process



Output based Routine Maintenance Measurement Process



Unit Rates for Non Compliance– examples

Road
User
Comfort

| Item Description | Unit rates for Non Compliance |
|--|--|
| <p><u>MAXIMUM IRI FOR ANY ONE-KM SECTION OF EXISTING PAVEMENT</u> Average value for any one-km road section < <u>•4.0 IRI</u></p> | <p><u>1.25%</u> of the quarterly lump sum for one km applied to each one-km section which does not comply</p> |
| <p><u>AVERAGE PAVEMENT ROUGHNESS FOR ENTIRE ROAD</u> Average value for entire road or road section < <u>•3.0 IRI</u></p> | <p><u>1.25%</u> of the quarterly lump sum for one km applied to each one-km section which does not comply</p> |

Payment Reduction – Non Compliance

The Contracting Entity must comply with the service level requirements within the time limit allowed for repair, or will have to face payment reductions escalated in three stages:

Stage 1

Consists on the application of the payment reductions for non compliance of level of service required, applicable during the first 30 days of non compliance after official notification.

Stage 2

Additional thirty (30) days will be given to repair the no compliances after official notification.

Deduction formula:

$$PR = 2^n * PR_x$$

D :# of days for non-compliance

PRx: unit rate of payment reduction for parameter x.

Coefficient $n = \left\{ \frac{D-1}{30} \right\}$

Stage 3

After sixty (60) days of non compliance the Employer has the option of sub-contracting another company to remedy all the “non compliance”.

The Contractor fully responsible for all works and repairs done by the sub-contractor as well as payments for those works.

Gradual Compliance during Rehabilitation Period

The full compliance with all the service level criteria is expected to be reached gradually.

Milestones indicate the minimum length (in percentage of the total road package) that should meet all the service criteria.

POST OPERATION STAGE

During the 8th year of the project, the Periodic Maintenance takes place on both roads with the design criteria presented previously.

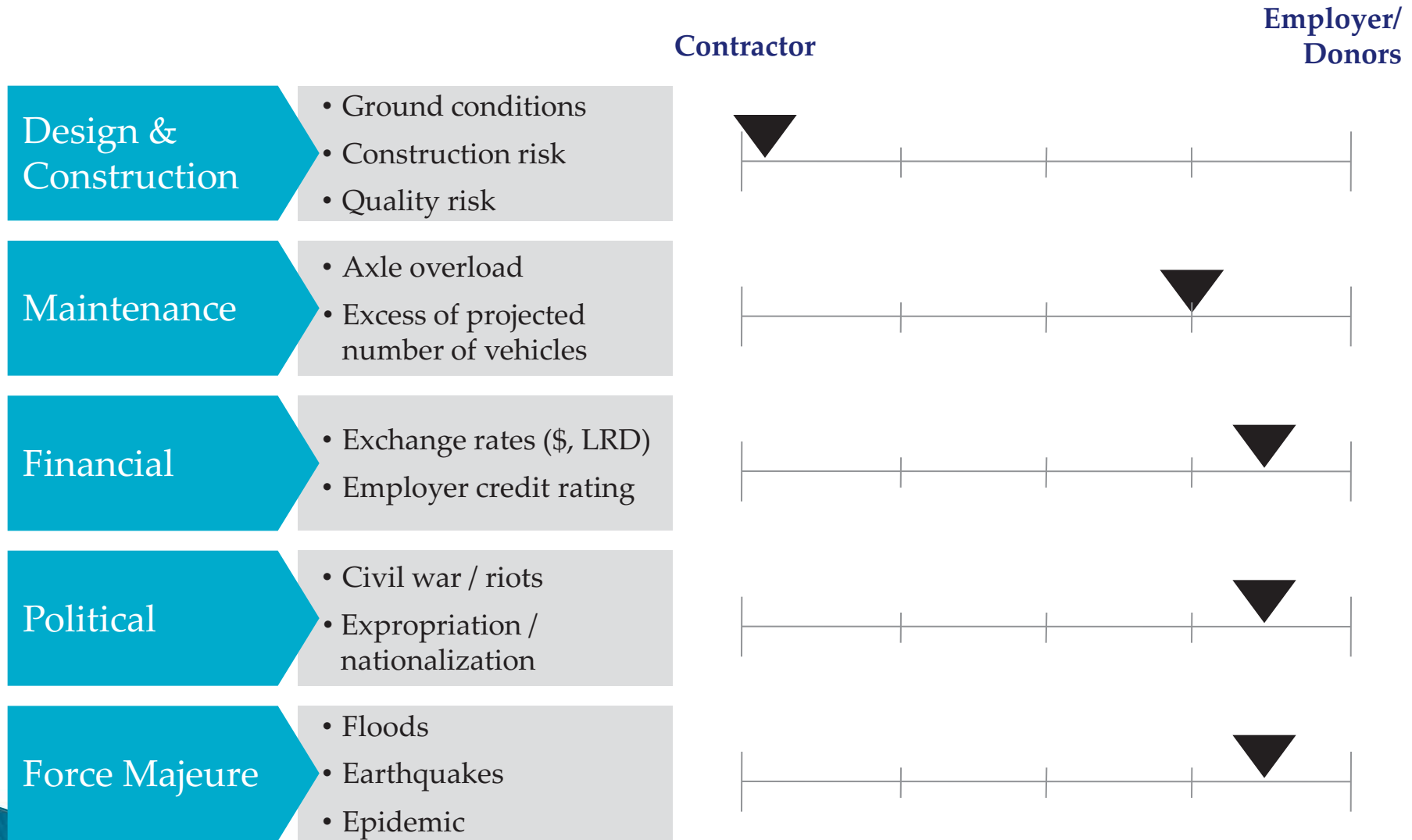
At the end of the OPRC (10 years), the Contracting Entity transfer the road to the Government of Liberia with the Predefined condition:

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Risk Mitigation Plan– Major Factors

(Clearly Identified in the Contract)



Traffic/Axle Load Risk

Periodic monitoring of excessive axle load (standard 8.2 Ton) and traffic volumes by the contractor and measured by an independent expert

Predetermined

Agreed compensation will be determined based on Axle Load and/or Traffic Volume Compensation Tables

| Traffic level/ axle over load | Compensation |
|----------------------------------|--------------|
| Standard | - |
| Stand + 15% | TBD |
| Stand + 20% | TBD |

Compensation

The Contractor may claim additional costs with justifications due to excessive axle load or traffic level

A Monitoring Consultant will evaluate the validity of the claim and determine the amount of additional costs to be paid as compensation

Beyond 15% Risk is with Employer . Compensation due to the Contractor.

Termination Risks

Force Majeure or Employer's default

Following 6 months of delays or when Reinstatement is deemed uneconomical by the Independent Expert, the Contractor may claim Termination and compensation:

During Rehabilitation phase:

- 125% of total **rehabilitation payments** until termination minus already paid **payments** plus 10% of un paid **payments**

During Maintenance phase:

- 125% of total **rehabilitation payments** minus already paid **rehabilitation payments** + 10% of all remaining **maintenance payments** the Contractor would have normally received

Contractor's default

Should the Contractor breach its obligations, the Employer may claim termination specifying the cause of the breach and a remedy period (>90 days)

Only if the Contractor does not remedy the breach during the remedy period, can the Employer terminate the project

Payment to Contractor

- 125% of total **rehabilitation payments** minus any paid **rehabilitation payments** minus **capped** damages suffered by the Employer as a result of the breach

Guarantees in LIBRAMP

1. Rehabilitation

- ~10% of Rehabilitation Cost
- US\$ 8.75 M
- Validity until 3 months following the issuance of Completion Certificate
- In addition 5% Retention as the works progress

2. Maintenance

- 2 Months before completion of Rehabilitation Works
- Valid until submission of Pre Transfer Guarantee
- ~ 10% cost of Maintenance Works
- US\$ 3.5 M

3. Pre- Transfer

- 3 Years before Contract end
- Valid until one year following the project handover
- ~20% of cost of Periodic Works
- USD 6.0 M

Figures indicated above are for Lot 1 Contract.

Thank You

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