**SECTION VI TERMS OF REFERENCE**

**TECHNICAL AND ECONOMIC FEASIBILITY STUDY AND FINAL DESIGN OF THE PROJECT REPLACING THE DEPARTMENTAL HOSPITAL OF NUEVA SEGOVIA,**

**REPUBLIC OF NICARAGUA**

**1. INTRODUCTION**

The return of the right to health has required clear guidelines to guide the actions of health, the social construction of health, to the development of a national health system fair, aimed at the welfare of the human being with his family and their community, realizing the principles of health as full bio-psychosocial wellbeing and not merely the absence of disease.

Health policy has identified as priorities for attention: children under five, adolescents and women, residents of dry areas, municipalities with a population in extreme poverty, the Caribbean coast, indigenous people, rural workers, people with disabilities, mothers of heroes and martyrs, victims of war and the elderly.

The health services network of Nueva Segovia is composed of (1) department hospital, two (2) primary hospitals, 10 health centers without beds and 59 health posts. The Alonso Moncada Department Hospital was founded in 1943, the materials from which it was built, do not allow further interventions to improve the existing infrastructure, as most of the areas must be replaced completely due to a large deterioration in the walls, ceilings and foundations.

For this reason, it is proposed to replace the current hospital with a new departmental hospital with 250 hospital beds, which will meet the demands of the population, increasing the quality of services already offered, guaranteeing free universal access to services, the primary objective of the Government of National Unity and Reconstruction, as part of the restoration of the right to health.

In order to verify the requirements of the new hospital and make the final architectural design will be the feasibility study and design as described herein. The design of the hospital shall provide for the projected growth of the new unit as a regional hospital in the medium term.

The products of this study will be used to negotiate the necessary financing for the project with the Central American Bank for Economic Integration (CABEI).

**2. OBJECTIVE OF STUDIES**

To determine the feasibility of the project "Replacement of the Departmental Hospital of Nueva Segovia, Republic of Nicaragua" through the development of studies of pre/investment (health, economic, social, environmental, organizational, architectural design, development of construction plans, calculation reports and equipment, etc.), considering population growth and demand for health services planned.

**3. SCOPE OF THE WORK**

This chapter will contain all studies to be developed by the consultant and that will determine the feasibility of the project; these are the products and must be submitted in the following order:

**3.1 Study of Market**

1. Develop a framework where the health sector is inserted into the National Development Policy, at national and departmental level.
2. Definition of the area of ​​influence of the study.
3. Consider the progress made in health in the Department of Nueva Segovia through other international cooperation programs.
4. An analysis of the situation of hospitals in context within the hospital network of the Department.
5. Analysis of the epidemiological profile of the Department of Nueva Segovia
6. Linking the operation of the new unit with the Prime Level
7. (Primary hospitals, polyclinics, health centers, health posts) in the area of influence and health services department.

**A. Demand**

1. Identification of the demand for health services, at first and second Level of Attention in Nueva Segovia.
2. Identify and analyze the demand of health services by disease, geographic origin, native communities, socioeconomic status, age group, sex, during the last five years.
3. Projection to fifteen years:
   * The demand of second level specialized health services.
   * Human resources required by level of care
   * Health institutions at all levels of care
   * Projected number of hospital beds including acute and chronic care beds setting improvement indicators for every 10,000 inhabitants.
   * Analysis of the references addressed by the current hospital health units in order to determine the area of influence of the new hospital.

**B. Offer**

1. Analyze the behavior and supply capacity of health services in the last five years of the hospital network of Nueva Segovia:
   * Current human resources per area or service, profession, position, wages and working hours,
   * Health institutions at all levels of care
   * Number of hospital beds available for clinical service, establishing indicators for every 10,000 inhabitants.
2. Identify the capacity of the health services offered by private entities (hospitals, clinics, pension and healthcare companies, etc.)
3. Identification of the current supply of public health services (quantitative and qualitative) Outpatient care, emergency and hospitalizations in current hospital units, presenting data from the last 5 years listed in order to estimate the number of services required in the new hospital.
4. Lack of demand (unsatisfied demand)
5. Projection to fifteen years in the supply of health services at first and second level.
6. Analysis of the counter-referrals made ​​by the current hospital to the health units.

**3.2. Diagnosis of the health situation.**

**3.2.1 Determinants of health of the population of Nueva Segovia.**

1. Political, socio-economic, cultural and environmental conditions
2. Characterization of the population and its trends: current population, age distribution, growth rate of the population and occupation of the patients.
3. Cultural and educational level of the population
4. Ethnicity and Health
5. Gender and Health
6. Characteristics of poverty
7. State of the environment (natural and built environment)
8. Lifestyles
9. Emergencies and Disasters

**3.2.2 Health indicators of the population of Nueva Segovia.**

1. Epidemiological profile of the population
2. Analysis and trends in mortality and morbidity
3. Child health
4. Immunizations
5. Management of Childhood Illness
6. Women's Health
7. Health of working men and women, identifying the population incorporated in the various social security schemes in the department.
8. Behavior of non-transmissible Chronic Diseases
9. Health of the elderly people
10. Health problems / emerging and reemerging diseases
11. Behavior and Trend of HIV and TB
12. Behavior and Trend of acute and chronic renal failure.

**3.3 Study of Environmental Impact.**

This study will determine the extent of the environmental impact the project will have on the environment and the mitigation measures necessary, including assessment components of air quality, vibration, noise, hydrology and water, soil, waste and waste land and stone, terrain, environment and landscaping, recreation socio-economic, transport and cultural aspects, monuments, water and electricity, including the planning, implementation and operation phases of the project.

The study must have:

1. Scope of the study.
2. Determine the scale of the study.
3. Methodological procedure used.
4. Content of the study
5. Environmental diagnosis (situation without project)
6. Analysis of environmental impacts (situation with the project)
7. Determination of measures for prevention and mitigation of the negative impacts caused by the project and identified in the study
8. Environmental assessment (Estimated costs of prevention and mitigation measures to be integrated into the total costs of the project, during implementation and operation of the hospital).

**3.4 Design of Infrastructure**

The consultants will undertake the design of the new hospital infrastructure up to the level of construction drawings, calculation reports, scope of works and respective technical specifications, which must be approved by the corresponding government authorities including the Municipality of Nueva Segovia, the Ministry Health, the Ministry of Environment and Natural Resources and the National Atomic Energy Commission (CONEA).

The project should respond clearly to the Functional Medical Program (PMF), with an Architectural Design proposal that includes 3 deployment models considering: the temperature, direction and wind speed, relative humidity, sun exposure, noise, traffic, topography, geology, geological faults and topography, as well as aspects of risk and vulnerability identified in technical studies in the field.

The architectural design should include a family shelter, a medical home and the Departmental Maternal House within hospital grounds with a capacity that will be defined by the outcome of the market study and diagnosis of health care. It also must contemplate the internal sleeping areas for medical and nursing staff, labor, offices, teaching areas and meeting rooms for clinical service.

The physical resource resulting from the project must take into account: constructive rationality, durability, affordable maintenance. It must also enable the growth to a hospital of higher level of resolution in the department and the flexibility and adaptability to new strategies and models of care, emergency or disaster situations.

Shall be considered as a factor:

* + 1. Constructive Technology: The technology will ensure the promotion of constructive labor and domestic supplies, through concepts of rationalization, industrialization and innovation.
    2. General and specialized medical equipmen**t:** This will be new equipment, latest technology, recognized brands or models, provision and widespread use; also selected equipment must have staff training plans for the proper operation of the equipment.
    3. Maintenance, Preservation and Training: Must work in institutional self-sufficiency, training staff to operate the equipment.

When incorporating technology has origin or overseas source, it must be unavoidable that it will be supported and represented by companies with establishment and background in the country. No opportunistic and/ or without trajectory representations brands would be considered.

**3.4.1 Functional and Architectural Program**

The consultants will conduct functional analysis of the new hospital (append methodology) based on the number of hospital beds already defined, then the internal distribution of hospital beds will be adjusted to the behavior of the morbidity in the region, establishing the physical facilities that must count towards the implementation of the project. Also, should be considered a projection on the growth of specialized services that will increase the resolution level of the hospital in the medium term**.**

The premises that integrate each service are described in the Functional Medical Program which defines the following:

1. Departmental category for the Hospital services and areas.
2. Service environments, family shelter and doctors home
3. Dimensional environments
4. Number of environments
5. Use of every environment
6. Particular specialized equipment of the department morbidity
7. Relationship diagrams for zones, services and environments

* Functional medical flow, for which we should perform

1. Patient Flow
2. Staff Flow
3. Visitors Flow
4. Feeding Flow
5. Flow of waste and its management until final disposal, considering the classification of residues in: hazardous and bio infectious material, out of surgery material and sharp objects, non-hazardous and hospital waste and public health services including stationery, food waste generated in the hospital kitchen, among others. An estimate should be made for each type of waste generated in the new hospital and establish final disposal system may include spraying sterilization prior to discharge to settling basin or autoclaves in clinical laboratories and pathology, dentistry and a center for equipment sterilization.
6. Flow of clean and dirty clothes.
7. Material Flow (instrumental, equipment) contaminated and clean.
8. Flow for emergency exits and evacuation routes.

To develop this component the consultants should work in close coordination with: the current technical team of the Hospital; the SILAIS staff, and executives of the Study Monitoring Committee. Should be taken into consideration the needs and requirements previously identified by the Hospital team which shall prevail in all cases. The study should take into account the new hospital equipment.

The functional study must be approved by the MOH Enabling Commission and ratified by the Study Monitoring Committee, to the complete satisfaction before moving on to the next phase of infrastructure design.

**3.4.2 Preparation of the Preliminary Draft**

The preliminary draft shall include:

1. The pre-investment studies engineering among which are: studies of soil, topography, hydrogeological study, tectonic, geological (geo-structural study), geological risk (flooding, seismicity, landslides and other hazards in the project area), local or regional faulting and other risks caused by human activities (fire).
2. Prepare and edit all documents of soil analysis, soil infiltration study and geology of the area, risk for flooding rains and other studies.
3. Meet Structural criteria for Buildings of the Republic of Nicaragua, in terms of Structural and Operating Safety
4. In developing the designs of the buildings, it must consider all actions or acting forces, mezzanines distortions due to lateral movements, define the appropriate structural system that will allow the proper flow of various forces and design actions, and finally consider the failure limit states and service.
5. Implement all design requirements, according to National Regulations currently in force (RNC-07).
6. According to the characteristics of the structure, seismic analysis shall be conducted in accordance to the items set forth in Chapter 5 of the National Regulation (RNC-07).
7. Consider the Special Requirements for Construction on active faults.
8. Consider the Dynamic Response Study of Soils (ERDS). To obtain an analysis of seismic microzonation location site. Allowing us to consider amplification factors for Seismic response spectrum adjusted to the composition of the soil, and then compare them with factors in the regulation of the National Regulation (RNC-07).
9. Dynamic Response Study of Soils (ERDS) allow us to define the type of foundation to implement on Buildings and the finish grade in these; and soil strength in this layer, possible settlements expected, and also indicating the energy levels that applied in the soil fill.
10. Consider soil deformity at the site of the Project, due to loads that were generated during the lifetime of the Building.
11. Architectural design of a departmental hospital (plants, elevations, sections and perspectives) should append additional projects to equipment, furniture, special installations and information networks, integrating everything into a comprehensive proposal. The design should consider the expectations of growth according to the information reflected in market research and Functional Medical Plan in Plumbing, HVAC, medical gases, fire, telecommunications, and electricity.
12. The design should consider the expectations of growth according to the information reflected in market research and Functional Medical Plan, for hydro sanitary facilities, air conditioning, medical gases, fire, telecommunications, and electricity.

• **Preparation of final draft**:

1. Should consider developing construction plans for each system, after approval of the draft, which must contain at least:
   * Surveying plane/ altimeter, contours every 0.25 m of the proposed site.
   * The seismic studies and risk from storms and hurricanes.
   * The studies of soils, soil infiltration and geology study of the area at risk for flooding rains.
2. Construction plans containing:
   * Architectural Design (Plans, Elevations, finishing and cutting tables, ironing doors and windows and all elements to the overall architecture of the building clear interpretation)
   * Design engineering: earthmoving and topography, structural, electrical and water production.
   * Design of special facilities: air conditioning, medical gases, propane gas and steam.
   * Protection and grounding system.
   * Design of Voice, Data and Networking.
   * Equipment and furniture
3. Technical Specifications:
   * Construction and Installations
   * Equipment
   * Furniture and equipment

1. Calculation and Memories:

* Design Engineering Construction (soil study, geological, structural calculation report, electric memory calculation, hydro sanitary memory calculation, thermal calculation memory, medium voltage pump stations memory, calculation and voice memory, all data memory and calculation related to the constructive.
* Special Facilities Design.
* Others consider the consultant.

1. Estimated cost or construction works. Integrate other costs of equipment, furniture, facilities and networks.
2. Physical works implementation program. Integrate program execution, procurement and installation of equipment, furniture, facilities and networks.
3. Model containing the entire Project at 1:500 scale.
4. Include a color animated video and narrated the Departmental Hospital with a duration of 6 minutes to present flows, the most important areas of the hospital

**3.4.2.1 General Specifications:**

The architectural plan will facilitate optimal lighting and natural ventilation with the proper sun protection and safety and measures.

The entirety of the benefits of the institution, being medical, administrative, or any other nature will be carried out with means and resources organized so as not to present architectural barriers for patients, staff and public.

The proposed volume should be consistent with the purpose for which the building is designed and meet applicable regulations (municipal, regional and national).

The entrance gates must be perfectly differentiated, identified and prioritized according to their functions. The design will ensure both the general public and staff and patients a pleasant environment to facilitate the location of their destinations and displacements through natural orientation processes without interference.

The circulation must be differentiated according to the flow, frequency and type of use, taking into account the signaling, with regard to dimensions and colors, to simplify reading for those interested.

The medical and nonmedical furniture will be designed taking into account the natural disaster and earthquake zone, flood and other characteristics that are proper of the region.

**3.4.2.2 Building Design**

The building must contain architectural and landscape elements that organize and express the type of building, and must prevail in the resolution, both spatial and technological criteria of economy and austerity. Relations with the immediate environment and the rest of the city should allow an easy access and promote a clear reading that is indicative of the different functions and organization of the whole, as well as the clear delimitation of the entries and exits for pedestrians and vehicles to the entire complex and each of its constituent parts. The organization that not only promotes the legibility of the various components of the program, but favors the efficiency in maintenance costs of both general and special installations, will be valued.

**3.4.2.3 Subsystems**

Development projects must respond to a space system that connects the various subsystems: functional space, circulations, and structural facilities.

It must meet with all municipal and national regulations and must also comply with regulations issued by the respective agency.

All subsystems must be designed with flexibility criteria. They must form joints by adding or deleting elements that allow the development of different activities and the selection of versatile elements in the use, movable and interchangeable and connectable modular elements, enabling the adaptation to different productions, even considering care technologies and epidemiological attention.

**3.4.2.3.1 Functional Space Subsystem**

It should create spaces that allow the adaptation to different possibilities of use and expansion. The layout of each service must respond to the process that it develops. The access should be restricted to the minimum necessary to ensure an efficient control of people, supplies and equipment. However, it will be necessary to provide for emergency exits to facilitate evacuation in case of an accident. The biosecurity and hygiene of each area and the proper signage must be strengthened and placed, from the initial planning.

**3.4.2.3.2 Circulation Subsystem / ERGONOMICS & DISPLACEMENT**

Project development will be governed by patterns of movement and association with strong horizontal preference.

As far as design guidelines are concerned, when in the corresponding sections of the medical architectural programming is defined explicitly that when two or more sectors or functional units are linked in "direct" contact, this will refer to a landscape feature that as it is assumed to exist independently of other ties - mechanical or not, a man will be able to move pushing rolling stock (service carts, stretchers, wheelchairs, etc.) without having to overcome slopes greater than 5% or distances greater than the maximum present the functional units in a direction (major axis).

This limitation shall be ergonomic in order to ensure displacements of bounded effort under conditions which allow both an independent alternative link of mechanical means and a plan of total evacuation in case of internal (evacuation) or external emergency (catastrophes).

The intermediate spaces, waiting areas, the connection between access points and circulation should have a correct dimensioning that allows the implementation of activities to develop in them.

It will be assessed within the building complex the spatiality and architectural identity of the waiting areas and the main hallways.

It should also, consider their relationship with the internal circulatory flows, which differ according to the need, in circulation for patients, staff, supplies (clean and used), etc. These circulations, contemplate differential valuations by type, quality and dimensional ranges according to the service to which they refer. And will address the observed relationships: patient-family, patient-doctor, doctor-family, technician-doctor, among others.

It is of utmost importance that the survey of circulations is made according to processes, leaving the spaces sets resolved and functional flows without adding unnecessary specific circulation surface.

The circulatory plot configuration must satisfy the relations of each sector in it, from different sectors among each other and also its layout must facilitate adaptability to changing roles and / or the needs of new spaces.

The right balance between the useful surface and the surfaces intended for circulation will be necessary.

Circulations are classified according to the type of user, such as:

* Public (outpatient, companions and visitors).
* Technical (transported patient, doctor, nurse, technical and administrative). Movement of elements (sourcing, provisioning and transport).

It is possible that in some parts the technical circulation and the movement of elements coincide. The separation criterion should be the biosecurity and patient survival.

**3.4.2.3.3 Installation Subsystems**

It should propose a network that ensures the provision of services to any point of the establishment, with the possibility of sectorization of them, for safety and continuity of services by area in case of breakdowns.

Modulation, accessibility of the sections, strategic location and ease of maintenance, should characterize the proposed facilities, providing adaptability for possible changes in production, technology and attention.

**3.4.2.3.4 Structural Subsystem**

It must set a strong structure that includes the seismic and climatic safety requirements that are characteristic of the area as the result of a structural study. This clarification is based on the definition that particularly every hospital is an essential facility for care in case of natural events that affect the health and physical integrity of the population. Therefore, it is necessary to apply the following criteria:

* The hospital must not collapse. It is also necessary to reduce effectively the vulnerability of its nonstructural components, their lifelines and their functions.
* It is necessary that its physical structure does not endanger the lives of its occupants at the time of the incident.
* It is necessary that the facilities are still open and continue to provide services after the disaster, allowing a massive attention.
* It is necessary that its flexibility enables the facilities to adapt to care for civilian emergencies or disasters.
* It should take into account the guidelines of the National Health and Hospital Insurance Program promoted by PAHO and WHO.
* Consider at all times in the design of the areas where X-ray equipment is located, shielding protection against ionizing radiation, The construction of this area should be monolithic or reinforced concrete. Complying with the standard of CONEA.

**3.4.2.4 Exterior Construction and Parking**

The design of the exterior construction and parking will consider all exterior circulations paved: access roads, parking for patients and staff, ambulance access, supply, waste removal, maintenance, maneuvering areas, access for fire vehicles and green areas, among others.

It should incorporate bicycle and motorcycle parking near the entrances to the public.

It should also include space for a bus and public transportation stop, waiting for taxi and the appropriate facilities to consider an effective circulation for patients, and staff, allowing the amelioration of the establishment.

It seeks to ensure that the parking lots have shade protection and easy connection with the hospital entrances.

It is generally desirable that the public waiting areas are provided with shade. In all of the exterior construction will be signage to guide the user throughout the complex and outdoor lighting that provides visibility and safety in all paved areas.

The design of parking will also consider other outdoor areas: the public spaces (patients + visitors), green areas, description of greenery, street furniture and maintenance project.

In the other outdoor areas there will be lighting and signage to guide users day and night.

It will incorporate street furniture of heavy resistance and durability in sufficient amounts and in required places: waiting benches, garbage cans and resting benches in the courtyards.

In the most representative areas of the parking lot, across the street, around the entrance to the public will be included an irrigation system.

**3.4.2.5 Humanization Criteria**

The project should be developed on the notion that the patient and family have the most important role.

Detailed below are some considerations regarding the humane approach:

In the design of the spaces will be respected habitable conditions, privacy, comfort, security and elimination of architectural barriers. In the design of the equipment, based on the ergonomics of the design, it will be adapted to the biological, physical and psychic requirements of the users. In the audience it is understood that it is composed of not only the patient but also the companion, the entire group of human resources and in general, every person who is in the building with a purpose of care and service, that strengthens the Strategic Policy Health System whose goal is the welfare of the human being with his family and community, fulfilling the principles of health as full bio-psychosocial wellbeing and not merely the absence of disease.

The exterior and interior should reflect solidity, efficiency, reliability and comfort.

In the internal environmental values​​, humanizing the space and patient care, creating optimal environments for staff, patients and the public. It will devote much attention to interior design, achieving adequate and adjustable lighting. The materials, textures, colors and shapes should be within a patient-centered approach, creating spaces nice and homey.

Keeping the patient's visual connection (especially in critical condition), with exterior space, given its importance as a psychological factor.

It will have outdoor spaces, accessible for an outpatient and companions, creating with greenery and natural lighting, friendly areas.

There will be ventilated and illuminated spaces that improve the quality for occupants, integrating green areas, gardens, greenery and fresh and renewed air.

The spaces will be designed on a human scale, with the use of traditional building materials and innovative resolutions.

**3.4.2.6 Building Sustainability**

The building must be designed with the expectation of a long life and, therefore, the conditions of sustainability that arise are very important and economies that these entail.

The solution will be adapted to the climatic conditions and geographical characteristics of the department.

The construction technology should allow for the completion of the work in time schedules, with the input of the techniques and materials available in the local market. For maintenance of the building and its parts, a design that allows the materials exposed to the outside and uses intense public have durability and wear resistance with easy repair or replacement must be proposed. Internal divisions should allow flexibility for modification of the administrative organization.

The solution of the generation and conduction of all fluids, including information technology and communication, must be contained in spaces of easy accessibility for repair or modification.

Provision shall be made that the technical spaces for accommodating equipment and building stocks are independent and autonomous from the rest of the set.

Consider installing solar panels for energy saving and production of renewable solar energy consumption.

**3.4.2.7 Design Guidelines – Installations**

The facility design will develop from the detailed study of the particular needs of each Service, taking into account future enlargements of facilities as growth projections.

The adopted solutions will result from the evaluation of specific activities, medical procedures, biosecurity protocols, comfort requirements and current regulations

Facilities should ensure rational consumption not only of each specific installation but also through convergent engineering.

It will define the technical characteristics of all elements that compose the cited installations following criteria of security, flexibility, economy, ease of assembly and maintenance.

**3.4.2.8 Electricity**

The power circuits will be separated according to uses and sectors, these circuits are protected from over-voltage and current leakage, and will also be equipped with isolation transformers and uninterruptible power sources for specific areas if necessary.

The power circuits for vital functions will be connected to the emergency power supply.

It must comply with the current regulations and must include the following information:

* + 1. The high and low system voltage substation (feasibility of the system, power system planning, distribution requirements and special medical areas).
    2. Equipment voltage
    3. Energy capacity, preparedness and capacity of the generator.
    4. The power supply systems to be used to interrupt the flow of energy in the critical path of the hospital (including load instructions and priorities).
    5. Types of cables and pipelines to be installed.
    6. Details of equipment that will keep the power system to fluctuations (sockets, leakage circuit breakers, surge suppressors, harmonic filters, etc.).
    7. Grounding system.
    8. Protection against lightning.

**3.4.2.8.1 Lighting**

A system of generation and lighting control facilities as a whole will be developed, also examine the type, amount and location of different light sources to meet the needs and requirements of the establishments, targeting low energy consumption, long life and high quality of light. Before the final design consultant will present three design alternatives considering all the elements to obtain adequate energy savings to the energy produced by the amount of medical and non-medical.

Therefore should be considered:

a) In the light source efficiency, color temperature and color rendering.

b) The minimum illuminance regional requirements

c) Types of Switches and Controls

d) Emergency lighting and area lighting scales generally

According to the need, systems of dimming and regulated artificial light and other illumination sources will be placed.

An emergency lighting system will be provided, to ensure the continuity of activities in case of power failure, and also a signaling system to enable rapid and safe evacuation and guidance. The system will consist of a set of self-contained automatic activation and other networked emergency.

This plan also proposes, as a general rule a natural lighting system that sufficiently illuminates all areas where patients reside and / or members of staff work, and all public circulation spaces.

A proposal of exterior lighting will also be proposed.

**3.4.2.8.2 Telecommunications**

This facility will form a network of several points of telecommunications and conveniently distributed data in order to provide proper coverage.

**3.4.2.8.3 Medical Gases**

The various medical gases will be distributed through pipelines designed for this purpose which will transport gas to each point of consumption. The facilities will incorporate necessary devices for production, quality control and alarm in accordance with current regulations. Use NFPA 99 C for medical gases.

The facility will meet the needs of all the Services. The design should consider the dimensions of the main medical gas lines and wait for future growth, should consider the design calculation report network where pipe diameters reflect, air capacity and vacuum generators, sectorization areas through valve boxes based on number of delivery points for gas.

**3.4.2.8.4 Fire Fighting System**

The will be a widespread use of flame retardants, fireproof, and minimize the use of fuel or flammable materials, emergency exits will be planed.

Staff training on fire prevention protocols, extinguishing measures and emergency evacuation procedures will be provided.

In the design of the exterior circulation a paved circuit will be incorporated to allow access to fire intervention vehicles to all the frontages where people may reside.

Consider the decoration, detailed descriptions of the areas fireproof and smoke compartments, the efficiency level of fire protection.

Building materials mixed in flameproof areas complying with the fire safety standards.

The Fire doors must close automatically after opening.

The fire alarms, automatic fire extinguishing equipment, smoke exhaust system and an evacuation system.

**3.4.2.8.5 Climate Control**

The facilities will have cold-heat systems that will satisfactorily respond to the requirements of comfort and energy consumption of the complex. This system will be assisted by treatment systems, filtration, and adequate air renewal to the critical areas that need it.

It is also fitted with an air extraction system of the areas to maintain a constant state of negative pressure inside thereof.

The temperature will be regulated with zonal thermostats to prevent overheating and energy wastage.

The project will need to incorporate sustainability concepts. This will require the incorporation of bio-climatization aspects and passive cooling. That is, to obtain internal cooling without added energy.

It should include all the memories of calculating thermal loads and speeds air flow, type of diffusers and grilles according to local weatherization.

**3.4.2.8.6 Sanitary Installation**

**3.4.2.8.6.1 Cold Water Supply:**

There will be a closed ring-shaped system to balance pressure differences of the entire network and to enable the cutting of part of it without affecting the supply, and the scope and design of the following components must be specified:

* + 1. Water Supply Systems
    2. Water consumption and water storage (describing the different stores to use and the criteria for storage, example underground tanks, elevated tanks, above ground tanks etc.) storage should be included in critical areas of the hospital, so that these supply are ensured of eventualities.
    3. Pipes and fittings
    4. Identification and studies Drinking Water Sources (allocation by type and existing water quality in the area).
    5. It should include studies to determine the allocation of water from different sources to consider supply, boreholes, public, springs, etc.
    6. Treatment and water purification systems to be required.
    7. There should pay greater attention to the quality of water to areas where dialysis activities are performed, propose treatments that are necessary to ensure the required quality in these areas.

**3.4.2.8.6.2 Hot Water Supply:**

The hot water network will be executed with return and circulation pump to instantly provide hot water to the consumption points. The hot water pipes will be fitted with insulation to minimize heat loss.

The hot and cold water supply networks will be equipped with general stopcocks sectors, near each point of consumption, without thereby affecting the supply network.

Appropriate measures shall be taken to prevent bacterial contamination in the system; it must include the best economic and technical option to determining the heat source (boiler, power, solar panels, etc.).

**3.4.2.8.6.3 Sanitary Sewers and Sewage System**:

The drainage system shall have sufficient access points, also will be equipped with a network of interceptors (grease, rags, etc.)

The sanitary systems and storm drainage must be prepared according to the requirements of the corresponding authorities. Inside storm drainage systems will seek to see as a first priority to evaluate the feasibility of infiltration into the subsurface aquifer feeding.

If necessary it will develop a system of sewers and a treatment plant of sanitary waste that will foresee its future connection to the public network or through most feasible mean available, should include additional treatments to areas from which hazardous substances, with the treatment due to compliance with national and international standards, example (for laboratory areas should be available neutralizing cameras, X-ray areas, slop tank or tanks are areas where disinfection to treat infectious diseases.

The faucets will be top of the line. Consumption points of cold/hot water for the general public will be the self-closing type, with a handle for disabled people where appropriate.

The instrumental washing points will be of single handle mixer type.

The staff washing points of the facilities will have mechanical action (a foot or elbow) or automated.

A study must be made and it should present wastewater characterization for the design of the treatment plan of the hospital.

**3.4.2.9 Design Guidelines - Bioclimatic Aspects**

The arrangement of the volumes in the set should minimize heat gain from sun exposure.

Thermal insulating materials should be used, it is suggested that the insulating capacity of perimeter wall or partition is high, and shall meet the following parameters:

1. Thermal transmission "K": 0.60 to 0.9 W/m2 ° C Thermal Resistance "R": 1.1 to 1.8 m2 ° /w
2. Admissible thermal transmission "K adm.": 1.5 to 1.7 W/m2 ° C

The insulation thickness shall comply with the recommended level.

The use of double glass with air chamber and the location of the openings will be analyzed.  
The use and induction of air currents, and crossed ventilation opening form of the windows.

Sun protection elements will be designed (on roofs or umbrellas and organic elements). The customized design must take into account an optimal solar incidence.

The finished surface must be of low absorption, light colored material or paint. It is required that the solvents should not absorb the incident heat.

All openings such as vents of crossed ventilation ducts must contain mosquito nets to prevent access of insects.

**3.4.2.9.1 Signaling**

The signage will be developed on the basis of written text in Spanish combined with ideographs and a proposed reading of colors, in combination with a clean architectural design that will facilitate the natural orientation and intuitive displacements.

The marking shall be written in Large Text and Bright Colors.

**3.4.2.9.2 Design Guidelines – Non Medical Equipment**

The bidder must complete an integral project of interior design and furniture.

For furniture equipment, will be generalized the use of flame retardants, fireproof materials and the use of fuel or flammable and/or toxic gases to be burned will be minimized, so it must be ergonomic and functional according to the located spaces.

**3.4.3 Elaboration of Final Architectural and Construction Plans**

The definitive Project must be prepared, after the approval of the final draft, which must contain:

1. Construction plans:

* Earthworks Plans
* Architectural Design.
* Design of terraces and roadways.
* Structural Design.
* Electrical Design.
* Hydro sanitary Design and Fire Fighting System.
* HVAC design.
* Special Facilities Design: steam, medical gases, etc..
* Communication and Security Systems Design.
* Network, Telecommunications and Data Design.
* Distribution of equipment and furniture.

1. Technical Specifications:

* Construction: Architectural and Structural
* Equipment
* Furniture
* Plumbing, electrical, mechanical installations and networks

1. Calculation Reports:

* Engineering Design (Structure, Electricity, Hydro sanitary)
* Special Facilities Design
* Others that the consultant deems necessary.

1. Estimated costs:

* Construction
* Equipment
* Furniture
* Facilities and Networks
* Maintenance

1. Implementation of physical construction program. Include the execution program and the procurement and installation of equipment, furniture, facilities and networks.
2. Model of the entire Project set in 1:500 scale.

**3.5 Special Facilities, Network & Communication.**

The design will include:

1. Installations that are related to the steam, propane, air, medical gases and fire systems as well as information and communication networks (such as sound, telephone, patient-nurse call, lighting alarms, network systems, signage, video).
2. Program special facilities, which should contain:

* Type of installations or systems to include in the project
* Performance and Capacity of the facilities or systems
* Environments in which they will be installed or supplied with these systems
* Special equipment catalog.

1. Information and network communication program, which must contain:

* Type of network to install
* Features and network capacity
* Requirements for each network equipment
* Environments in which will be installed or feed with these networks

1. Preliminary draft and final proposal for special facilities, information and communication networks. It must also be included in the preliminary architectural plans of the proposal for the special facilities, information and communication networks for its approval and in the definitive plans, once the preliminary draft is approved.
2. Preparation of Technical Specifications and calculation memory of special facilities, information and communication networks.
3. Estimated costs of special facilities, information and communication networks.
4. Physical execution program of the special facilities, information and communication networks integrated to the implementation program of construction. Determine the import of equipment and materials program, should it not be found in the domestic market.

**3.6 Identification of equipment and furniture.**

1. Equipment program (medical, non-medical, industrial), instruments and furniture, making reference to the functional medical program and architectural design, the equipment and furniture necessary for the Hospital’s operation should be determined. Therefore will be requiring:

* Inventory of hospital equipment and furniture in use, including comments on the articles that can be used in the future in order to avoid duplication of investment.
* List of medical equipment according to the defined service portfolio for the Hospital
* Nonmedical Equipment to use for each of the services.
* Industrial equipment considering the systems to be installed: steam, propane, power system, emergency power systems, kitchen equipment, laundry, maintenance, etc.
* List of instruments according to the portfolio of services defined for the Hospital
* Procedures and surgeries to be performed.
* Furniture-for-service (fixed and movable).

1. Preliminary draft and final proposal of equipment and furnishings. Include in the architectural plans of the preliminary draft the proposal for equipment and furniture for its approval and in the final plans, once the preliminary draft is approved.
2. Preparation of technical specifications for equipment and furnishings.
3. Estimation of the costs of equipment and furniture
4. Program of acquisition and installation of equipment and furniture integrated to implementation of the construction program.

**3.7 Identification of Medical and Non- Medical Supplies**

The consumer goods that the Hospital requires for its operation should be identified according to their ability and profile.

Quantification of medical and non-medical supplies should be done on a quarterly, semi-annual and annual basis according to the expected service production.

Define the amount of consumer goods of each type by each specialty or services the hospital provides and determine their origin (if it’s imported or local market), according to the following list:

* Periodically replaced material
* Medications
* Equipment Consumables
* Hospital clothing
* Food
* Cleaning materials
* Fuels and lubricants
* Office Supplies
* Other inputs

Develop a procurement plan for consumer goods, according to the source (if import or local purchase)

**3.8 Hospital Organization Proposal**

This topic must consider the organizational and legal aspects of hospital’s operation.

1. Design an appropriate organizational structure to run the Departmental Hospital, reflecting the levels of command that must exist.

1. Define the needs of Human Resources, for two moments: a) key group of staff before the hospital begins operating and b) human resources, medical hospital, and administrative that will remain working, once the hospital is running.
2. Conduct a screening of the necessary human resources with the appropriate profiles for the hospital’s operation, according to the capacity provided by each environment, service offerings and defined attention hours.
3. Define a recruitment and/or removal plan of human resources located in other hospitals.

**3.9 Training:**

A training plan for the medical, technical, administrative and maintenance staff must be developed covering the following aspects:

1. Organization of services
2. Contingency plans (for natural or anthropogenic disasters)
3. Handling of Human Resources
4. Flows and administrative processes.
5. Handling inventory and supply plans
6. Management of new technology acquired

**3.10 Legal Aspects**

A study of the legal aspects on which the hospital’s organization and operation will be based must be developed.

1. Legal framework of the Hospital’s organization.
2. Legal framework of the hospital’s operations.

**3.11 Estimated Investment Costs:**

Determine the investment costs of each of the components included in this project: cost of land, infrastructure and facilities (all costs incurred in the execution of the works, whether vertical or horizontal) Equipment and furniture (industrial, medical, mobile, non-medical, office, kitchen, etc..), Spare parts for equipment, medical and non-medical supplies (drugs, materials, instruments, medical bags, among others.) to run the first year. Organization expenses including legal fees, among others.

These costs should be defined by currency and by each of the categories. This should include the calculation reports.

Develop a timeline of financial performance. Design a disbursement schedule of the investment by component and periodicity.

**3.12 Economic Analysis**

1. Conduct a cost effective operation of the new unit as a departmental hospital.
2. Conduct an economic analysis, including social IRR and NPV.
3. Identify the impact that this project will generate from the budgetary point of view, both on the Republic’s and the budget allocation of the Ministry of Health.

**3.12.1 Impacts generated by the Project**

Identify and analyze the impact that the General Hospital will generate, from the elaboration of studies, up to the commissioning of the same, from a social, institutional and economic standpoint.

**3.12.2 Operating Costs**

A study to estimate the costs of operation and maintenance of the hospital in the first five years must be developed. Therefore, other items are included that can be part of other components of the studies, without this resulting in redundant cost for the project or for consulting activities.

In these cases the results of studies must be submitted.

1. Human resources costs (per year)
2. Program and human resources training costs (before initiating operations and cost per year, once in operation)
3. Medical and nonmedical supplies costs (per year)
4. Logistics plan and relocation and opening of services costs
5. Maintenance costs, broken down by year and by category (infrastructure, equipment, furniture, vehicles, among others.)

**3.13 Development of the Bidding Document for Project Execution.**

The Consultant will prepare the necessary bidding documents for the procurement of works and equipment, as well as the supervision of the Project, taking as reference the existing models documents of CABEI (Central American Bank for Economic Integration).

**4. METHODOLOGICAL GUIDANCE**

**4.1 Document provided by the Ministry of Health**

The Project Executant will provide the Consultant, the available technical information for compliance with the objectives and scope of the Consultancy, among those are mentioned:

1. General Health Act and its Regulations, Policies and National Health Plans
2. Model of Care in Family and Community Health.

**4.2 Consultant Activities**

1. The consultant should review institutional documents (studies, hospital indicators, project profile, etc.) to provide a basis for the Consultancy.
2. The Consultant shall consider methodological techniques, such as those listed below:
   * + Sources of primary information (quantitative and qualitative)
     + Secondary information sources
   * Research Instrumentation
   * Research Techniques
   * Sample design
   * Population of interest
   * Sample size
   * Data Analysis

The consultant will coordinate activities to develop with the appropriate authorities. Schedule coordination meetings, leaving them in evidence (minutes, memory aids), especially in the most relevant cases of decision making, integrating them in the final document as a memory of the sessions with working groups.

**5. EXPECTED OUTPUTS**

The expected outputs of the Consultancy are:

1. Market Research.
2. Diagnosis of the Health situation of the beneficiary population.
3. Functional medical program
4. Environmental Impact Assessment.
5. Project Design: corresponding architecture and engineering, facilities, networks, equipment and furniture.
6. Model of the Project set in 1:500 scale.
7. Hospital Organization Study.
8. Operating Costs and Financial Study of the Project (including social IRR and NPV).
9. Program of physical and financial execution of the Project.
10. Document of works and equipment procurement as well as the supervision of the Project according to CABEI format
11. Training Plan.
12. Methodological designs: all studies and designs to be delivered by the consultancy must be accompanied by the used methodology to reveal the degree of validity and reliability of the information. (Methodological techniques mentioned in Section 4.2 of this document).

**6. DELIVERED DOCUMENTS AND METHOD OF DELIVERY**

The Consultant will deliver in quadruplicate (two in English and two in Spanish) a Global Report and individual reports from each of the required studies in both physical (paper) and digital (CD).

El Consultor entregará por triplicado un Informe Global e informes individuales de cada uno de los estudios requeridos tanto en físico (papel) como digital (CD).

**6.1 Global Executive Report**

This report should emphasize the relevant aspects of the project, highlighting:

1. Characterization of the current situation.

2. Identification and prioritization of problems in the area of influence.

3. Location and area of ​​influence of the Project.

4. Direct and indirect beneficiaries.

5. General organizational requirements, technologies and other required investments.

6. Total value of the project.

7. Features funding.

8. Financial and economic indicators calculated.

9. Socioeconomic impact.

10. Project Log frame.

11. Others that the consultant deems important.

**6.2 Individual Executive Reports**

These reports shall contain the following information:

1. Introduction
2. Background
3. Objectives
4. Methodology employed
5. Results
6. Conclusions

**6.3 Results of Studies**

They must submit four individual documents (two in English and two in Spanish) with digital support (CD) of each study as detailed in the scopes of work and expected outputs with annexes, methodologies and bibliography. This shall contain all the detailed information.

Annexes will be used to present those charts, graphs, laws, calculation reports or other information that supports the study.

**6.4 Presentation Formats**

The format for the presentation of the expected outputs of the consultancy is as follows:

For text documents, reports, tables, calculation reports and graphs:

* Microsoft Word, Microsoft Excel and Microsoft PowerPoint
* Images and pictures:
* Image Format JPEG and / or TIFF
* For project schedules and implementation programs:
* Microsoft Project Manager
* For the construction plans, architectural diagrams and other documents: Autodesk Autocad

If the development of charts, diagrams or other drawings is necessary, the program and the version in which they were produced should be specified. If the MOH and / or CABEI do not have the program, the Consultant shall provide it.

All documents and drawings produced by the Consultant shall be delivered with the appropriate approvals (MOH, MARENA, Fire Department, Municipal City Hall of Nueva Segovia, CONEA, ENACAL, Union Fenosa, etc.). The costs will be borne by the Consultant.

Submit four copies of the documents (two in English and two in Spanish) containing the studies, along with CD containing the information provided.

**7. DURATION OF THE STUDIES**

The time allowed for the development of pre-investment studies is 300 calendar days, including time for technical reviews by the MOH and the No Objection by the CABEI (60 days). The consultant has 300 days to complete the study including within this period, the time of the final report and presentation of the documentation required for the execution of the project. Note that for this implementation, the consultant in charge of its development must submit a bank guarantee of compliance, estimated to be 10% of the total contract amount.

The deadline of the Consultant to comply with will begin counting from the date of receipt of the first payment, which will be paid after approval of the Work Programme, which will contain the Work Plan and Schedule of activities to develop.

This Work Plan and Schedule will be delivered in Gantt chart with the indication of the beginning and completion of each activity, highlighting the critical path of the process and timing of review by the MOH and the No Objection by the CABEI.

**8. MONITORING COMMITTEE**

For the implementation, supervision and monitoring of the Consultancy, a Task Force will be made conformed by at least five (5) employees of the Ministry of Health (MINSA), the following departments and units: General Directorate of Extension and Quality of Care, Department of Planning and Development, Department of Infrastructure and Technology Development, Health Regulation Department and the Department of External Cooperation. This Committee will be coordinated by the Division of External Cooperation.

In addition the Local Integrated Health Care (SILAIS in Spanish) beneficiary will create a Local Monitoring Committee which will be responsible of accompanying the implementation and monitoring of activities under the work schedule of the Consultancy, as to provide information of SILAIS level that would be required by the consulting firm and all coordinated by the National Monitoring Team.

**9. ACTIVITIES TO BE PERFORMED BY THE CONSULTANT.**

**9.1** **Consultant Activities**

The consultant should review institutional documents (studies, hospital indicators, project profile, etc.) to provide a basis for the Consultancy. The consultant will coordinate activities to develop with the appropriate authorities. Schedule coordination meetings, leaving them in evidence (minutes, memory aids), especially in the most relevant cases of decision making, integrating them in the final document as a memory of the sessions with working groups.

The activities that have to do with each interest group are:

Bank:

A. With the Country Management and the Department of Pre investment of CABEI

- Coordination of legal, administrative and financial aspects of the contract.

MOH:

B. With the General Directorate of Extension and Quality of Care

C. Coordination and review of medical and hospital aspects in the field of consulting.

D. With Human Resources Department: coordination and review of human resource aspects of the Hospital.

E. With the Department of Infrastructure and Technology Development: coordination and review of design criteria for architectural, engineering, equipment, furniture. Technical specifications, budget, program execution of works.

F. With the Department of Health Regulation General- Enabling Health Facilities: coordination and review of rules and standards Enabling Hospitals.

G. With the General Medical Supplies: coordination and review of medical supplies requirements

H. With General Directorate of Health Surveillance - Environmental Health: coordination and review of norms of hospital waste and review of environmental impact study.

I. With the Technical Unit for Disaster Liaison: coordination and review of safety standards, accessibility, signage, and National Hospital Insurance Policy, etc.

J. With the Financial Management Division and Department of Planning and Development: coordination and review of studies of investment costs and operation of the Project.

K. With the Department of Planning and Development - MOH Information System: coordination and design review of information systems and networks.

**10. ETHICS AND CONFIDENTIALITY**

All participants in the team of the Consultancy shall maintain confidentiality in all documents produced for the purposes of it. It may not use said documents without the prior written permission of CABEI. It is also inhibited from participating in the construction processes directly or indirectly, associated or not with construction companies participating in the bidding when appropriate.

The Consultant will be responsible for the quality of the products delivered, even when they are produced through subcontracts with other consultants by virtue of this consultancy.

**11. PAYMENT**

The Bank shall pay the Consultant in dollars of the United States of America, with prior approval of the

Ministry of Health, as follows:

| **Desembolso** | **Productos** | **Porcentaje** |
| --- | --- | --- |
| First Payment | With the signing of the contract and approval of the final work plan by MINSA. | 15% |
| Second Payment | With the delivery of the Ground Technical Studies approved by MINSA that determine the feasibility of the Land, the Diagnosis of Health Situation and Market Study Functional Medical Plan. | 15% |
| Third Payment | With the delivery to the satisfaction of MINSA of the following products: Preliminary Architectural draft, Engineering, Special Installations and Information Networks Draft, Equipment, Furniture and Supplies Draft, Environmental Impact Assessment including: Environmental Diagnosis, Identification of Impacts of the Project, and Design of Preventive and Mitigation of Impacts, Animated Video. | 20% |
| Fourth Payment | With the delivery to the satisfaction of MINSA of the following products: **a)** Hospital Design including: Architecture, Engineering, Special Facilities and Information Networks, Equipment, Furniture and Supplies, **b)** Environmental Impact Study including: Environmental Management Program , Design of Preventive and Mitigation of Impacts and Environmental Impact Studies, **c)** Preliminary draft of Quality Organization and **d)** Organization Final Project that includes: Proposed Organizational Structure, Human Resource Plan, Training Plan and Report of Legal Issues. | 20% |
| Fifth Payment | With the delivery to the satisfaction of MINSA of the following products: Estimated Supply and Demand, Investment Cost Estimation, Operational Cost Estimation, Financial Implementation Schedule, Cost Benefit Analysis, Financial Sustainability, Current Net Financial and Social Value Calculation, and finally the Physical Implementation Schedule. | 20% |
| Sixth and last payment | With the delivery to the satisfaction of MINSA of the following products: Scale Model, Base Specification for Bidding Process and the Final Report. | 10% |
|  |  | **100%** |

**12. PROPOSED EVALUATION CRITERIA**

The Committee consists of MINSA officials that will evaluate the offers on the method of selection based on Quality and Cost, as set forth on said method of procurement policy of CABEI and the documents of the contest of consultancy.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Estimated Costs** | | | | | | |
| **Replacement of Nueva Segovia Departamental Hospital** | | | | | | |
|  |  | |  | | |  |
| **Products Documents** | **Items** | | **Total** | | | **Percentage** |
|  |  | |  | | |  |
| I | Approval of the work program by MINSA and CABEI | | $ 146,341.46 | | | 15% |
|  |  | |  | | |  |
| II | Delivery of Market Study approved by the MOH and the no objection of CABEI | | $ 146,341.46 | | | 15% |
| Delivery of Health Diagnosis approved by the MOH and the no objection of CABEI | |
| Delivery of Functional Plan approved by the MOH and the no objection of CABEI | |
|  | | | | | | |
| III | Delivery of Preliminary draft corrected and approved, approved by the MOH and the no objection of CABEI | | $ 195,121.95 | | 20% | |
| Delivery of Environmental Assessment of the Project Site, approved by the MOH and the no objection of CABEI | |
|  |  | |  | |  | |
| IV | Delivery of final designs and Special Facilities Plans approved by the MOH and the no objection of CABEI | | $ 195,121.95 | | 20% | |
| Delivery of Environmental Impact Assessment approved by the MOH and the no objection of CABEI | |
| Delivery of Study of Hospital Organization approved by the MOH and the no objection of CABEI | |
|  |  | |  | |  | |
| V | Delivery of investment and operating costs approved by the MOH and the no objection of CABEI | | $ 195,121.95 | | 20% | |
| Delivery of the Program Physical Implementation and Financial Study approved by the MOH and the no objection of CABEI | |
| Delivery of the Training Plan approved by the MOH and the no objection of CABEI | |
|  |  | |  | |  | |
| VI | Delivery of Final Study Report approved by the MOH and the no objection of CABEI | | $ 97,560.98 | | 10% | |
| Delivery of the Scale model approved by the MOH and the no objection of CABEI | |
| Delivery of the Bidding Document approved by the MOH and the no objection of CABEI | |
|  |  | |  | |  | |
|  |  | | | | | |
| Total | | $ 975,609.76 | | 100% | | |