LEGIII/PE-2240-00

Señor
Javier Pérez de Cuellar
Ministro de Relaciones Exteriores
Ministerio de Relaciones Exteriores
Palacio de Torre Tagle
Jirón Ucayali 1363
Lima 1, Perú

Ref: Cooperación Técnica No Reembolsable ATN/JF-7023-PE. Programa de fortalecimiento del Sistema de Información Geográfico (SIG) para apoyar los estudios regionales de transporte, planificación y privatización de carreteras.

Estimado señor Ministro:

Esta carta convenio (en adelante denominada el "Convenio") entre la República del Perú (en adelante denominada el "Beneficiario") y el Banco Interamericano de Desarrollo, en su calidad de Administrador del Fondo Especial del Japón (en adelante denominado el "Banco"), que sometemos a su consideración en esta primera parte (en adelante denominada las "Condiciones Especiales"), tiene el propósito de formalizar los términos del otorgamiento de una cooperación técnica no reembolsable al Ministerio de Transportes, Comunicaciones, Vivienda y Construcción (en adelante denominada la "Cooperación Técnica"), para financiar la contratación de servicios de consultoría y la adquisición de bienes, necesarios para la realización del programa de fortalecimiento del Sistema de Información Geográfico (SIG) para apoyar los estudios regionales de transporte, planificación y privatización de carreteras (en adelante denominado el "Programa").

Este Convenio se celebra en virtud de la Carta Acuerdo firmada entre el Banco y el Gobierno del Japón, que establece el Fondo Especial del Japón, con fecha 26 de abril de 1988.

Los términos y condiciones de la Cooperación Técnica están incluidos en esta primera parte y en el Plan de Operaciones que se adjunta como Anexo Unico y que forma parte integrante de este Convenio. Los aspectos principales de esta operación son los siguientes:

1. El monto de los recursos otorgados por el Banco para la realización de la Cooperación Técnica será hasta por el monto de setecientos cincuenta mil dólares de los Estados Unidos de América (US$750.000), que se desembolsará con cargo a los recursos del Fondo Especial del Japón (en adelante denominado la "Contribución"). La Contribución será otorgada con carácter no reembolsable.

2. Las partes convienen en que la entidad encargada de actuar como contraparte nacional para la ejecución del Programa será el Ministerio de Transportes, Comunicaciones, Vivienda y Construcción (en adelante denominado el "MTC"), con la participación del Instituto Nacional de Estadística e Informática (en adelante denominado el "INEI").

3. El Beneficiario, por intermedio del MTC, se compromete a realizar oportunamente los aportes que se requieran, en adelante el "Aporte", en adición a la Contribución, para la completa e ininterrumpida ejecución de la Cooperación Técnica. El total del Aporte se estima en el equivalente de ciento cincuenta mil dólares (US$150.000), con el fin de completar la suma del equivalente de novecientos mil dólares (US$900.000), en que se estima el costo total de la Cooperación Técnica, sin que estas estimaciones reduzcan la obligación del Beneficiario de aportar los recursos adicionales que se requieran para completar la Cooperación Técnica. El Aporte se destinará a financiar las categorías que, con cargo al mismo, se establecen en el presupuesto que aparece en el Anexo A.

4. Los plazos para la ejecución y el desembolso de los recursos de la Cooperación Técnica serán de doce (12) y dieciocho (18) meses, respectivamente, contados a partir de la fecha de este Convenio. Estos plazos sólo podrán ser ampliados, por razones justificadas, con el consentimiento escrito del Banco.

5. El Banco se compromete a contratar y pagar directamente los servicios de consultoría necesarios para el cumplimiento de los objetivos de la Cooperación Técnica, de conformidad con lo establecido en el Anexo Unico. Para estos efectos, el Banco seleccionará, previo acuerdo con el MTC, el experto o expertos individuales/firma o firmas consultoras necesarios (en adelante denominados indistintamente los "Consultores"), para la ejecución de las actividades contempladas en la Cooperación Técnica.

6. El Organismo Ejecutor se compromete a colaborar con los Consultores en la realización de sus tareas, y a proveerlos con el apoyo logístico, servicios secretariales, espacio de oficinas y comunicaciones locales necesarias para el desarrollo de la Cooperación Técnica.

7. El otorgamiento de la Cooperación Técnica por parte del Banco no implica, en forma

alguna, un compromiso de parte del Banco de financiar, total o parcialmente, el programa, proyecto o cualquier otro servicio que directa o indirectamente pudiera resultar de la ejecución de la Cooperación Técnica. Las opiniones de los Consultores no comprometerán al Banco o al Beneficiario, los cuales se reservan el derecho de formular al respecto las observaciones o salvedades que consideren apropiadas.

8. Todo aviso, solicitud, comunicación o notificación que las partes deban dirigirse en virtud de este Convenio se efectuarán por escrito y se considerarán realizados desde el momento en que el documento correspondiente se entregue al destinatario en la respectiva dirección que, en el caso del Beneficiario, se indica en la primera página de este Convenio y que en el caso del Organismo Ejecutor y del Banco se anotan a continuación, a menos que las partes acuerden por escrito de otra manera:

Del Organismo Ejecutor:

Dirección Postal:

Ministerio de Transportes, Comunicaciones, Vivienda y Construcción
Calle 1 S/N
Urbanización Corpac
Lima 27, Perú

Facsímil: (51 1) 224 3261

Del Banco:

Dirección Postal:

Banco Interamericano de Desarrollo
1300 New York Avenue, N.W.
Washington, D.C. 20577

Facsímil: (202) 623-3096

Le ruego manifestar su aceptación a los términos del presente Convenio, en nombre y representación del Beneficiario, mediante la suscripción y entrega de uno de los ejemplares originales en las oficinas del Banco en Perú.

Este Convenio se suscribe en dos (2) ejemplares originales de igual tenor, por representantes debidamente autorizados para ello, y entrará en vigencia en la fecha de su suscripción por el Beneficiario.

Atentamente,

Banco Interamericano de Desarrollo

Vladimir Radovic
Representante en Perú

Aceptado:

República del Perú

Javier Pérez de Cuellar
Ministro de Relaciones Exteriores
Ministerio de Relaciones Exteriores

Lugar: Lima, Perú

Fecha: 24 de Enero de 2001

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PERU

PLAN OF OPERATIONS

GIS STRENGTHENING TO SUPPORT REGIONAL TRANSPORTATION STUDIES AND HIGHWAY PLANNING AND PRIVATIZATION

(TC 99-01029-PE)

This document was prepared by the Project Team consisting of: Rodolfo Huici (RE3/FI3), team leader; Henry Green (REI/FI1); Alfonso Tique (COF/CPE); Isabel Cardona (RE3/FI3) and David Stevens (consultant)

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LIST OF ANNEXES

TERMS & ABBREVIATIONS

CECV – Comisión Especial de Concesiones Viales
GDSS – GIS-based Decision Support System
GIS - Geographic Information Systems
INEI – Instituto Nacional de Estadística e Informática
LAN - Local Area Network
MERCOSUR - Southern Common Market
MTC – Ministerio de Transportes, Comunicaciones, Vivienda y Construcción
OPLA – Oficina de Planificación del Transporte

SUMMARY

PROJECT NAME:	GIS Strengthening to Support Regional Transportation Studies and Highway Planning and Privatization
PROJECT NUMBER:	TC 99-01029-PE
PROJECT TEAM:	Rodolfo Huici (RE3/FI3), team leader; Alfonso Tique (COF/CPE), Henry Green (RE1/FI1) and David Stevens (consultant)
UNIT WITH BASIC RESPONSIBILITY:	Finance and Basic Infrastructure Division 3 (RE3/FI3) in coordination with the Ministerio de Transportes, Comunicaciones, Vivienda y Construcción (MTC).
BENEFICIARIES:	Ministerio de Transportes, Comunicaciones, Vivienda y Construcción and Instituto Nacional de Estadística e Informática (INEI)

FINANCING PLAN:	IDB (Japan Special Fund):	US$ 750,000
LOCAL COUNTERPART		US$ 150,000
TOTAL ESTIMATED COST:		US$ 900,000

I. BACKGROUND

A. *Highway Implementation and Privatization in Peru*

1.1 The Bank's strategy in the country has been focused on: I) support the process of structural reforms, II) rehabilitate and expand the economic infrastructure, III) finance private investment in physical infrastructure, IV) contribute to the efforts on the reduction of poverty, and V) support the modernization of the State, with emphasis on the strengthening of the management capacity of the central government. Specifically, the strategy in the highway sector is centered on i) the improvement and expansion of the available highway infrastructure, particularly the primary and tertiary networks, ii) tackle the emergency situation created by the 'El Niño' phenomenon, iii) promote the integration and expansion of the primary network and improve its conservation, iv) promote the participation of the private sector and the highway concession system, and v) support the modernization and institutional strengthening of the MTC and its agencies.

1.2 The Bank has two highway projects under preparation (PE-0140 Rehabilitation and Maintenance of Rural Roads Phase II and PE-0195 Alternative Development Highway Program), one highway project being initiated (PE-0197 Highway Rehabilitation and Improvement Program – Phase III, loan 1150/OC-PE) and two other projects in execution (PE-0131 Highway Rehabilitation and Improvement Program – Phase II, loan 836/OC-PE and PE-1036 Rehabilitation and Maintenance of Rural Roads Phase I, loan 901/OC-PE). This technical cooperation will provide improved tools for supporting the planning, implementation and management of all project related activities.

1.3 The Bank has been supporting the Highway Concession Program in Peru, through a program of institutional strengthening of the Comisión Especial de Concesiones Viales – CECV (Special Commission on Highway Concessions), by supporting policies and strategies, by supporting the design of the highway concession program (ATN/MT-5532-PE), and through the Highway Rehabilitation and Improvement Program – Phase III, loan 1150/OC-PE, which includes a project component to support the concessions through the participation of the private sector in highway management, and allocating funding resources to carry out technical studies of the highways that will be offered for concession.

B. Information Technology and Development

1.4 Historically, the Bank has been engaged in the financing of information systems as they relate to the institutional strengthening of borrowers and executing agencies of projects and programs. The demand for this support has been driven up consistently over the years by the cost saving advantages of automation.

1.5 The Bank's actions have been focused on several areas, including areas this project focuses on which are: support of national efforts to define and implement national strategies for information age technologies and development; push for the establishment of the regulatory and policy framework for the information age technologies and development sector; and project support for implementation of information technology

solutions that will enhance the efficiency and coverage of public social services and infrastructure implementation.

C. GIS and Transportation Planning and Infrastructure Management

1.6 In planning processes carried out in developing countries funds are limited and decisions have to be made in a timely manner, thus providing an ideal environment for the incorporation of geographic technologies that can bring in a number of supporting tools for better and speedier decision-making. Furthermore, a GIS-based system can support various transportation planning and management related activities such as regional analysis of multi-modal transportation solutions, corridor selection, decisions which relate to maintenance and upgrading, social and environmental impact analysis, and concession studies.

1.7 In developing countries, and even true to a certain extent in more developed countries, fully operational GIS systems that already form a part of the decision-making process are often nonexistent. Even though the private sector has an increasing role in such areas as real estate development, marketing and forestry, it is the public sector that still carries out and consolidates most planning activities.

D. MTC and INEI and their Competence in GIS

1.8 The MTC has been implementing since 1996 a GIS solution to support the implementation of projects in the area of transportation infrastructure and communications. The system is being implemented in 4 phases. Phase 1 was concluded in 1997 and involved the development of the system concept design and development of the digital cartographic database. The second phase, which concluded in 1999, encompassed developing the project database and the integration of the GIS system with other software solutions.

1.9 Phases 3 and 4 are presently being initiated and the Special Commission for Highway Concessions (Comisión Especial de Concesiones Viales - CECV) together with the Transportation Planning Office (Oficina de Planificación del Transporte - OPLA) of the MTC have requested support from the Bank for the inclusion of specific additional activities that are needed to support the highway planning and privatization program of the National Government. This project once implemented will provide the needed support to develop these specific GIS activities needed by CECV in its task to privatize highways and at the same time will strengthen the GIS expertise and the planning capabilities at the MTC. As a result, the MTC will be provided with an improved technical platform with which it will be able to achieve these goals.

1.10 INEI has also indicated the need to improve the national cartographic database needed to support the various activities carried out by the institution and which will also support the planning activities of the Ministries of Education and Health. Part of the spatial database to be developed for CECV and OPLA will contribute to this.

II. PROJECT OBJECTIVES

2.1 The proposed operation will strengthen and expand GIS capabilities of the Ministerio de Transportes, Comunicaciones, Vivienda y Construcción (MTC), existing within its Asesoria Técnica Despacho Ministerial with the aim at consolidating GIS capabilities at the Comisión Especial de Concesiones Viales (CECV) and the Oficina de Planificación del Transporte (OPLA). The operation will also support the Instituto Nacional de Estadística e Informática (INEI) which will benefit from both the spatial data to be compiled and the training it will become involved in. The focus will be on the development and implementation of GIS tools and spatial databases to assist in highway planning and privatization and infrastructure management. The Project will also include tools to develop a highway inventory system using satellite-based GPS (Global Positioning System) technologies.

2.2 The strengthening of the GIS system will contribute, in a decisive way, to the understanding of the social-environmental consequences of the privatization of highways and of other highway projects which the Bank is presently involved in. At the same time it will provide the MTC and the Bank with additional analytical tools and spatial data to support the study of the inter-oceanic corridors.

III. PROJECT DESCRIPTION

3.1 This technical cooperation includes two phases, 'Systems Design' and 'System Development, Spatial Data Compilation and Training'. These phases are further divided into ten tasks, all to be performed by the Consulting Team. The phases and tasks are further expanded in the attached terms of reference (TOR).

3.2 The various tasks reflect the conceptual basis of the technical cooperation which is to build upon the present GIS capabilities of the MTC providing additional capacity in terms of technical expertise, spatial data and GIS applications that will support concession studies, and to a lesser extent but equally important provide support to the Transportation Planning Office in incorporating the technologies in the development of future planning activities.

3.3 Activities include the compilation of spatial data for a specific region of Peru (the southern Departamentos of Cusco, Puno, Tacna, Moquegua, Arequipa, Apurimac and Ayacucho specifically the information on the location of *Centros Poblados* and a mosaic of satellite imagery. Additional tasks include providing tools for supporting transportation planning and management such as dynamic segmentation and network analysis and application development to improve the present capacity that MTC has of managing its projects (Sisema de Controle de Proyectos y Emergencias Viales).

IV. THE BANK'S STRATEGY IN THE COUNTRY AND THE REGION

4.1 The Bank has supported several GIS initiatives in the region, promoting the consolidation of the use of GIS technologies and seeking to strengthen the capabilities of each country's Transport Ministry. In Bolivia during 1996 a GIS survey and seminars (with transport applications included) were carried out followed by the development and implementation of a full GIS system (expected conclusion May/2000). General GIS surveys and seminars have been carried out during 1995 and 1996 in Argentina and some agricultural applications have been advanced. Similar GIS systems, such as the one for Bolivia, are being implemented for both Argentina and Chile. Brazil, Uruguay and Paraguay are also countries that have requested support and the Bank is presently consolidating the needed funds.

4.2 As part of the Bolivia project the Bank supported the development of a GIS-based Decision Support System (GDSS). This system, which supports the study of corridors, will be made available to the Peruvian project thus providing additional analysis capabilities to the MTC.

4.3 The implementation strategy pursued by the Bank so far has consistently focused on the transfer of technology and capacity building. Government personnel are to be trained in the use of cutting edge technological tools that will improve the efficiency and timeliness of their decisions.

4.4 This program could certainly have a decisive impact on structuring and supporting a planning process which will optimize the actions needed to plan and manage existing and future transportation infrastructure, the benefits of which would extend to the countries in a region that has already taken essential steps toward integration of its economies through the establishment of MERCOSUR.

4.5 All spatial data compiled will be made available and distributed on a Data CD to interested government and non-government organizations, thus enabling the benefits to reach other areas of the government and the public sector.

V. EXECUTION

5.1 The main execution responsibility will reside within the Ministry of Transportation(MTC), through the office of the Viceminister of Transportation(VMT), who is in charge of managing the whole transportation sector and operational responsibility will remain within OPLA, with the support of the Asesoria Técnica del Despacho Ministerial.

5.2 OPLA, created around the existing CECV, receives the support of an on-going loan (1150/OC-PE, Highway Rehabilitation and Improvement Program, Phase 3), and the

VMT has provided continuing support and has demonstrated good technical skills and commitment. This TC will improve its already significant planning capabilities

5.3 Institutional sustainability for this TC will be assured through VMT leadership and support, demonstrated by the activities already performed by force account, and coordinationmeasures to be adopted by OPLA. Technical sustainability will be assured by the gathering, of new and up-to-date information by OPLA. This information will be provided by the highway agencies, their consultants and contractors, in a technical format to be developed and supplied to them by OPLA, through this TC. This operational procedure will minimize cost, thus assuring the financial viability of this technology.

VI. BENEFITS AND RISKS

A. Benefits and Beneficiaries

6.1 The project will provide the following major benefits: (a) provide tools that will contribute to improving effectiveness, efficiency and equity of government strategic planning, management decisions, and operations in the area of highway planning and privatization and infrastructure management; (b) reduce cost in data management resulting from the elimination of redundant data collection and maintenance efforts; (c) provide organizational structure that will permit the collaboration among agencies with regard to exchange of data and information; (d) contribute to increasing flow information from government to the private sector; (e) provide the ability to integrate diverse and disparate data; (f) increase technical capacity in the application of GIS; and (g) make available and readily accessible geographic referenced digital data bases.

6.2 The direct beneficiaries of this program will be the Ministerio de Transportes, Comunicaciones, Vivienda y Construcción and the Instituto Nacional de Estadística e Informática. Indirect beneficiaries will be the GIS and Government community as a whole who will benefit from the various workshops, and more specifically on the discussion of the National Spatial Data Infrastructure.

B. Risks

6.3 Recurrent Costs: Benefits from GIS typically accrue in the medium to long-term as policies are developed, inter-agency procedures are established, agency coordination is strengthened, users become more sophisticated and data becomes more available. On the other hand costs for equipment, training and data are immediate. This project is intended to consolidate on-going efforts within the Ministry, while at the same time establish a proposal of a national framework in which this effort will be inserted, enabling the avoidance of duplicating efforts and the assignment of responsibilities. The full development of such a system is an on-going process which requires continued government support, awareness to and demonstration of the benefits. To be sustainable this project will require periodic updates and maintenance of the geographic databases

developed, staff will require continued training to stay abreast of the latest technological advances and equipment will have to be maintained and replaced, all of which will result in future costs. Considering that this project will build upon an existing system there already is a directive to support the consolidation of GIS technologies in the area of transportation.

6.4 These recurrent costs are typical of all operations which involve the introduction of information systems technology and imply a commitment for continued funding from the various agencies involved. Existing commitment of the management staff which will all have the opportunity of participating in the various seminars that will raise managerial awareness to GIS, will ensure continued budgetary and human resources support that will guarantee the sustainability of the project.

6.5 Future Bank loans to Peru should include specific institutional strengthening components that will build upon the capabilities developed during this Project.

6.6 Lack of Interagency Coordination: Exchange and integration of diverse geographic data is critical to the successful use of GIS. Without cooperation and collaboration between agencies there is a risk that groups will adopt GIS technology but remain isolated in their use, thereby not gaining the full benefits which result from inter-agency cooperation and sharing of data. The Project will foster more cooperation and the seminars to be given will promote more interaction among user groups throughout the country and at the Mercosur level. This will be even more so considering the specific discussion on the issue of consolidating a National Spatial Data Infrastructure that this project promotes.

C. Environmental and Social Impact Issues

6.7 The proposed project has positive environmental and social implications and thus requires no further consideration with regard to these issues. It will contribute to the quality of the environmental impact assessments for the highway projects currently being developed with Bank participation, as well as to future projects. At the same time training will be provided during the planned workshops and seminars on the use of the developed applications and the compiled data in carrying out social and environmental analysis.

6.8 Specifically to support the environmental and social assessments of projects two layers of spatial data information will be compiled and integrated into the current GIS efforts. A mosaic of satellite imagery will be produced which will be used for the development of land use type analysis contributing to identifying fragile eco-systems. The information on the location of villages will be used for identifying urban areas within the area of influence of the existing and proposed projects

6.9 The implementing team will follow closely the compilation of these data, the development of the applications, the outline of the training provided and also ensure that all this is made available in digital format to institutions and organizations that Final approval of the work conducted by the consulting firm will depend on this evaluation to be conducted by the implementing team.

6.10 The execution of the Project will facilitate the viability, usefulness and significant value of geospatial approaches to transportation and infrastructure projects, and will contribute to addressing relationships to the crucial areas of environment and sustainable development. It will exemplify the general goals of other Bank initiatives in the use of GIS for environmental studies and will promote regional integration.

VII. PROJECTED COSTS AND FINANCING

7.1 The total cost of the project will be the equivalent of US$ 900,000, of which the Bank will provide non-reimbursable financing of up to US$ 750,000 from the Japan Special Fund, in accordance with the attached estimated budget summary. The disbursements of the JSF's resources will be made by RE3/FI3, in coordination with the Country Office in Perú.

7.2 The Bank's contribution, which amounts to 83.3% of the total project cost, will be used to finance a total of 38 person/months of consulting services and general support including computer equipment and digital data.

VIII. ACTION PLAN

8.1 It is envisaged that an international firm with solid expertise in developing and implementing GIS solutions, also employing local experts, will carry out the core of the activities. The completion of the activities will cover a period of 12 months and will have an intermediate report consisting of a Discovery and Needs Analysis. Approval of this report will be required before initiating and completing remaining tasks.

8.2 National workshops focusing on the use of the technology, on presenting the project and on discussing the structure of a National Spatial Data Infrastructure will be held in Lima.

8.3 Specialized supervisory consultants will also be hired to support the Bank in analyzing the proposals, in the analysis of the reports, evaluation of the products delivered, and support to the Bank's staff in the task of integrating this project with other GIS-related projects being supported by the Bank in the Region.

8.4 In the execution of this Technical Cooperation the Ministerio de Transportes, Comunicaciones, Vivienda y Construcción (MTC) will provide logistic support. The Instituto Nacional de Estadística e Informática, will also provide access to its offices and access to information on Centros Poblados. The MTC will be involved in the review of the proposals and the selection of the consulting firm.

Peru – GIS Strengthening for Regional Transportation Studies
Budget Summary (in US$ equivalent)

Item	Quantity	Unit Cost (US$)	Total Cost (US$)
A. Remuneration of Consulting Firm			
I. Salary Cost			
I.1International Professionals	(Months)		
I.1.1Project Director	4	9,000	36,000
I.1.2 GIS-T Analyst	4	8,000	32,000
I.1.3 GIS/Remote Sensing Specialist	2	7,500	15,000
I.1.4 RDBMS Analyst/Programmer	2	7,500	15,000
I.1.5 GIS/Systems Programmer	5	7,500	37,500
I.1.6 GIS Database Technician	6	2,800	16,800
I.1.7 Systems Analyst	1	5,700	5,700
Total Salary International Professionals			158,000
I.1 National Professionals	(Months)		
I.1.1 Transportation Planner	2	4,500	9,000
I.1.2 GIS/Remote Sensing Specialist	4	3,500	14,000
I.1.3 GIS Database Technicians	16	1,500	24,000
I.1.4 Systems Analyst	1	3,000	3,000
Total Salary National Professionals			50,000
Total Salary			208,000
II. Overhead		1.1	228,800
Total Salary and Overhead			436,800
III. Direct Costs for Consulting Firm			
III.1 Per diem for International Specialists	500	130	65,000
III.2 International Travel	12	2,900	34,800
III.3 Travel within study area	10	290	2,900
III.4 Satellite Imagery	Total	58,000	58,000
III.5 GPS hardware/software	1	15,000	15,000
III.6 NT Workstations and software	Total	50,000	50,000
Total Direct Costs for Consulting Firm			225,700
Estimated Budget Consulting Firm (A)			662,500
B. Project Administration Costs			
I. Specialized Supervisory Consultants	Unit	50,000	50,000
Total Project Administration Costs (B)			50,000
C. Contingencies	Unit	5%	37,500
Total To Be Financed (A+B+C)			750,000
D. National Administration Costs			
I. Office Support and other Direct Administration Costs	Unit		60,000
II. Logistic Support and Equipment	Unit		35,000
III Counterpart Professional Staff	Total		55,000
Total National Administration Costs (D)			150,000
TOTAL ESTIMATED BUDGET (A+B+C+D)			900,000

Peru

GIS Strengthening to Support Regional Transportation Studies and Highway Planning and Privatization

TC No: 99-01029-PE

Terms of Reference

I. Project Objectives

1.1 The proposed operation will strengthen and expand GIS capabilities of the Ministerio de Transportes, Comunicaciones, Vivienda y Construcción (MTC), existing within its Asesoria Técnica Despacho Ministerial with the aim at consolidating GIS capabilities at the Comisión Especial de Concesiones Viales (CECV) and the Oficina de Planificación del Transporte (OPLA). The operation will also benefit the Instituto Nacional de Estadística e Informática (INEI). The focus will be on the development and implementation of GIS tools and spatial databases to assist in highway planning and privatization and infrastructure management. The Project will also include tools to develop a highway inventory system using satellite-based GPS (Global Positioning System) technologies.

II. Scope of Work

2.1 This technical cooperation includes two phases, 'Systems Design' and 'System Development, Spatial Data Compilation and Training'. These phases are further divided into ten tasks, all to be performed by the Consulting Team:

a. **Phase I – Systems Design**

(i) Task 1 - Institutional Assessment of both the MTC and INEI and a survey of available spatial data in Peru in Government and Non-Government Institutions. This assessment will lead to a 'Statement of Needs' and a comprehensive 'Conceptual Design' and also a proposal for a 'National Spatial Data Infrastructure'

(ii) Task 2 - Introductory Project Seminar and GIS Workshop.

b. **Phase II - System Development, Spatial Data Compilation and Training**

(i) Task 3 – Development of the technical specifications for a GIS interface to the 'Sistema de Control de Proyectos y Emergencias Viales';

(ii) Task 4 - Spatial Data Compilation;

(iii) Task 5 - Application Development, Integration and Implementation;

(iv) Task 6 – Implementation of Dynamic Segmentation Capabilities and a GPS-based Inventory System;

(v) Task 7 - Software and Hardware Acquisition and Installation;

(vi) Task 8 - GIS Implementation Seminar, Training and Workshop;

(vii) Task 9 – Workshop on the National Spatial Data Infrastructure, and;

(viii) Task 10 - Preparation of Terms of Reference and Final Report.

A. Phase I

1. Task 1 - Institutional Assessment, Statement of Needs and Conceptual Design

2.2 The Consulting Firm must analyze the work processes, information flow and current planning and decision-making capabilities of the Ministerio de Transportes, Comunicaciones, Vivienda y Construcción, focusing on the Asesoria Técnica Despacho Ministerial, the Comisión Especial de Concesiones Viales and the Oficina de Planificación del Transporte (OPLA). Based on questionnaire interviews to be carried out, which should include a discussion of flow of information, existing and planned hardware and software solutions, and network capabilities (WAN, LAN, etc.), the consulting team must provide an assessment of the present situation and develop a 'Statement of Needs' and a 'Conceptual Design'. The Conceptual Design must include all activities already planned within the scope of this operation and activities that should be included in future operations. This report must also define and specify the hardware and software to be acquired for the project.

2.3 Activities to be developed as part of the scope of this operation are the following:

a. Compilation of the following spatial data, specifically for the following Departamentos, Cusco, Puno, Tacna, Moquegua, Arequipa, Apurimac and Ayacucho: Improvement of the planimetric information contained in the 1:100,000 digital spatial database by updating the information on the location of urban settlements (Centros Poblados), based on the information compiled by INEI for the 2000 Census existing within the Ministries of Education and Health, and complemented if necessary by utilizing satellite imagery. INEI has compiled most of this information on hardcopy census

maps and will not only provide access to this information but also be responsible for clarifying discrepancies contained in these data.

b. Development, for the area that includes the totality of the 7 (seven) Departamentos above, of a mosaic of satellite imagery to support regional social-environmental vulnerability analysis. Both these layers (Centros Poblados and satellite imagery) are needed to support highway privatization efforts. The location of urban areas is needed to develop impact studies caused by providing highway concessions. The satellite imagery is needed to study the occupation along the right-of-way and interpret land use patterns within the area of influence of the highways.

c. These two layers of spatial data, the satellite imagery and the location of villages, will support the studying of environmental and social impact analysis. Proposed infrastructure developments need to be analyzed from the perspective of the benefits but at the same time the understanding of the negative effects such as displacement of populations and loss of fragile eco-systems has to be improved through the compilation of up-to-date data. This project will provide this opportunity. The consulting firm should demonstrate during the workshops and training the use of the compiled data and the applications developed in carrying out this analysis.

d. Update the geometric information of highways of the red nacional and the red departamental. This information will be updated by the interpretation of the satellite imagery. Also, for a total length of 1.000 km of the red an inventory will be carried out utilizing GPS. This GPS-based inventory will be done together with MTC professionals who will thus have the opportunity of being trained.

e. Dynamic segmentation capabilities must be included in the present GIS-system and is also part of the present scope of work. This will include defining a linear referencing system for the red nacional and provide a system solution for implementing the linear referencing system and for geo-referencing related attribute data such as highway projects and accidents.

f. Development of a software solution that provides an integration of the spatial database with the attribute information contained in the 'Sistema de Control de Proyectos y Emergencias Viales'. This solution to be developed must take into consideration the need for access by the various levels of users, making available all types of data, spatial and non-spatial, and supporting access in a client/server architecture, with the possibility of migrating to an Intranet/Internet solution. Consideration must also be made to present plans the Asesoria Técnica has of migrating its software solution to an SDE and Oracle-based solution.

g. Implementation of Network Analysis capabilities within the present GIS

system.

h. Incorporation of the GIS-based Decision Support System for supporting the study of the inter-oceanic corridors. This includes updating the GDSS specifically with data available for Peru (spatial data and the attribute data needed to run the models).

2.4 Similarly, the consulting team must analyze present GIS capabilities of the Instituto Nacional de Estadística e Informática - INEI. Focus will be on identifying sources of data (existing and planned) needed to support the activities at the MTC and an analysis of ongoing GIS activities, providing guidelines that INEI could focus on to improve their GIS implementation activities.

2.5 An inventory of the existing spatial data in both government and non-government organizations will be carried out. The objective of this inventory is two-fold: first provide a list of existing spatial data available that could be used by the MTC and INEI. Second provide the basis for a proposal of a framework for a 'National Spatial Data Infrastructure (NSDI)'. Through a questionnaire survey and targeted interviews with spatial data users and providers, provide a report on the status of the use of spatial data (in both analog and digital format) in Peru and a structured framework for implementing a National Spatial Data Infrastructure, discussing identified priorities within this framework that would positively impact the GIS activities being carried out at the MTC and INEI.

2.6 Ensure during the development of all activities that there is direct consideration for CONAM (Comisión Nacional de Medio Ambiente), sectoral environmental units and environmental authorities at the descentralized level (Departments and Municipalities), to ensure that their needs are understood and considerated in the developments of the various tasks of this project. The Bank will make available to these sectors the spatial data being compiled and the applications developed. The consulting firm shiold also ensure that these authorities, experts and technicians are invited to the workshop on the National Spatial Data Infrastructure

2.7 The following reports will be prepared and delivered. 'Discovery and Needs Analysis (DNA) Report' and 'National Spatial Data Infrastructure (NSDI) Proposal Report'. The first report (DNA) will present the results of the Institutional Assessment, Statement of Needs and the Conceptual Design and include a refinement and scheduling of the tasks to be developed during Phase II. The second report will present the results of the inventory carried out and the proposal for a NSDI. This report must be made available on the web and will be revised before the conclusion of the project, updating and incorporating the comments received.

2. Task 2 - Introductory Project Seminar and GIS Workshop

2.8 At least one introductory one-day GIS Workshop and one Project Seminar should be planned for phase I. The workshop will focus on bringing together various guest speakers and experts in the field that will help promote, through their presentations, a

common understanding of the benefits and advantages of GIS and its use for highway planning and management, providing a forum for receiving comments and feedback, and an opportunity to discuss related topics. A large audience is expected and the consulting firm will be responsible for organizing the workshop including the distribution of invitations.

2.9 The Project Seminar will be restricted to those that will benefit from the project. During this seminar the 'Discovery and Needs Analysis Report' will be presented focusing on the Conceptual Design of what is being proposed. It will provide an opportunity for discussing with the beneficiaries the proposal being put forward.

2.10 All seminars and workshops are to be conducted in Spanish and all presentations and material distributed at the GIS Workshop must be made available on the web.

B. Phase II

1. Task 3 – Development of the Technical Specifications for a GIS Interface to the 'Sistema de Controle de Proyectos y Emergencias Viales'

2.10 With the Bank's approval (in consultation with the beneficiaries) of the *DNA Report* the Consulting Firm must build upon the Concept Design, detailing the data model, the functionality of the application to be developed, the technical specifications of the user interface, and propose and justify the software and hardware solution. These topics should be included in the *'Application Design Report'*.

2.11 The hardware/software design specifications should take into consideration the need for an integrated solution accessible to the various users and building upon the existing system configuration.

2. Task 4 - Spatial Data Compilation

2.12 The following spatial data will be prepared and delivered to the beneficiaries: Centros Poblados, Transportation Network, and satellite images. All data should be integrated into the present spatial database. Consideration for projection and referencing system should be made, including an analysis of the suitability of what is presently used proposing alternatives if needed.

2.13 Updating of the GDSS database specifically with data for Peru (spatial and non-spatial data) needed for the GDSS. This spatial database was initially developed with existing sources at the 1:1.000.000 scale. For the updating the most complete existing digital data should be used. Updating of the attribute data implies that the actual information needed to run the models should be identified, compiled and included in the decision system.

2.14 The delivered satellite imagery must be geo-referenced individually and corrected to the proposed level of accuracy and included into the spatial database as additional layers. A multi-user license is needed, as the imagery will be shared by at least two

institutions (MTC and INEI).

3. Task 5 - Application Development, Integration and Implementation

2.15 All modeling applications shall be developed and delivered to the beneficiaries. These include developing the GIS interface to the 'Sistema de Controle de Proyectos y Emergencias Viales', the incorporation of Network Analysis capabilities, the implementation of dynamic segmentation capabilities (needed for Task 6) and the incorporation of the GIS-based Decision Support System (GDSS).

4. Task 6 – Implementation of Dynamic Segmentation Capabilities and GPS-based Inventory System

2.16 A GPS-based system for gathering geo-referenced data to be used for highway inventory, transportation planning, pavement management and highway safety must be developed and provided. This system is to be used to gather specific geo-referenced attribute data that can be downloaded straight into the GIS system. Extensive hands-on training to a group of up to 10 MTC professionals shall be provided on the use of this system and one GPS unit with the developed software solution shall be provided by the Consulting Firm and delivered to the beneficiary. Also, the inventory of 1.000 km of part of the red nacional shall be carried out and incorporated into the spatiai database.

2.17 Dynamic segmentation capabilities are to be included into the present GIS system.

5. Task 7 - Software and Hardware Acquisition and Installation

2.18 Hardware and applicable GIS software will be purchased by the Consulting Firm and installed. These computers are to be networked into existing LAN. Details of the hardware and software to be purchased are included in the 'Specific Guidelines'.

6. Task 8 - GIS Implementation Seminar, Training and Workshop

2.19 Following the development and conclusion of the previous activities the following seminars, training and workshop will be provided:

(i) Final Workshop – a one-day workshop to be given to the same audience of the initial workshop, presenting the final solution implemented and demonstrating the possible uses of the tools and the spatial data in supporting other government needs.

(ii) Implementation Seminar – targeted to the beneficiaries this seminar will present the final system implemented.

(iii) GIS Training – a 80-hour hands on training to be provided to a group of up to 10 professionals from the Asesoria Técnica, OPLA and CECV on the following topics: Geographic Information Technologies, Spatial

Analysis and Network Analysis. Focus will be on providing the necessary understanding on how the spatial database developed and the tools being provided can support the privatization studies of the CECV and the planning activities of OPLA.

2.20 For the training, all needed *User Manuals* must be completed for distribution. Also, the Data Dictionary and the Metadata must be completed and distributed prior to training. All seminars, workshops and training will be conducted in Spanish.

7. Task 9 – Workshop on the National Spatial Data Infrastructure

2.21 The community of GIS Users in Peru (from the decision level down to the everyday users) will be invited to this one-day workshop to be held in Lima and the objective is to provide a forum where the proposal for the NSDI can be presented and the group can further discuss the proposal being put forward, providing a feedback to this proposal.

8. Task 10 - Preparation of Terms of Reference and Final Report

2.22 Terms of Reference will be developed to allow for identification of further enhancements to the system and the components to be incorporated into other Bank supported projects.

2.23 A Draft Final Report and subsequent Final Report must be prepared summarizing the previous reports together with an analysis and feedback from the implementation seminars and workshops, and recommendations for future activities.

III. Products and Services

3.1 The products and services described in this paragraph are part of the deliverables. All of the reports shall be presented to the beneficiaries and to the Bank for review in a total of 7 copies in both hard copy and digital format. For the permanent report (Final Report) an additional 25 copies will be presented after acceptance or approval by the Bank.

A. Reports

a. Inception Report (15 days after contract signing) - The Inception Report will present the Consultant's Work Plan and Personnel Allocation Plan for the project, with any modifications agreed to during negotiations. This report should also indicate any special circumstances that might affect the timing or the successful development of the work.

b. National Spatial Data Infrastructure Proposal Report (Task 1) – to include the

inventory carried out of existing spatial data in both government and non-government organizations and the proposal of the structure for a National Spatial Data Infrastructure. This Report must be made available on the web. It must be revised with the pertinent comments and suggestions received at the NSDI workshop (Task 9).

c. Discovery and Needs Analysis (DNA) Report (Phase I) - This report will present the results of the Institutional Assessment, Statement of Needs and the Conceptual Design and include a refinement and scheduling of the tasks to be developed during Phase II. Approval of this report by the Bank, in consultation with the beneficiaries, is needed before beginning the activities of Phase II.

d. Application Design Report (Task 3) – to include the technical specifications of the application to be developed. Also, to be included in this report are the outlines of the Data Dictionary and Metadata information to be developed for the digital data produced.

e. Draft Final Report (Task 10) - A Draft Final Report will be prepared summarizing the three previous reports, a description of the activities carried out during the development of the project, together with an analysis and feedback from the implementation seminars and workshops, including also recommendations for future activities.

f. Final Report (Task 10) - The Final version of the Report will be presented after review and comments from the beneficiaries and the Bank of the draft version and will include all of the spatial data and additional printed and digital copies of reports.

g. Monthly Progress Reports - During the first ten (10) calendar days of each month the Consulting Firm should deliver a brief report covering the activities of the prior month, which should specify the personnel allocated, advances in the period by category of the work detail schedule and present graphic presentations of the progress in the project and the projections for completion.

B. Databases (Task 6)

h. Spatial Data – the spatial data compiled for Tasks 4 and 6

i. GDSS Database – the spatial and non-spatial data compiled for the GDSS.

j. Satellite Imagery - all satellite imagery products acquired during the development of the project. All the imagery will be geo-referenced to the same projection and coordinate system used for the vector data.

C. Spatial Applications and User Interface

k. Interface to the 'Sistema de Controle de Proyectos y Emergencias Viales'

(Tasks 3 and 5) – the application developed, including the *User Manuals*.

l. Other Systems (Task 5) – the applications and solutions developed for Task 5 (besides the one above), including the *User Manuals*.

D. **Hardware and Software**

m. GPS hardware and software solution (Task 6) - one (1) GPS unit and application developed.

n. Computer Hardware and Software Acquisition and Installation - (Task 7) As detailed in the 'Specific Guidelines'.

E. **Training and Other Materials**

o. Training Materials (Tasks 2, 6 and 8) - all training materials utilized for the various seminars, trainings and workshops should be delivered in both the original format and in HTML format (a set of training materials should be provided to each trainee and 7 sets of training material in both hard copy and digital format should be provided to the Bank and the beneficiaries).

p. Data Dictionary and Metadata - a Data Dictionary must be developed with the listing of all the data written to the CD-ROM (as indicated below) and with Metadata information for the digital data produced by the consultant (7 sets of Data Dictionary and Metadata in both hard copy and digital format).

q. Terms of Reference (Task 10) - all terms of references should be provided in both digital and hard copy formats (7 copies of each).

F. **Ownership**

3.2 All reports and relevant data such as maps, images, diagrams, plans, statistics and supporting data acquired, compiled or prepared in the course of the services shall be confidential and shall be the absolute property of the Bank and the beneficiaries. Also, the Bank and the beneficiaries, to the extent permitted by the vendor, will own the copyright to any spatial data, including remote sensing imagery, created or acquired for use in the Project, including the right to reproduce, distribute, disseminate and publish.

3.3 The Bank and the beneficiaries will also own the copyright of programs written to implement all applications (including the User Interface application) except for existing previous applications already developed by the Consulting Firm and if specifically stated in the technical proposal, in which case the beneficiaries' rights will be limited to using such applications for its needs and the Bank's rights will be limited to using the application in similar GIS projects.

3.4 All spatial data and the National Spatial Data Infrastructure Proposal and Final

Reports will be delivered in digital format, written to CD-ROM, to the Bank and to the beneficiaries, in the spatial data structure it was created in, as well as in an industry-standard export format (a total of 25 copies shall be made available after approval of the draft version). All data included in the CD-ROM must have associated metadata information. The Consulting Firm shall deliver all these materials to the Bank and to the beneficiaries upon completion of the services, together with the Final Report.

3.5 The Consulting Firm may retain a copy of such materials but may not use the same for purposes unrelated to this contract without prior written permission from the Bank.

IV. Qualifications of Consulting Firm and Considerations for the Technical Proposal

4.1 Given the nature of the work the Consulting Firm must have extensive expertise and familiarity in the development of GIS solutions for Regional Transportation Planning and Infrastructure Management and the current status of GIS technology. The utilization of integrated teams drawing from local and international expertise is expected. The consultants will allocate the personnel necessary for the successful completion of the project in accordance with the methodology, work program and staff allocation, which will form part of the proposal and, as such, it is the exclusive responsibility of the Consulting Firm to determine the specialties and timing of the professionals to be used. The following table may be considered to be a minimum composition of an acceptable project team and presents an estimate of professional involvement. This estimate is made for orientation purposes only. Estimate of Consulting Firm involvement totals 47 consultant/months:

Professional Expertise	Estimated Time (months)
Project Director	4
Transportation Planner	2
GIS-T Analyst	4
GIS/Systems Programmer	5
GIS/Remote Sensing Specialist	6
RDBMS Analyst/Programmer	2
Systems Analyst	2
GIS Database Technician	22

4.2 The Project Director should have no less than 10 years international experience in managing projects of similar content and complexity. The Director should have had demonstrable experience in the development and implementation of GIS-based

solutions and working ability to communicate in Spanish. The post of Director may be combined with one of the other senior positions listed.

4.3 The listed senior professionals (excluding GIS Database Technicians) should have at least 5 years of relevant experience. Those professionals that will be working in Peru should be able to communicate adequately in Spanish.

4.4 In the *Proposal* the Consulting Firm should give special attention to the following items:

a. Seminars, Workshops and Training - provide descriptions of the format of the seminars and the approach to the training environment.

b. Digital data - indicate understanding of the existing data to be used in compiling the digital data (spatial and non-spatial) and discuss the methodology for developing each spatial database (specifying hardware, software, data sources and procedures to be used).

c. Map projection and referencing system - provide an understanding of the issues of having different sources of spatial data utilizing different map projections and different referencing systems.

d. Satellite Imagery - discussion of existing satellite imagery, indicating the choice made, together with supporting arguments having in mind what the imagery is needed for. Satellite imagery must be recent and with minimum cloud coverage. Indicate and discuss the choice of control points for correcting the imagery and the level of accuracy expected after final processing.

e. GPS-based system for gathering geo-referenced data - discussion of the system to be provided and also an outline of the training to be provided.

f. User Interface Application - indicate design considerations for the User Interface and the conceptual issues for providing an Intranet/Internet solution for accessing spatial and non-spatial data.

g. Quality Assurance and Quality Control - describe issues of quality of the spatial data being compiled and of the applications being developed and describe how QA/QC will be incorporated into the project. As part of the discussion of quality control of the spatial data indicate any metadata and cartographic standards that shall be followed.

h. User Manuals and Help Capabilities for the applications developed and for the system- provide a description of the format of the User Manuals and also the Help capabilities to be included in the system.

i. Schedule of Deliverables - provide a schedule of deliverables. In the development of this schedule the proponent must consider that the Bank and

the beneficiaries need to have up to 30 days to analyze and approve the *Discovery and Needs Analysis Report* and the *Draft Final Report*.

j. Schedule of Personnel Allocation - provide a schedule of personnel allocation, indicating extent of involvement and location.

k. Spanish - All reports, user manuals, and all other materials shall be produced in Spanish (the consultant may provide additional versions or copies in English).

l. Budget - The proponent must provide a budget broken-down by tasks. The satellite imagery should be budgeted as a separate budget item: a total estimate of the number of scenes to be acquired should be provided together with a unitary price.

V. Duration of Project

5.1 The work should be conducted in a period of no longer than 12 months. The Draft Final Report should be delivered 10 months after the contract signing date, with the final 2 months needed for its review and for the delivery of the Final Report, which must include all spatial data.

VI. Reporting Relationships

6.1 The local counterpart for the study will be the Ministerio de Transportes, Comunicaciones, Vivienda y Construcción (MTC) through the Comisión Especial de Concesiones Viales (CECV).

6.2 The supervision of the study by the Bank will be a joint responsibility of the Finance and Basic Infrastructure Division 3 (RE3/FI3) and the Peru Country Office (COF/CPE).

INTER-AMERICAN DEVELOPMENT BANK

PERU

GIS Strengthening To Support Regional Transportation Studies
and Highway Planning and Privatization
(Project: TC-99-01029-PE - Pending Approval)

General guidelines for topics to be included in the 'Expressions of Interest'

General Conditions:

- Confirmation that the firm is based in a member country of the Bank.
- General background of the firm. Pertinent to the project being contracted.
- Experience on projects of comparable size, complexity and technical specialty
- Professional qualified personnel with experience in the region and language capability
- On-going projects
- Corporate existence: a minimum of 3 years trading is required. In the case of a consortium, a majority of the members should have at least three years trading
- Financial resources and capability: an annual turnover of 3 times the value of the project is required (estimated budget for the project USS 650,000.00)
- Inclusion of evidence of local and foreign technical expertise as part of the team to be proposed.
- A firm may participate in only one consortium but may act as subcontractor in more than one.

Specific Conditions:

- Firms that meet successfully all the above conditions would then be evaluated on the basis of the further criteria:

    - Previous experience in similar studies – based on the description of the 6 most relevant studies. Include a 1 page description of up to six relevant projects recently developed by the firm(s), including an outline of the project, the objectives, a list of activities and tasks, cutting edge technological solutions used, total amount of the project and duration, and the client with a telephone and e-mail of a person that can be contacted for further references. Graphics and cartographic outputs of the work developed could also be included as part of the description of the project.
    - Specific experience in the region of the study – based on the description presented above of the 6 most relevant studies.
    - Professional depth: the firm should present a list of the professionals, with a 2-page curriculum vitae including language capabilities, that it can eventually make available to the project. As a suggestion the following professionals could be considered: GIS Expert, Remote Sensing Expert, Systems Analyst/Programmer, Spatial Database Specialist, and Regional Transportation Specialist. Professionals that are part of the permanent staff of the firm will be considered more favorably during the analysis of the Expressions of Interest.