

PUNJAB STATE ROAD SECTOR PROJECT
LOAN # 4843-IN

**Consultancy Services and Project Preparatory Studies for
Package II (Phase II)**

Interim Report 1



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(Phase II)
Interim Report 1**

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1 Executive Summary

1.1 Terms of Reference Requirements for the Interim Report

The requirements for the Interim Report listed in the Terms of Reference for the Consultancy Services and Project Preparatory Studies for Package II (Phase II) of the Punjab State Road Sector Project Loan # 4843-IN are summarised in the table below..

TASK/PART	Sub-Task	Deliverables List	Status
A. Development of Strategy	A1: Definition of Service Levels	Recommended Generic OPRC Service Levels	Included in Section 1.
	A2: Financial Model to be Used for Payment	The development of at least 3 alternative cost recovery models and the recommendation of the most optimised method for contractor payment	This report is delayed until pilot networks are identified and initial data collection on these networks can take place. Financial models will be included in the Interim Report 2.
	A3: Legal Framework,	Report on the existing legal framework for the implementation of the OPRC concept	Included in Section 2.
	A3: Environmental and Social Frameworks	Report on integration of social and environmental requirements into the conceptual designs and contract documents	Included in Section 3.
	A4: Confirmation of Contracting Capacity to Undertake and Manage the Works	Report on existing capacity of the contracting industry to deliver on the OPRC contracts and recommendations to improve capability and capacity	Included in Section 4.
	A5: Overseas Study Tour	Study tour itinerary & briefing notes and study tour report	The Study Tour has been postponed until February 2009. The Study Tour Report will be included in The Interim Report 2.
	A6: Development of Contract Format	Report recommending OPRC contract format	Included in Section 5.
	A7: Industry Consultation Workshop	Workshop held (& debrief notes)	Workshop 1 was held in September and debriefing report was submitted..
	A8: Development of a Comprehensive Approach to Allocation of Risk	Report on risk allocation and management	Programmed for Interim Report 2

TASK/PART	Sub-Task	Deliverables List	Status
B: Review Adequacy of Current Information & Collection of Additional Condition Data	B1: Checking Suitability and Selection of the Proposed Road Sections to be Included in OPRC	Report recommending roads for piloting OPRC	Report recommending Pilot OPRC Roads was Included in Section 6.
	B2: Review of Adequacy of Current Information	Technical Report recommending the need for supplementary data collection programme	Included in Section 7. Appendix 5 summarises data collected to date.
	B3: Collection of Additional Roughness, Rutting and Video of Network	Report on the Selection, Purchase of, and training with, Portable Profilometer equipment.	Included in Section 8.
	B3: Collection of Additional Roughness, Rutting and Video of Network	Report on collection of additional data and validated data lodged in the HIMS system.	Programmed for Interim Report 2
C: Preparation of Conceptual Designs and Bidding Documents	C1: Definition of Service Levels for Each Road Included in the Pilot Study	Confirmation of Service Levels for each Road Hierarchy	Programmed for Interim Report 2
	C2: Contract Packaging, Conceptual Designs, Financial Model and Confidential Price Estimate for Each Contract	Recommended Financial Model, Conceptual designs for-gradation, Rehabilitation and Maintenance Forward Work Programme under OPRC including previously identified road safety improvement designs, schedules, specifications and confidential price estimate.	Programmed for Interim Report 2 Programmed for Draft Final Report
	C3: Estimate and Pricing for Emergency Works	Basis & price estimate for emergency works	Programmed for Interim Report 2
	C4: Preparation of Contract Documentation	Contract documents for pilot OPRC contracts , and draft TOR for Future Technical Assistance to the GOP under Part E	Programmed for Interim Report 2

TASK/PART	Sub-Task	Deliverables List	Status
D: Support to the Procurement Process	D1: Prequalification of Contractors	Proposed contractor prequalification scoring system Prequalification documents, including questionnaire forms Prequalification evaluation report (for each road package)	Programmed for Draft Final Report; Pre qualification Evaluation Report
	D2: Pre-Bid Workshops	Workshop held (& debrief notes)	Programmed for Draft Final Report; Tender Evaluation Report
	D3: Tender Process and Evaluation of Tenders	Assist with Tendering Workshops, Address Tender Queries, Tender evaluation and reports	
	D4: Training	Prepare training plan and report at the conclusion of all training and workshops	Workshop I Report was submitted in September ROMDASTraining Report Programmed for February Workshop Reports as per Programme

2 Report A1 - Definition of Service Levels

1. The overall philosophies for setting the generic Service Levels are that:
 - **All activities should be managed through performance measures.** The contract should be void (to the maximum extent possible) of any prescriptive methods to achieve results, and should instead have performance measures that specify the outcome required.
 - **What gets measured gets done.** Contractors should reasonably be able to focus on the measurements to drive their work programmes. If something is not being measured, then it is not reasonable to expect the contractor to undertake the work.
 - **Must be affordable.** A balance must exist between the cost of service and the level of service. Not all roads should (or need to) be maintained to the same level.
2. It is recommended that the three broad categories of Service Levels defined in the World Bank Sample Bidding documents namely:
 - **Road User Service and Comfort** measures,
 - **Road Durability** measures,
 - **Management Performance** Measures,be adopted for implementation in this Output and Performance Based Road Contract (OPRC).
3. The setting of “fit-for-purpose” service levels is pivotal to the whole OPRC exercise. In summary, the selected levels should:
 - follow the lessons from applicable global and national precedents, refined to match the Punjab situation, to minimise implementation problems;
 - be neither too many/complex or too few/simple; and
 - be quantifiable, based on readily collectable/verifiable condition data, and correspondingly permit an equitable OPRC payment regime.
4. The generic Level of Service measures initially proposed in this report are expected to require adjustment following the collection of the respective high speed condition data by the ROMDAS vehicle and the network pavement deflection data.
5. Because of the additional cost of skid resistance data collection it is recommended that this Level of Service measure not be adopted at this time.
6. The collection of texture data is possible with the ROMDAS machine but further discussion is required with the PRBDB over the application of this information in terms of better managing the macro-texture component of surface friction contributing to wet weather skid resistance, before any further commitment is made in applying this Service Level measure on the OPRC pilot network.

7. The proposed Service Level Measurements listed in Table 4.1 are expected to be applicable to all potential networks currently under consideration for management under OPRC. These generic Service Levels are also considered satisfactory as a basis for initiating consultation with representative road user groups and other affected parties.
8. Further refinement of these Service Level Measures will be necessary once the consultation phase of this task is complete and the additional data collection phase under Task B3 has determined the baseline conditions. Further more refined HDM modelling to be completed under Task C1 will then assist in defining the cost of these Service Levels for inclusion into the cost recovery models.
9. An option for phasing compliance with the final Service Level measurements by the Contractor is outlined in Table 4.2. This will allow time for the Contractor to understand the way his activities on the network are influencing the performance measurers and for him to then, if necessary, alter these to ensure that compliance is achieved before any payment penalty is applied.

3 Report A3a – Legal Framework

This report prepared by Atul V. Sood, Advocate addresses legal issues on which he was consulted relating to the implementing of OPRC in Punjab State. Issues addressed are:

1. Legal position with regard to access to roads which have been handed over to the OPRC Contractor;
2. The tenability of Government of Punjab / PRBDB in entering long-term contracts of 10 to 15 years and the commitment of Government to allocating funding o these contracts;
3. The manner to deal with contracts that have an existing maintenance obligation (e.g. PSGMY contracts) within the OPRC network;
4. The rights of local agencies & third parties (public & private sectors) that have existing assets (e.g. power, water, telecommunication, etc.) within the ROW or the legal position of these parties after award of the OPRC Contract;
5. Existing legislation that may obligate the OPRC Contractor to deal with emergency situations and circumstances that need proactive action to ensure safety / traffic flow within the ROW;
6. Where the future situation changes (e.g. land use, new legislation – allowance for traffic access, etc.) and causes a difference in the traffic patterns and usage of the OPRC road network, the provisions and confines of the Contract Form that such situations will cause a Variation
7. The situation where a section of the awarded network is removed from the OPRC Contractor for an Up-gradation Project;

4 Report A3b - Assessment of Environmental and Social Frameworks for OPRC

Preliminary Impacts and Mitigation Measures

- Generic impacts and mitigation measures are fairly well covered. However, in order to suit the OPRC format, the management measures will need modification, augmentation and customization to suit the OPRC model taking into account the role of OPRC contractor during operational phase.
- The EMP should be strengthened to include more operational phase management measures such as those on road safety and accident spot analysis; tree maintenance; storm water drain maintenance; recurrent consultation process with local user community/stakeholders and using the feedback to manage the road; third party audit system to monitor performance integrating it with any engineering audit proposed by OPUS; and performance incentives based on stakeholder and 3rd party audit outcome.

Institutional Framework

- The institutional framework formulated in the Screening Assessment consists of Contract Management Unit (CMU) and Contract Implementation Unit (CIU) reporting to Project Director within PRBDB. Considering the long term nature of OPRC projects, a stable Institutional arrangement needs to be formulated based on discussions and concurrence from PRBDB.

Environmental Supervision, Monitoring and Reporting Systems

- The Environmental Management Plan Implementation Unit (EMPIU) within CIU where an Officer (preferably in the rank of Asst. Engineer) would be responsible for supervising the implementation of the EMP with the assistance of the Environmental Specialist of the Construction Supervision Consultant (SC). This arrangement for Supervision needs to be re-assessed based on discussions and concurrence from PRBDB. • Environmental Quality Monitoring program recommended in the Screening Assessment report is comprehensive and adaptable to OPRC Pilot with little modifications, if needed.
- A linear reporting system initiated at the lowermost level and reaching till Project Director level has been envisaged in the Screening Assessment Report. In light of the comments above on Institutional framework and supervision systems, reporting system will also undergo modifications to suit OPRC model.

Environmental Training and Capacity Building Needs

- Environmental Training has been fairly well covered and the training framework recommended in the Screening Assessment report is adaptable to OPRC projects will augmentation and strengthening to suit the OPRC requirements and long term nature of the project. A provision for recurrent training program to OPRC Contractor and sub-contractor staff and user communities/ stakeholders needs to be built-in considering the long term nature of the project.

Cost Estimates

- Typical cost estimates per linear length of road in km for dust suppression, construction of noise barriers, environmental monitoring, disposal of solid wastes, plantation including 3 years of maintenance and relocation of hand pumps, relocation of temples and training have been

provided. This unit cost data needs to be re-assessed in the current year and provision for escalation during the OPRC contract period needs to be included.

- The cost estimates must be linked to a measurable bill of quantities and payment linked to performance as is done in an engineering works.

Social Aspects

Under the proposed OPRC contract there are not many and major social issues as the proposed roads do not need any land acquisition. However few other relevant measures like public consultation and disclosure plan needs to be developed before embarking upon the project. Also a full and complete social baseline survey of the area needs to be done to identify all the project affected people (PAPs) . Based on that an entitlement matrix as given in the R & R policy for all the PAPs need to be made to negate any adverse impact of the project.

5 Report A4 – Confirmation of Contracting Capacity

Table 1: Industry Capacity Overview

Activity	Contractor	Consultant	Action / Comment
Staff resources	✓	✓	Resources are available, but will require some training in new approach
Physical resources	✓	NA	Contractors have (or could readily get) the resources needed
Maintenance management	Not system based	Limited	Training to be provided on maintenance management
Performance based maintenance activities	Limited to bridge construction and maintenance management on road improvement schemes	Limited	Training to be provided on maintenance activities
Long term contracts	Limited to construction contracts	Limited to construction contracts	Previous long term (5 years) contracts are only of a construction type or Design and Build.
Quality assurance	Limited to Batching Plant Quality Control systems	Variable and dependent upon size and experience.	ISO or equivalent certification only typically held by large national or international companies.
Pavement and surface understanding	✓	✓	All parties generally understand pavement and surfacing construction
Multi-asset experience	Variable and dependent upon size and experience	✓	The value of experience beyond the scope of Road Construction and Maintenance needs to be evaluated during the prequalification phase.
Project management	✓	✓	Management of large contracts is routine
Data collection and analysis	Limited to non-existent	Variable and dependent upon size and experience.	Variable experience in collecting and interpreting data.
Tender document development	NA	✓	External input will be required for initial OPRC tender
Business risk processes	✓	✓	Experience available from other contract types and standard operating procedures, but will need to be modified for OPRC.

Activity	Contractor	Consultant	Action / Comment
Partnership experience	Some but generally limited to large national Contractors and within in the context of road construction.	Variable and dependent upon size and experience.	The ability of all parties to work cooperatively within a trusting environment is critical to the success of the OPRC concept.

6 Report A6 – Development of Contract Format

Introduction

- (i) The *World Bank Sample Bidding Documents* will provide only a basis for the final contract structure however it is anticipated that a number of amendments will be necessary to reflect both the specific and unique needs of this pilot and to incorporate the recommendations of this report.
- (ii) The reviews of Contractor Capacity undertaken under Task A4 indicate that the Contracting Industry within the State and nationally has the capabilities to undertake the scope of work required.

Assets to be Included

- (iii) It is recommended that the majority of the assets within the road RoW and administered by the PRBDB, the PWD and the Forest Department are included in the pilot OPRC, with the only exclusions being the structural repairs to bridges, large culverts or retaining structures and the maintenance of traffic lights and street lights.
- (iv) The policy for the maintenance of network sections that are currently under construction or maintenance through the PMGSY or NABARD schemes requires further consideration from both an administrative and legal perspective. However handing over the maintenance of these sections of the network to the OPRC contractor at the commencement of the OPRC pilot or as soon as current construction work has been completed is considered to be preferred option.
- (v) Where existing asset inventories are incomplete, the OPRC Contractor will be required to record and update the existing inventory or populate a new inventory (where none exists) and submit this information to the Client within a reasonable time frame from the commencement of the contract. On-going auditing of the accuracy and completeness of this data is strongly recommended.
- (vi) The verification of all existing inventory data and the collection of new inventory data in the field should be linked to GPS coordinates at the time of data collection.

End of Contract Residual Road Condition

- (vii) All of the current Output and Performance based Road Contracts (OPRC) that Opus International Group are aware of have specified minimum annual quantities (m²) of pavement rehabilitation and surfacing renewal as the basis for managing the risk of unintended pavement asset consumption. This concept is also provided for within the World Bank's Sample Bidding Documents for OPRC.
- (viii) While further international research into alternative ways of measuring and managing this risk will be on-going, there is presently still insufficient confidence over the use of condition measures or pavement strength assessment tools to allow us to recommend them as the only mechanism for ensuring unintended consumption has not occurred.

- i. It is therefore recommended that both field observations and HDM modelling outputs be used to determine a minimum annual quantity (m²) of surfacing renewal and pavement rehabilitation that will be specified in the Contract documents to be undertaken by the Contractor. It will remain the responsibility of the Contractor to identify the location of this work along with the detail of the proposed design.
 - ii. In addition it is also recommended that a mechanism is developed that will permit substitution between surfacing renewal and rehabilitation quantities to be agreed by the CMB. This would account for the level of variability that is likely to occur between years, or where there is a reduction in the need for the specified annual quantities as a result of better than expected performance delivered from the OPRC Contractor's pavement and surfacing treatments. However any substitution will be limited to a percentage (e.g. ± 10%) of the specified annual quantities and will need to be fully justified by the Contractor before being submitted for approval.
- (ix) It is recommended that a Client funded programme of network wide pavement deflection testing utilising a Falling Weight Deflectometer is undertaken at an appropriate frequency and that through analysis of this information over time, network specific calibration factors determined so that this approach can be used in the future to monitor pavement consumption.
 - (x) It is recommended that an acceptable distribution of pavement deflection values to be achieved through post construction testing on all rehabilitation and upgradation works be developed. This will assist in encouraging the Contractor to apply adequate Quality Control in all pavement construction works which will give greater confidence that the expected design life of the rehabilitated pavements has actually been achieved. To calibrate the test results it is recommended that previously re-constructed pavements using verified construction practices and materials be tested and the distribution of deflection results correlated with expected pavement design lives. Because the testing results can be influenced by both the time between construction and testing as well as antecedent weather conditions, it will be necessary to plan the post construction testing well in advance in an effort to mitigate these effects on the overall results.
 - (xi) The application of Durability Performance Measures and Road User Service and Comfort Measures can be expected to control pavement repair and construction workmanship issues.

Recommended Procedure for Joint Inspections Prior to Network Hand Back

- (xii) The requirement for the Contractor to develop and operate a defects recording system is to be monitored by the Client through regular joint inspections.
- (xiii) This list is to form the basis of formal inspections of the network and the identification of any uncompleted work at 1 year and at 6 months from the due date for the end of the contract. In addition a further joint inspection is recommended at 2 months from the expiry of the maintenance defects period.
- (xiv) We will ensure the contract documents also require the Client and the outgoing and incoming Contractors to complete a joint inspection within two weeks of taking

possession of the network. This requirement will then avoid the potential for a dispute between the new Contractor and Client over the quality of repairs and/or condition of the network presented by the out-going Contractor.

Financial Arrangements for Performance Guarantees

(xv) The preferred alternative would be for the Contractor to obtain a Performance Guarantee (Performance Bond) to a value that would provide the same level of security to the Client as retentions would but with a reduced potential for financial hardship and administrative complexity than that associated with retentions. This performance guarantee would have three components:

i. Construction Guarantee:

This bond needs to cover the estimated value of all of the planned upgradation works during the term of the OPRC pilot. It is recommended that 50% of the bond is released following completion of all of the planned upgradation works and the balance upon acceptance of all post construction inspection and subsequent pavement deflection testing.

ii. Operation and Maintenance Guarantee:

This bond needs to cover the risk of inadequate maintenance or re-work arising from poor pavement rehabilitation construction or maintenance activities. The value of this guarantee would be expected to be to the same value as the estimated aggregated sum of the retentions plus another 10% to allow for the risk associated with a fixed value based upon the contract estimate rather than on a percentage of actual physical works claims which may include the value of any additional services. However it is recommended that this value be reviewed on a 2 yearly basis and if necessary the value amended in line with the actual contract value and to ensure it's value is sufficient to cover the full cost of repairing any defective workmanship and backlog of uncompleted maintenance. This bond would be released at the end of the contract term.

iii. Pre-transfer Guarantee:

This bond would need to be provided by the OPRC Contractor at 3 years from the end of the contract duration and must remain valid for 2 years after the end of the contract. This bond is to ensure that the Contractor complies with his obligation to carry out the required level of maintenance right through to the end of the full contract term. It should be for an amount equivalent to the average annual cost of the maintenance activities (including pavement rehabilitation) completed over the previous 7 years. This bond would be called in by the Client in the event that the average number of Durability and Road User and Comfort Performance Measure Non-conformances over the last 3 years of the contract exceeded the average annual number of non-conformances for the previous 7 years by more than 5%.

(xvi) Interviews held with Contractor's during the preparation of the report on Contractor Capacity under Task A4 indicated that the Contracting Industry was familiar with the use

of Performance Bonds and they did not foresee any problems with the application of this to the OPRC pilot format.

Compliance Framework

- (xvii) It is recommended that a “Contract Management Board” (CMB) comprising an Executive committee of senior management personnel from both the Contractor’s and Client organisation is established. This Board would meet at regular (at least 6 monthly) intervals to review performance, and who would have the authority to agree necessary actions to address any issues threatening the successful outcome of the OPRC pilot.
- (xviii) To facilitate and maximise the involvement of the communities being served by the OPRC network, it is recommended that CMB be responsible for developing a communication strategy for consulting with the heads of the village or townships (Sapanch) within the OPRC network on a regular basis. This would then provide a forum for specific concerns relating to the way the network was being operated and maintained to be raised and if necessary addressed by the Contractor.
- (xix) It is proposed that the contract performance system is divided into three key groups being Management Performance Measures, Road User Service and Comfort Performance Measurers and Durability Performance Measures.
- (xx) To provide an appropriate level of tolerance to the Contractor failing to achieve full compliance at all times that a “bucket” system of allowing a prescribed maximum number of Non-Conformance’s (NC’s) to be accumulated at any time before payment penalties are applied.
- (xxi) The following table outlines how the proposed payment adjustment regime will accumulate points based upon the NC’s recorded and how these will then result in the applied payment reductions.

Item	Standard	NC Multiplication Factor		Notes
		Weighting	Sub-weighting	
Repeat Non-Conformance Report	Consecutive non-Conformance Reports relating to the same occurrence in a rolling 3 month period	6	1, 2	Sub -weighting increased in the last year of the Contract
Failure to identify and record defects	Inspection and recording regimes as set out in the maintenance specifications and any amendments agree to by the CMB	6	1,2,3	Sub-weighting increased progressively during the last year of the Contract
Road User Service and Comfort Performance Measures	Any one of the RPM’s set out in the maintenance specifications and any amendments agree to by the CMB	4	1	

Item	Standard	NC Multiplication Factor		Notes
breached				
Durability Performance Measures breached	Any one of the performance measures set out in the maintenance specifications and any amendments agree to by the CMB	4	No. of Months	Sub-weighting relates to the number of full calendar months DPM is breached.
Management Performance Measures breached	Any one of the performance measures (including safety) set out in the maintenance specifications and any amendments agree to by the CMB	3	No. Weeks	Sub-weighting relates to the number of Weeks (7 days) the MPM is breached. Part weeks would be countered as a full week.
All other verified Non-Conformances	Any other breach of the specifications or any other failure to meet contractual obligations not specifically covered in the above sections	1	1	
Aggregate Non-Conformance Report Score for the Month	≤30 Full Performance Payment is made 31 or more – No performance payment is made ¹ .			

Table 2: Proposed Table of Non-Conformance Scores and Payment Reductions

- (xxii) ¹Given the uncertainty surrounding the sensitivity of this proposed scoring mechanism on the local network it will be necessary to carry out a series of tests on representative sections to see how difficult it would be to trigger a payment reduction. The final score may then need to be adjusted to provide a fair balance between acceptable levels of non-conformance and the Contractor's risk.
- (xxiii) It is recommended that the PRBDB appoints an independent auditor who would undertake regular reviews of the Contractor's performance and would nominate the randomly selected sections of the network to be audited by the Contractor. It is understood that this role will be a requirement of the Consultant yet to be selected through Part E of the T.O.R.
- (xxiv) The Contractor will be required to establish and operate a monthly operational compliance system using their own auditor, but who is independent from the operational team to establish conformance with the specified performance measurers and contract outputs.

- (xxv) The Client is to be given the ability through the contract to also instigate a Project Audit Team. The Project Audit Team would typically consist of representatives of the Client (and Consultant if appointed) and the Contractor. The Project Audit Team would undertake a joint audit of the network from time to time to gauge how well the OPRC pilot is meeting the principal objectives and whether there are aspects of the contract that should be presented to the CMB for consideration.
- (xxvi) It is recommended that regular (monthly) assessment of the Contractor's performance be undertaken and scored against predefined and agreed criteria by the Client. The criteria would be jointly developed between the Contractor and the Client as soon as possible after the award of the Contract, along with an agreed weighted scoring system. The achievement of a minimum monthly performance score would then form one of the MPM's in the Conformance Schedule. This would provide both a formal means of communication between the Contractor and the Client and an opportunity for the Client to raise any concerns or pass on acknowledgment of successful outcomes and performance.
- (xxvii) It is not anticipated that Separable Portions will be necessary within the OPRC contract nor should Liquidated Damages apply as other mechanisms for encouraging Contractor compliance are expected to be sufficient. However identified risks associated with the completion of works under adverse conditions should be highlighted in the Contract specifications. The exception to this recommendation could be where it was decided to keep the maintenance of the network sections previously constructed, under either the PMGSY or NABARD schemes, with the respective Contractors until the end of the maintenance defects periods. The application of Separable Portions covering the transfer of this maintenance to the OPRC Contractor may then be more appropriate.

Tender Evaluation Procedures

- (xxviii) It is recommended that, to adequately manage the risk of securing the most suitable Contractor(s), an Expression of Interest (EOI) be requested from all potential Contractors and a short list of suitable Tenderers be determined who will then be invited to Tender.
- (xxix) To assist with ensuring that a high level of Industry awareness is achieved prior to the commencement of the final tendering, it is recommended that a comprehensive package of information be made available to all short listed Contractors who have registered their interested prior to final tender advertising. This information should include:
- maps of the proposed pilot networks, GPS locations, relevant photographs and the network video taken during the roughness survey
 - basic schedule descriptions and specifications covering the scope work to be undertaken
 - an indicative programme and annual quantities of work
 - summary draft of the contractual arrangements
 - proposed payment mechanisms and sample bidding documents

- the roles of the various parties
 - an outline of the tender evaluation criteria and procedures that are proposed.
- (xxx) To quantify the value of the quality attributes submitted by the Tenderers to the Client it is recommended that score applied to each tender by the Tender Evaluation Team (TET) be separated into Price and a Non-Price (Quality) components. These two components will be assigned on an agreed weighting, e.g. Price 60%, Non-Price 40% that will provide an acceptable balance of risk between quality expectations and the price paid.
- (xxxi) Clearly identified non-price quality attributes, that the Tenderers must provide (separately from their Price) for evaluation by the TET, will form a component to the evaluation and selection process. These attributes would be assigned weightings to reflect the value of their contribution to the overall non price score.

The scores applied to the non-price attributes from all of the Tenderer's submissions would be used to assign a monetary value or premium that reflects the additional value of the respective Tenderers quality to the PRBDB and the GoP.

7 Report B1 – Review of Suitability and Selection of Pilot Areas

When considering the actual portion of the project area to be included in the Pilot a number of factors were considered, including the need to consider discrete networks within the overall total project area.

The factors considered were:

- Outstanding Planned Upgradation, Rehabilitation and Renewal Works
- Connectivity
- Mix of Road Types
- Risk and Success Factors
- Contracting Industry Fit
- Representative Sample of Location
- Timing of Contacts

Based on our drive-over observations and our review of the available OPRC network data, and keeping the above network selection criteria in mind, two sub network areas (“Mansa” and “Sangrur”) from within the total provided OPRC network have been identified for inclusion within an overall OPRC Pilot network.

We conclude and recommend:

1. That the two identified networks “Mansa” and “Sangrur” are adopted as a Pilot network for the OPRC. Given the estimated annual cost of these networks it is our recommendation that these two are combined into a single Pilot network.
2. That the pilot project concept (subject to budgetary constraints) be expanded to other areas in Punjab state so that OPRC outcomes can be better assessed in a situation where there is a broader range of conditions. Options for locating an additional network would include the Amritsar network inspected on the 27 and 28 September and a network in Hoshiarpur that will be inspected upon approval by GOP of the final network configuration. Section 7.6 referencing the advantages of having networks from other areas of the Punjab also refers.
3. That Pilot Network tenders are timed so they are let at such time intervals as to ensure for prior tender outcomes to be determined before subsequent tenders are required to be submitted
4. That, along the lines of discussion at the industry workshop, for the purposes of comparison, consideration is given to allocating one of the OPRC Pilot networks to the Public Works Department (PWD) to administer under the same performance criteria.

8 Report B2 – Review of Adequacy of Current Information

As part of the Opus International Group (Opus) submission for the *Punjab State Road Sector Project Loan # 4843-In Consultancy Services and Project Preparatory Studies for Package II (Phase II)*, Task B2 required a review of the current data to be undertaken to determine its adequacy in terms of:

- Service levels to be set under Task A1 and the pilot OPRC network under Task B1;
- Upgradation standards and pavement design;
- Contract performance measures;
- EIA and SIA requirements to be considered and implemented;
- Network safety strategies and improvements to known black spots;
- The impact of existing utilities in the corridor and their impact upon upgradation and pavement rehabilitation;
- Risk identification and allocation mechanisms; and
- Financial model development.

Data sources identified within the review included:

- Feasibility study reports;
- HDM-4 setup files;
- Consulting Engineering Services (India), Feasibility Study Report for Project Preparatory Studies for Punjab State Road Sector Project, Package I, Phase I dated March 2006;
- Lea Associates Strategic Options Study for Punjab Roads Dated January 2004; and
- Various ancillary reports provided by PRBDB

The key findings from this task are:

- Some basic inventory data is available for most of the network but more data especially as regards to periodic maintenance interventions is required;
- A limited amount of condition data is available but most data is now several years old;
- Traffic data collected in 2004 and 2005 is available for about half of the network roads but current traffic data is required for pavement design;
- The proposed data collection for Task B-3 is essential to the success of the project; and
- The measurement of residual life in particular will be a challenge. Even with the recommended network level survey under Task B-3, no time series data exists for calibrating models.

The following conclusions are made:

- Besides the planned high speed data collection, it will be necessary to collect significantly more data (e.g. basic inventory – pavement thickness, age of construction, periodic

maintenance history) than currently exists to enable for both the Opus team and tendering contractors to estimate the quantum and cost of works involved in the contract. Task B-3 will need to be carefully scoped to maximise the benefits to the project from available Provisional Sums;

- The absence of traffic data is of critical concern. It is essential that traffic data is collected to enable for the setting of levels of service, designing of upgradation and rehabilitation works, and estimation of maintenance efforts required by the contractors;
- The lack of quality data will affect the reliability of predictions from the HDM-4 pavement performance model with only one data point (that proposed under Task B-3) for some of the network roads and only two points on others.
- Setting appropriate residual life targets for the end of the contract period will be difficult with a single data collection run for a large part of the network. It is therefore recommended that deflections at the time of completing the works be undertaken to ensure quality control rather than for predicting residual life at the end of the contract period (notionally 10 years); and
- Overall the current quantity and quality of data is not sufficient for either the Opus team to accurately develop the tender quantities, or a potential contractor to reliably estimate his tender price. It is therefore recommended that use be made of the provisional sum allowance within Task B-3 to address, as much as is practically reasonable, the remaining areas of data inadequacy.

To address the above issues, a data collection plan has been established. The plan is presented in detail within the report, with a summary in the table below.

Activity	Description
1. High Speed Data Collection	Roughness, transverse profile, texture, GPS coordinates and video of the entire network.
2. Traffic Data	Three day counts on one or more locations on each network road in accordance with road classification and traffic volume.
3. Visual Condition Inspection	Visual inspections as required to identify testing locations, verify work programmes, collect easily observable basic inventory data and other activities as required.
4. Pavement Deflection	Benkelman Beam at either 500m centres or Falling Weight Deflectometer (FWD) testing at 250m centres staggered between lanes across the network – Refer Table 7 for detail.
5. Soils Investigation	On selected sections of the network test pits as per Table 7 with the following tests: <ul style="list-style-type: none"> • Field Dynamic Cone Penetrometer (DCP) tests at the base of the test pit and in the adjacent shoulder to a depth of 1.5 m; • Grading of base and subbase materials; • CBR – Soaked and Unsoaked; • Plasticity Index

The establishment of control sites and benchmark sites is also recommended as a part of a longer research effort into pavement performance. This work will initially require the identification of

suitable sites within the network to be managed as control or benchmark sites and then a programme of long term detailed data collection prepared to establish the calibration factors to be used in further refining the pavement deterioration model.

The HIMS database system, supplied by ROMDAS as part of their system for high speed data collection will be implemented and populated with the new information once this has been collected. In addition, existing data that is appropriate and validated will also be entered into this database.

It is recommended that any remaining inventory data not already held by the PRBDB or easily collected during remaining field visits is left for later collection by the OPRC Contractor. Except where it may be vital to provide more accurate information to Tenderers at the time of tender (to assist with pricing), it is recommended that the balance of the outstanding inventory data is subsequently collected by the OPRC Contractor over the first 6 to 12 months of the contract.

The proposed minimum data fields that are recommended to be populated over time are indicated in Table 8 in Section 4.

Note: This report was compiled before discussions on the final network size and location was completed. Comments on data availability relate to the originally identified 652km road network, although there is an expectation that a similar level of data availability exists within other road networks across Punjab.

9 Report B3 Report on Selection of High Speed Data Collection Equipment

As part of the Opus International Group (Opus) submission for the *Punjab State Road Sector Project Loan # 4843-In Consultancy Services and Project Preparatory Studies For Package II (Phase II)* a provisional sum was included for the supply of high speed data collection equipment.

Collection of roughness, rutting and video data was specified as a minimum requirement. Opus additionally recommends the inclusion of texture measuring capability as it can be readily captured by the same high speed data collection equipment at marginal additional cost, and provides a measure that directly influences the safety of the network. While the direct measurement of skid resistance may be a more common measure in some countries, this requires additional and expensive equipment to collect. Texture measurement is a sensible first step in our opinion.

The Opus submission proposed the use of the ROMDAS system for meeting the RFP requirements. Before committing costs against the provisional sum, the client has requested a short justification report on the ROMDAS system, including a comparison with other similar solutions.

This report summarises the outcomes of our review and concludes that the ROMDAS is an appropriate value for money solution and meets the contract's requirements. In addition to meeting the functional requirements, the extensive support base (30 other users plus permanent offices) within India is seen as a strength of this solution. A review of other systems in the market did not identify any other products that had the capability of meeting the RFP requirements without significantly increasing in costs and/or the forgoing of video collection equipment.