STATE PUBLIC SERVICES COMISSION

OF MEXICALI

BECC STEP II PROJECT FORMAT

FOR THE

"SANITATION PROGRAM OF THE CITY OF MEXICALI"

October, 1997

Contents

1.- Executive Summary

Background It must be noted that the determination to develop and implement the works involved in the projects as well as their general costs are based on actions coordinated by the International Boundary Water Commission (IBWC) of Mexico and the United States, within the framework of the international agreements reached in Minutes 264 and 294. Both Commissions have developed coordinated actions to address the shared sanitation needs. In this regard, the Binational Technical Committee (BTC) was established in October 1996 to address the sanitation needs of Mexicali. The committee has the participation of local, state and federal authorities from both countries. BTC members defined the concept and monetary requirements for implementation of the sanitation actions which was to be submitted as Step I Format to BECC. This re-defined format was submitted to BECC on May 27, 1997, in which the Mexicali I System and Mexicali II System projects were bundled and totaled approximately $50 million dollars.

27. General Project Description

The 41 projects that will be implemented in the City of Mexicali, are part of the Mexicali Sanitation Program that consists in the following:

- *Rehabilitation and Expansion of Treatment Plant of the Mexicali I System.*
- *Lining for 6,100 m. of sewer collectors.*
- *Replacement of 7,390 m. of sewer collectors and sewer lines in several diameters.*
- *Construction of sanitary sewer, Pumping Plants and main sewer lines in different areas of the city to provide service to over 46 housing developments and an approximate population of 60,000*
- *Rehabilitation of 4 lift stations*
- *Installation of telemetry equipment in the lift station system, pumping plants and treatment lagoons*
- *Mexicali II System treatment plant construction (first stage)*
- *Construction of pumping plant N° 4*
- *Construction of main sewer line Mexicali II (9.5 km.) in second stage*
- *Construction of collectors and subcollectors (27,853 m)*
- *Replacement of sewer collectors (2,012 m.)*
- *Rehabilitation of 2 lift stations*
- *Installment of telemetry equipment in lift stations, wastewater pumping plants and Mexicali II treatment plant.*

1. Compliance with BECC criteria

B.1. General Information

The National Water Commission (CNA) analyzed 9 different options for the wastewater conveyance, disposal, and reclamation. (See under Executive Project) It was determined to locate the Mexicali II System treatment plant 9.5 km. away from pumping station N° 4 and treat wastewater to a level adequate for reclamation purposes in agricultural irrigation. The region has an extensive area for agricultural use in which treated effluent can be reclaimed. The quality standards used in designing the plant are NOM-001-ECOL-96 and the parameters defined in IBWC Minute 264. In this first stage of construction, the plant will have a treatment capacity of 880 liters/second.

Other program projects include construction of a sanitary sewer system to service over 46 housing developments, some of which have been without service over 35 years. Also included is the construction and rehabilitation of collectors in different areas of the city as well as the rehabilitation of pumping stations. At present, sanitary sewer service coverage is 90%; project implementation will increase coverage to 95% of the city population.

B.2. Human Health and Environment

The sanitation program projects will resolve problems related to untreated wastewater discharges into the New River which are discharged by the City's sewer system, specifically, the area covered by the Mexicali II System. The projects will also increase the quality of wastewater treated by the Mexicali I System treatment plant, located at the Colonia Zaragoza. Collector rehabilitation and lining will eliminate problems in the drainage system and wastewater running through the storm water drains will no longer be necessary; therefore, the New River will no longer be an infectious foci affecting residents on both sides of the river bank throughout its course.

The construction of sanitary sewer in over 46 housing sites on the west side of the city will improve the quality of life of the residents and eliminate contamination due to latrines in the backyards and the risk of diseases and infections experienced among children and adults. Another benefit will be reflected in the reduction of gastrointestinal diseases and the risk of non-bacterial food diseases.

The Environmental Impact Statement (EIS) has been developed and approved by the Environmental Department of the State of Baja California, as well as the statement issued by the National Institute of Anthropology and History (INAH) stating no archeological ruins exist in the areas of interest.

The transboundary environmental impacts will be positive given that the wastewater from the city of Mexicali will be treated pursuant to quality standards agreed under IBWC Minute 264 and will benefit water resources on the US side of the border, since the New River crosses into the United States.

B.3. Technical Feasibility

A detailed description of the technical feasibility of the Mexicali II System wastewater treatment plant is provided in the executive project which includes the technical files of all projects submitted to BECC. The operation and maintenance plans, safety plan, emergency, training and personnel training programs are also included.

The projects will comply with design regulations from the beginning of the construction and will conform to city construction regulations.

B.4. Financial Feasibility

The financial analysis of the project has considered an $8.70 million contribution by the US EPA through IBWC Minute 294 and a contribution by the State Government of Baja California which will be defined through the Public Works and Human Settlements Secretary of the State (SAHOPE) and the SPSCM. Another possible contribution may come from through grants contributed by the Mexican federal government through the CNA and a possible additional contribution by the EPA (NADBank).

In determining the project's financial feasibility, the SPSCM and BECC evaluated different scenarios which consider funding by the US EPA, the Mexican federal government, and BEIF in accordance with NADBank regulations. These scenarios reflect the following premises:

- *The funds contributed by the SPSCM via loans or capital will be matched by a grant contribution made by SAHOPE*
- *The funding amount contributed jointly by SPSCM and SAHOPE will be matched by the Mexican federal government*
- *The possible EPA additional contribution, through the NADBank.*
- *Funding provided by SCPSM are maximized based on financial projections*

Investment recovery and program to cover any increase in the O&M costs for the new structure is described below and make the project financially feasible.

1. With regard to the investment amount:

The SPSCM will recover the loan amount through the economic benefits resulting from the project. Users benefiting directly by the new service will be charged for construction costs and a connection fee which has already been established by the 1997 State Earnings and Expenditures Law.

2. With regard to the O & M costs:

The SPSCM has annual pre-authorizations for rate increases based on a formula that includes increases in the main O & M costs. This updating process is carried out monthly until the established limit is reached. When the accumulated rate and fee increases exceed the limit, approval by the State Congress is required.

B.5. Community Participation.

The purpose of the Steering Committee was to carry out follow-up actions related to project development as well as to provide notice of public meeting to all sectors of the community. The purpose was to provide project general information as well as information regarding any impacts it could have on the community.

Two public meetings were held, one on October 2nd, and the second on October 10th. Public meetings were also held on the U.S. side of the border in El Centro, California on October 3rd and 16th. At the meetings, the project scope and impacts on user fees were presented.

According to the Community Participation Report submitted by the SPSCM on October 11th, the community at large was adequately informed, public access to project information was guaranteed, and based on the opinion survey taken, the majority supports the project and understands its benefits and impacts. However, concerns were raised by a small group of residents (250) living in the Farm El Choropo, approximately 1 km from the edge of the Mexicali I plant proposed site. This group has presented its disapproval with the plant's proposed location. The SPSCM, the Steering Committee, and the proper authorities have addressed the issue and are currently in the resolution process.

B.6. Sustainable Development

The SPSCM has legal jurisdiction, is economically independent, and has the technical and human capacity to ensure the continuity and the development of all tasks related to the Sanitation Program of the city of Mexicali.

The SPSCM is developing sustainable activities such as the Border Program for Industrial Discharge Controls which has had the collaboration of the State's Environmental Agency since 1996.

The project's sustainability is based on the social, economical and environmental development without affecting any natural resources of the area and ensures a better environment for the present and future. In this regard, the SPSCM has planned implementation and operation of an Industrial Water Pre-treatment and Recommendations Program and a permanent municipal wastewater characterization program.

Additionally, the SPSCM is involved in negotiations with NADBank to support actions for the institutional development of the organization. The SPSCM also has a program through the CNA to carry out an inventory of the potable water and sanitary sewer pipe line system. All of these actions contribute to ensure the project is developed in a sustainable manner for the community of Mexicali.

1. List of documents submitted to BECC.

The list below is the list of documents submitted to BECC by the SPSCM:

- *Official notices Nº SOC-1492/97 and Nº SOC-1531/97 dated June 5 and 10, 1997 addressed to the Environmental Department of the State of Baja California from the State Commission of Public Services of Mexicali in order to get the approval and authorization for execution of project tasks related to environmental impacts*
- *Revised Master Plan for Potable Water, Sanitary Sewerage System and Sanitation of the City of Mexicali, Baja California*
- *Technical project information for the works to be done within the Sanitation Program of Mexicali under the Revised Master Plan for Potable Water, Sanitary Sewerage System and Sanitation of the city of Mexicali, Baja California*
- *Record books with the financial statements of the State Public Service Commission of Mexicali for 1994, 1995 and 1996*

- *Environmental Impact Statement, General Terms, prepared for SPSCM by CH2MHILL*
- *Transboundary Environmental Impacts Study, prepared for SPSCM and the two section of the IBWC by CH2MHILL.*
- *Rate Schedule for 1995, 1996 and 1997*
- *Authorization Procedures for water rates*
- *Legal Capacity of the organization.*
- *Current Organizational Chart*
- *State Public Service Commissions Law*
- *Regulations of the potable water service law.*
- *Earnings Law 1995, 1996 and 1997.*
- *Project Implementation Program (1998-2000).*
- *Meeting Calendar for the Steering Committee*
- *Urban Master Plan of Mexicali*
- *Community Participation Program*
- *Demand distribution. Consumption by user type*
- *Percentage of billing in relation to volume supplied by user type, billing efficiency levels*
- *Percentage of collection in relation to the amount billed by user type. Collection efficiency levels*
- *Sustainable development, Program for Efficient Water Usage*
- *Management*
- *Updated Users Directory*
- *Overdue Bill Collection Plan*
- *Development and training*
- *Macro and micro metering program*
- *Executive project of the Mexicali II System wastewater treatment plant submitted by the National Water Commission which includes plans*
- *Resolution on the legal status of the land proposed for the construction of the wastewater treatment plant in the colonia Colorado, issued by the State Public Service Commission of Mexicali. Official authorization letter to use land for the Mexicali II System wastewater treatment plant issued by the National Institute of Anthropology and History (INAH).*
- *Industrial Water Pre-treatment Program and Recommendations for Implementation Program. Prepared by CH2MHILL in 1997*
- *Municipal Wastewater Characterization Program. Prepared by CH2MHILL in 1997*
- *Border Program for Industrial Discharge Control for Mexicali. Developed by the State Environmental Agency and the SPSCM in 1995.*
- *Community Participation Committee Report*
- *Authorization letter from the State Department of the Ecology to the Environmental Assessment (MIA), October 16, 97.*

2. General Information

A. Project Type

The name of the project is "Sanitation Program of the City of Mexicali" and consists in the implementation of 40 works to be carried out in the City of Mexicali. It includes sanitary sewer and wastewater collection and treatment which will improve the quality of life of thousands of Mexicali citizens as well as the quality of the water of the New River which crosses the international boundary into the United States.

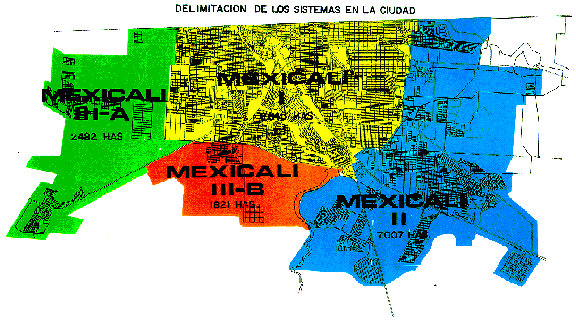
B. Project Location

The project will be carried out in the City of Mexicali, located in the Northwest area of the State of Baja California (latitude North 31 degree 30 minutes; longitude West 115 degree 30 minutes). To community to the north is Calexico, California in the United States.

The city of Mexicali is divided in four large zones for the provision sanitary sewer services and the area and population estimated in 1996 in each of the four zones is listed below:

System	Area (ha.)	Population (residents)
Mexicali I	*6,845*	*405,321*
Mexicali II	*7,007*	*163,618*
Mexicali III-A	*2,482*	*30,000*
Mexicali III-B	*1,821*	*2,000*
Total	**18,155**	**600,939**

Source: SCPSM, Population includes the city and the Valley of Mexicali.



Population includes inhabitants in the urban area as well as in the colonias and villages existing in the legal limits (Legal Area) of the city which are included in the "Urban Development Program of the Population Center of Mexicali, BC. 1993-2007" in effect.

The works to be carried out will have an enormous effect on the City of Mexicali in general, given that the population is spread out in different areas and the positive impacts will reflect a healthy environment for all the inhabitants on both sides of the border.

The New River flows in a southeast - northwest direction near the central area of the city of Mexicali into the United States. The waters treated by the Mexicali I System treatment plant, located in the colonia Zaragoza, and serving only the Mexicali I System flows into the New River. Likewise, raw wastewater generated by the Mexicali II system is also discharged into the New River. As such, the New River formation is due to its topographical location and has a permanent flow by collecting the agricultural waters returned from the north side of the Mexicali Valley, and also serves to convey seasonal storm water discharges of the basin.

C. Project Description and Work Tasks

1. Project Description

The project consists in the implementation of 40 works whose purpose is to address the lack of a sanitary drainage system in over 46 neighborhoods in the city; to meet this objective, construction of pumping stations, main collectors, as well as the construction and expansion of wastewater treatment plants, and the replacement and construction of collectors, and the rehabilitation pumping stations is required.

The projects that will be carried out are the following:

a) At the Mexicali I System:

- *Rehabilitation and Expansion of Treatment Plant of the Mexicali I System.*
- *Lining 6,100 m. of sewer collectors.*
- *Replacement of 7,390 m. of sewer collectors and sewer lines in several diameters.*
- *Construction of sanitary sewer, pumping plants and main sewer lines in different areas of the city to benefit over 46 housing developments with a population of approximately 80,000 residents*
- *Rehabilitation of 4 pumping stations*
- *Installment of telemetry equipment in the pump system, pumping plants and treatment lagoons*

b) At the Mexicali II System:

- *Mexicali II System treatment plant construction (first stage)*
- *Rehabilitation of 4 pumping stations*
- *Construction of pumping plant N° 4*
- *Construction of main sewer line Mexicali II (9.5 km.) in second stage.*
- *Construction of collectors and subcollectors (27,853 m.)*
- *Replacement of 2,012 m. of sewer collectors*
- *Installment of telemetry equipment in lift stations, wastewater pumping plants and Mexicali II treatment plant*

General Description of the project's main technical concepts:

a) Mexicali I System

a.1. Rehabilitation and expansion of the Mexicali I System Treatment Plant (Lagoons at the Colonia Zaragoza).

Increase capacity from 980 liters/second to 1,300 lps

The works will consist in rehabilitation of 980 lps and an increase in the capacity of the treatment plant in 320 lps, from 980 lps to 1,300 lps, the current treatment system consists of 13 stabilization lagoons, three are anaerobic and 10 of the facultative. The operation is done by dividing the flow in order to operate at the same time with an "Australian" system; the distribution channels and the floodgates are in bad physical condition, causing the flow to be unevenly distributed. The hydraulic design has several short circuits with dead areas having no movement and causing the real retention time to be shorter than the estimated time. Furthermore, equipment to remove floating material is inadequate. In order to reach higher efficiency levels, actions to this effect are detailed in the technical chapter of this document.

Included in the works that will be carried out in the Mexicali II System, is construction of several collectors that will allow some areas currently discharging wastewater into the Mexicali I System to be conveyed to the Mexicali II System. This will provide the Mexicali I System Plant with a larger capacity to treat wastewater from the neighborhoods during the initial sewage works carried out on the western area of the city.

- *a.2. Lining 6,100 m. of sewer collectors.*

  Sewer lines have collapsed in several parts of the city due to their age and because they are made of concrete. Furthermore, their location does not allow replacement by traditional methods. As such, lining the existing collector system has been determined to be the most appropriate solution.

- *a.3. Replacement of 7,390 m. of sewer collectors and sewer lines in several diameters.*

  In some areas of the city, the sewage collectors have collapsed due to age and pipe material, in addition silt deposits have accumulated over the years. These problems at times have made it necessary to divert wastewater to the storm water drainage system which in turn discharges into the New River. These replacements will be made of PVC pipelines.

- *a.4. Construction of sanitary sewer, pumping Plants and main sewer lines.*

  In the area located to the west of the city of Mexicali, there are neighborhoods that are not provided with sanitary sewer service; there are several sub-divisions over 40 years old while others are experiencing rapid rates in population increases. Provision of services with systems discharging into the treatment lagoons of the Mexicali I System located in the Colonia Zaragoza is required.

- *a.5. Rehabilitation of 4 lift stations*

  Due to the age and the constant use of the pumping equipment immediate implementation and rehabilitation of the project is necessary for the lift stations. This involves replacing or repairing the motor pumps, replacing and repairing, if required, the reverse flow sectioning valves and air admission and expulsion valves; replacing pipelines, accessories and instrumentation damaged by corrosion; constructing gates and periphery fences to protect facilities which includes lighting, landscaping, and installing odor control devices, paving sidewalks, painting signage, etc. to not stand out against the surrounding residential area; as well as the general outfitting of the electrical installations, control systems, measurement boards, electrical substations, land systems, level controls, and security systems, etc.

  b) System Mexicali II

- *b.1. Construction of Mexicali II System treatment plant (first stage)*

  The Mexicali II System Treatment Plant will be located approximately 9.5 km. to the south of Pumping Plant N° 4 and will have a final capacity to treat 1,760 lps; currently construction of first stage to treat 880 lps.

  Construction of the proposed treatment plant will consist in the first stage of a lagoon system based on anaerobic, facultative and maturation ponds, with a 880 lps capacity during the first stage. For the sludge treatment from the filters, anaerobic lagoons will be used, while chlorine is being proposed to eliminate algae.

  The second stage of the project includes an average design flow of 1,760 lps through the year 2015, which will be applied in 4 modules using trickling filters preceded by the oxidation ponds which will have a design flow per module of 220 lps. This second stage is not included in this package of works submitted to BECC.

- *b.2. Construction of pumping plant N° 4*

  Pumping plant N° 4 which will have an installed capacity of four 350 HP pumps in each of the two stages to overcome hydraulic charge of 33.50 m.c.a. and will pump 880 lps; it will recollect the untreated wastewater from the Mexicali II System and will be strategically located at the intersection of the road to San Felipe and the Dren Satélite which is a branch of the New River. Subsequently the water will be pumped and conveyed by a pressurized main collector to the future treatment lagoons. This plant consists in the connection of the collectors system to the pumping plant, plumbing, joint works, control room, electromechanical work, building for the electromechanical controls, building for the emergency plant, civil engineering for the lift station, sand trap and pumping equipment.

- *b.3. Construction of the main sewer line Mexicali II (9.5 km.) in second stage.*

  From pumping plant N° 4 the wastewater will be conveyed by a pressurized main collector, approximately 9.5 km. in length and will be installed in the center median center of the road Mexicali - San Felipe. It consists in two steel pipelines with a diameter of 48", each one has a capacity to conduct 880 lps. At present the first line is in the process of being installed, with the CNA in charge of the project. This program only includes implementation of the second stage and will result in a total design capacity of 1,760 lps of final average flow.

- *b.4. Construction and replacement of collectors and subcollectors (27,853 m.)*

  This organization has developed a Master Plan for the Mexicali II System which includes the main collectors and subcollectors to provide required service coverage to the east and southeast area of the city of Mexicali. With these works, in addition to providing service to the are, several pumping sumps presently discharging into the González Ortega treatment lagoons will be eliminated.

  The executive project for these collectors include the use of P.V.C. or polystyrene pipe, which is why the useful life is a minimum of 60 years.

  b.5. Installment of telemetry equipment in at Mexicali II Plant System

  The required equipment will be installed to monitor operation of the pumping equipment such as the R.P.M., amperage, discharge flow to lift stations, level at lift stations, and long distance equipment discharges.

1. *Description of the Community*

Economical Situation of Mexicali

Historically, the city of Mexicali has been characterized for its agricultural, industrial and more recently to manufacturing activities. In accordance with the 1990 Population and Housing Census by INEGI, 48.1% of the local population works in the 3rd sector (commerce and services). The estimated population in the area within the legal city limits (Fondo Legal) of Mexicali in 1996 was 600,939.

Due to its special geographic location in relation to the southern California market, and starting in 80's and through State Government policies that have encouraged industrial development, the city has become an area for industrial development of considerable importance for the regional and state economies. This phenomenon has resulted in the creation of a higher number of services and jobs in the community, which have in turn increased the demand for these by the community.

With recent growth in the maquiladora industry, growth in population during the last 5 years (according to estimates provided by the Population and Housing Counting of 1995) has increased at a higher than the prior two decades. This has intensified development of some areas which had not been included service planning/projections. Population projections based on the statistics provided by the census and the Population and Housing Counting of 1995 of the INEGI, establish that the population will increase at an annual rate near 3%, and will double from 507,000 in 1995 to over 1 million residents by the year 2020.

In planning the required service capabilities, the city's current and expected distribution of sub-divisions in areas has been reviewed and divided for the provision of services: Mexicali I, the old central area experiences little growth; Mexicali II, the area with higher growth rates in recent years; and Mexicali III which will have the highest relative growth according to the planning horizons. The City is considered to under the marginality rate. In 1996, the minimum wage in the region's urban areas was $22.60/ day.

The information related whit the social-economical aspects of the city of Mexicali and it's future projections are described in more detail in the "Revised Master Plan for the Improvement of the Services of Potable Water sanitary Sewerage and Sanitation of the City of Mexicali, B.C." dated December 1996 and prepared for the General Sub-Directive of Construction of the National Water Commission by the firm Infrastructure and Services Consultants".

2. *Project Alternatives*

In order to carry out the construction and collector replacement project the works will be implemented in accordance with the procedures established by the SPSCM in this area which have proven to be the most convenient and causing less damage to the neighbors. They also make any excavations as narrow as possible and any material excavated is removed from the area as soon as possible once the ditches are filled in and the pavement has been replaced.

With regard to the lining the collectors, the method being considered has proven successfully in the area. Few disturbances are caused to area residents; the lining for the South collector which has 5.2 km. and crosses under the city's railroad station, which will not allow works to be carried out using traditional methods.

In May 1997, the National Water Commission (CNA) carried out the "Technical-Economical Analysis of Treatment Alternatives Mexicali II" to evaluate different treatment modules in order to determine the most appropriate process for the Wastewater Treatment Plant for the Mexicali I System.

A total of 9 treatment modules have been analyzed based on the next 4 basic processes:

1.- Activated sludge

2.- Aerated lagoons

3.- Dual treatments

4.- Natural lagoons

From these basic treatment processes the natural lagoons alternative was selected because of its lower costs in operation costs as well as its simple method of operation. Alternatives based on this process were also analyzed and cover three types of lagoon modules: anaerobic, facultative, and polishing. The first two systems do not guarantee an effluent quality required to meet coliform concentration level standards established by NOM-001 for water to be used in agriculture; the third type of lagoons does meet requirements and is an important consideration in the selection of process and will also determine lagoon dimension.

In the same regard, a technical-economical analysis has been made in order to select the site of the Mexicali II wastewater treatment plant. The analysis determined that among the 11 alternatives, the plant site will be located on a lot 240 meters away from the 9.5 km. (marker) on the road between Mexicali and San Felipe.

With regard to the Rehabilitation of the Wastewater Treatment Plant of the Mexicali I System, located in the Col. Zaragoza, the process selected is described in the "Rehabilitation Project of the Treatment Lagoons of the Col. Zaragoza", prepared by Montgomery Watson Mexico, S.A de C.V. for the National Water Commission in December 1996 which has been submitted to the BEEC.

3. *Project Justification*

The sanitary sewer works and wastewater sanitation to be carried out will improve the environment as well as the quality of life for the residents on both sides of the border since it will improve the quality of wastewater that cross into the United States trough the New River.

Project execution is justified in accordance with the "Revised Master Plan for *the Improvement of the Services of Potable Water sanitary Sewerage and Sanitation of the City of Mexicali, B.C.",* **dated December 1996, and prepared for the General Sub-Directive of Construction of the National Water Commission by the firm Infrastructure and Services Consultants".**

With regard to control of the urban development, this area is also in compliance with the Program for Urban Development of the Population Center of Mexicali, B.C. 1993-2007. The planning and ordinances have been followed which will result in the consolidation of the city of Mexicali.

D. Conformance with International Treaties and Agreement

Project implementation, specifically with regard to wastewater treatment, are in conformance with effective federal regulation as well as the provisions established in IBWC Minute 264, dated August 26, 1980.

In this regard, both sections of the IBWC encouraged the creation of a Bi-national Committee to review and evaluate the project's technical alternatives.

Minute 294 (IBWC) November 24, 1995.

"Project Consolidation Program to Address Border Sanitation Problems"

The development, processing, and issuing of the technical files regarding the Sanitation Program of the city of Mexicali through the BECC, meets requirements established in the Minute with regard to all infrastructure projects and wastewater management which requires all border sanitation projects to be certified by the BECC (Border Environment Cooperation Commission).

Minute 264 (IBWC) August 26, 1980.

"Recommendations for the solution of the border sanitary problem of the New River at Mexicali, Baja California - Calexico, California".

The works that will be carried out to provide wastewater treatment in the City will avoid any untreated wastewater discharges into the New River; the action will conform to recommendations presented to address all New River border sanitation problems, which in accordance with this Minute, is considered to urgent and the first to be addressed in order to benefit the health and well being of the citizens of both countries.

Minute 274 (IBWC) April 15, 1987.

"Parallel Project for the improvement of the quality of the New River waters at Mexicali, Baja California - Calexico, California".

In this Minute the Commissioners determine that financial resources contributed by the Governments of the United States and Mexico must be used in a project that produces a significant improvement to the quality of the waters of the New River at the international boundary, which will be obtained with the Rehabilitation of the Wastewater Treatment Plant of the Mexicali I System, and with and which will achieve a higher quality of the treated water that specifically discharges at the point where the New River crosses into the United States, and with the Construction of the Wastewater Treatment Plant of the Mexicali II System, untreated wastewater will no longer be discharged into the Mexicali Drain, all of this will be reflected in the quality of the New River waters.

Minute 288 (IBWC) October 30, 1992.

"Conceptual plan for the long term solution of the border sanitation problem of the New River at Mexicali, Baja California - Calexico, California".

The execution of the works of this project provide continuity to the provision established in this Plan which defines the required projects to clean up the New River, and these concur with those included in the Sanitation Program and which as a final consequence will improve the quality of the water diverted to the New River.

The most representative works are considered to be the rehabilitation of the treatment plant of the Mexicali I System, construction of the wastewater treatment plant of the Mexicali II System based on a lagoon system, only in it's first stage, which will provide service to the East area of the city, thus resolving the longstanding problem of discharging raw wastewater to the Dren Mexicali and, as a consequence into the New River.

At present the SPSCM in coordination with both sections of the IBWC is carrying out a Wastewater Characterization Study and an Industrial Discharge Control Program which will determine an effective control of the New River conditions in compliance with this

Minute's Resolution.

3. Human Health and Environment

A. Existing Needs

Currently the city of Mexicali provides potable water services to 96% of the community and sanitary sewer services to 90% though it does not have sufficient capacity to provide treatment to all wastewater generated. It can provide treatment to 67%. This has caused untreated wastewater to be discharged into the New River causing an increase in contamination and bad odors along the New River area. The health of all residents of the city has also been affected. As commonly known, the New River is a natural valley drain that has been used as an agricultural drain for many years because it is the lowest geographic point in the area and thus receives wastewater discharged by the city. It also flows from South to North and then crosses the international boundary into the United States where it empties into Lake Salton.

Many areas of Mexicali do not have sanitary drainage service (approximately 10% of the population), resulting in residents installing latrines and/or septic tanks on their properties. This has become problematic because the lots are small and in the course of the years, space to build more latrines has been depleted resulting in diseases among children and adults due to the continuous contact with human waste which also contaminates to the subsoil.

The sanitary drainage of the city of Mexicali is in a state of major deterioration caused by the age of the pipelines or the materials used, making replacement necessary in order to prevent situations that pose risks to the community. When problems with the sewer system surface, wastewater must diverted to the storm water drain system and are then discharged into the New River.

Water that the Mexicali residents discharge into the New River must meet quality standards established by Mexican Laws as well as Regulations NOM-CCA-031-ECOL/1993, NOM-CCA-032-ECOL/1993, NOM-080-ECOL/1994, NOM-041-ECOL/1993, NOM-006-ECOL/1993, NOM-001-ECOL/1993, NOM-004-ECOL/1993, NOM-001-SEMP/1994 and NOM-001-ECOL/1996. Parameters must also conform to international agreements between Mexico and the United States making it critical that all wastewater discharged into the New River be properly treated.

Ninety percent of the city is provided with sanitary sewer services however only the Mexicali I System provides wastewater treatment. The system is located at the treatment plant in the Colonia Zaragoza on the outskirts of the city along the road between Mexicali and Tijuana.

The treatment lagoons in the Colonia Zaragoza require rehabilitation since they are working at maximum capacity and it has become necessary to clean them out and implement complementary works in order for them to be operated adequately. The edges and structures require corrective maintenance, existing shrub growth is affecting the lagoon hydraulics. The organic surface load in the anaerobic lagoons is higher than the recommended load; decomposition of organic matter produces unpleasant odors; the parallel operation does not permit higher efficiency levels, and hydraulic efficiency levels are not adequate. At present the lagoons provide service to 405,321 residents under Mexicali I which only represents 67.45% of the entire city.

The zone for the Mexicali II System (area east the city), does not provide treatment to its wastewater, meaning wastewater generated by 195,618 residents undergoes no treatment at all and is discharged directly into the drains leading to the Río Nuevo, causing contamination and health problems.

The zones for the Mexicali III-A and Mexicali III-B Systems do not provide sanitary sewer service. Residents must use septic tanks and latrines with the constant health risks involved. Which is why the Mexicali I System treatment plant will provide treatment to this water and also why this project includes providing sanitary sewer service to a large part of the zones already developed and rely on potable water services.

An important parameter with regard to human health needs is the reduction of gastrointestinal diseases caused by food products. The Secretary of Public Health published 1995 data regarding this issue and determined for the State of Baja California:

Disease	**Cases (residents)**
Acute Respiratory	*341.53*
Gastro-intestinal diseases	*73.69*
Helmintiasis	*11.62*
Amibiasis	*6.23*
Non bacteria food poisoning	*3.32*

Source: Secretary of Health

As seen in this table, gastrointestinal diseases place second in the number of cases occurring. These figures are expected to decrease once the city is able to treat all wastewater generated in the city as well as provide sanitary sewer coverage at a similar level as the potable water coverage.

The following table indicates the main causes in the rate of morbility. This data was provided by the Coordinated Services of Public Health of the State of Baja California for 1995.

Disease	**Cases (inhabitants)**
Acute Respiration	*163.59*
Gesture-intestinal	*18.08*
Helmintiasis	*2.7*
Amibiasis	*2.1*
Nourishing Intoxication non bacterial	*1.0*

Source: Health Secretary

B. Environmental Assessment

4. *Environmental Impact Statement*

To comply with information requested by the State Environmental Agency of the State of Baja California Public Service Commission of Mexicali, through official notice Nº DGE-MXL-578/97 dated June 17, 1997, wherein the agency determined that the proposed project would have a positive impact on the sanitation of the city of Mexicali.

The private firm, CH2MHILL developed and prepared the Environmental Impact Statement under General Terms. The EIS covers the rehabilitation, replacement and construction of wastewater treatment plants, as well as the rest of the works to be executed in the city.

As a result of the Study it was determined that the Sanitation Project of the city of Mexicali, would improve the quality of life of the residents with the specific objectives of the general project from the beginning, to satisfy the city's sanitary sewer needs and as a

result will generate jobs during construction of the project with resulting economical benefits.

Based on information collected and verified in the field, analysis and assessment of information, environmental impacts were identified and described during the projects stages and the effects on the natural and social-economical environment.

Due to the nature of the project, an Environmental Impacts Verification List was prepared initially. The List was based on the field visits made and an identification of definite impacts caused by the project was also prepared. This allowed for a quick and general identification of the potential impacts caused by projects under analysis during their different stages. Each one of the impacts was qualified and evaluated and is defined as follows:

Three significant adverse impacts will be generated and will be present during construction of the four lift stations in populated areas. The impacts will result in modifications in land use and have a potential impact on residential areas. Secondly, 18 minor negative impacts have been identified. They are temporary and can be mitigated. In addition, there are 10 minor impacts related to the project's operation and maintenance; these will be mitigated with measures developed during the development of the executive projects. In general, the projects is considered to have positive impacts on the environment. The study has identified 24 positive impacts on health, generation of employment, improvement in the quality of life, and economic development particularly in the southeast area of the city where the project will promote economic and residential developments that will also respond to the need to protect the environment.

In the same manner, project development during the different stages will generate 39 non- significant adverse impacts; 29 of which 29 will be experienced during construction phases and 10 of which will be experienced during operation and maintenance stages. Among these is the alteration to the soil caused by construction of the lagoons, occupation of land for agriculture b the project, which tends to be abandoned due to its proximity to the city limits, etc. To address this situation, mitigation/compensatory measures will be applied, such as irrigation of areas in which dust and dirt will be raised caused by passing trucks and when trucks are required to pass through residential areas, spills may occur though the truck will be covered, which will result in minimal impacts on the environment.

The Non Significant Beneficial Impacts will not be presented given that all these are Significant Beneficial Impacts; there are 5 and are present during site selection and during construction, operation and maintenance, these impacts include environmental concerns such as land use, encouraging the regional and local economy. Furthermore, the effluent will meet Qualitative Regulations contained in the IBWC Minute Nº 264, Mexican Official Norm NOM-001-ECOL/96, as well as the provisions established in the Concession Title issued by the CNA in November 1994. As such it avoids contamination by wastewater of the New River.

Based on the above, the project will create a source of employment in addition to promoting urban development that will enhance the quality of life of the community. In this regard, expansion of the treatment plant, construction of the new plant and the complementary works must be considered under the framework of the Environmental Ordinance programs as part of a sustainable utilization of resources. For these reasons, this Study considers the project feasible from the environmental perspective.

The Environmental Department of the State of Baja California issued on October 16, 1997 authorization number DGE-MXL-1050/97 for project implementation in accordance with Environmental Impact Statement, under General Terms submitted by the SPSCM. In such permit, there are certain conditions as the legal statement authorizing the Land Use according to the type of activity which is proposed & the compatibility with the Municipal Urban Development Plan.

In accordance with the Environmental Impact Statement, impacts generated will be significantly beneficial for the community. The benefits are present during site selection process, construction stages, and during operation and maintenance stages. With regard to the Mexicali I system, the level of wastewater treatment will increase and the Mexicali II system, which at present has no wastewater treatment in place, will provide treatment pursuant to Mexican regulations and IBWC Minute 264.

With regard to the introduction of sanitary sewer service to over 46 colonias in Mexicali; this new service will improve the living conditions of the residents given that, at present, they are forced to dispose of all waste in latrines and septic tanks under the best condition. In addition the new service will improve the environmental conditions along the New River on both sides of the border.

With regard to the works that will be carried out for the Rehabilitation and Expansion of the wastewater treatment capacity for the plant located in the Colonia Zaragoza that serves the Mexicali I System and in the future will serve the Mexicali III-A and III-B Systems, in order to mitigate any adverse potential impact by odours during the plant operation. W a specific prevention and/or mitigation measurements will be applied. Some of these include the reforestation of the area surrounding the lagoons as well as creating a protective barrier around the lagoons. This provision is included in the Urban Development Program of the Mexicali Population Center, which is effective between 1993 and 2007, and which the City Council of the City of Mexicali is implementing.

5. *Transboundary Environmental Assessment*

The private firm CH2MHILL developed and prepared the Environmental Assessment regarding the effects caused by the Rio Nuevo Program project in the United States. These works were carried out as an option by the SPSCM to comply with BECC requirements in accordance with its Project Certification Criteria.

The assessment evaluated four long term alternatives for improvement of the wastewater treatment systems of the city of Mexicali, meant to increase wastewater collection, conveyance, and treatment. And also meant to improve the level of sanitation in the city as well as improve the quality of the treated wastewater being discharged into the New River.

ALTERNATIVE Nº 1.- Alternative selected for application to BECC.

Total present cost $ 57,239,900.00 Dollars.

Operation costs $ 200,000.00 Dollars.

This alternative is being submitted by the State Public Service Commission of Mexicali to the BECC for certification and its based on the Master Plan of Potable Water, Sanitary Sewer and Sanitation of the city of Mexicali dated December, 1996, carried out by the National Water Commission.

Under this Plan the city of Mexicali would be divided in three large areas for the potable water and sanitary sewer services; they are Mexicali I, Mexicali II and the Mexicali III-A and III-B. Wastewater of the Mexicali I, III-A and III-B Systems will be collected and conveyed to the lagoons in the colonia Zaragoza which need to be rehabilitated; their design capacity is of 980 lps and need to be rehabilitated and expanded to reach treatment capacity of 1,300 l/s. Part of the works involved in the Mexicali II System include construction of several collectors which will enable them to stop discharging into the Mexicali I System and divert their wastewater to the Mexicali II System. The will provide the Mexicali I system plant with more capacity to treat wastewater from the neighborhoods that will be experiencing work related to the introduction of new drainage lines in the west side of the city.

With the rehabilitation and expansion works, the Mexicali I Plant will serve the west side of the city where over 46 areas without sanitary sewer service are located and which is considered as part of the works presented under this alternative.

The wastewater of the Mexicali II System will no longer be discharged without prior treatment into the New River. It will be conveyed through a pumping plant through two main collectors 48" in diameter, 9.5 km. to the location where the treatment plant will be constructed. The plant will have an initial capacity to treat 880 lps based exclusively on a lagoon system; these are the only

works being considered in the proposal. In its final stages, without increasing the area of the lagoons and based on a trickling filter system, the final treatment capacity will be 1,760 lps. This alternative includes only the second stage of the pressurized main collector, the works to introduce the pressurized main collector in its first stage are being developed by the National Water Commission.

ALTERNATIVE Nº 2.- Treatment plant on the south side of the division box of the New River.

Total present cost $ 71,926,000.00 Dollars

Operation cost $ 419,000.00 Dollars

This alternative is identical to alternative #1 except the Mexicali II System treatment plant is located to the South of the road 'Mexicali - San Felipe', and the wastewater would be sent to the South outside of the New River basin.

ALTERNATIVE Nº 3.- Treatment of the New River.

Total present cost $ 144,638,000.00 Dollars.

Operation cost $ 3,720,000.00 Dollars

It consists in the pre-treatment of the New River based on a metallic screen to remove trash and thick solids, followed by a chlorinating process of the raw water and by mechanic aeration in order to increase the levels of dissolved oxygen in the water. The proposed screens will be located in a 10 acres area east of the New River adjacent to the international boundary with the United States. Screening facilities will consist in a diversion canal made of concrete with the screens.

ALTERNATIVE Nº 4.- Collection of wastewater in Mexico for treatment in the United States

Total present cost $ 351,920,000.00 Dollars

Operation cost $ 4,360,000.00 Dollars

It consists in the diversion of the entire wastewater flow from pumping plant Nº 4, Pumping Plants 1, 1A and 2 based on a collector using gravity to convey the wastewater of Mexicali to a new treatment plan located in the area of Calexico, California. The new collector would be installed from the pumping plant Nº 4 along the New River and would extend 9.5 miles up to the lagoons installed on the west side of Calexico. The required surface for these lagoons is 270 acres of which 208 acres would be used exclusively for the treatment lagoons. After the treatment the water would discharged into the New River, the total treatment capacity of the lagoons would be of 50 MGD.

ALTERNATIVE Nº 5.- None action taken. No cost

This alternative assume that the works of sanitary sewer or treatment would not be carried out and that Mexico would continue operating the system at the present levels. The wastewater will continue flowing into the New River and the levels of the New River will increase in accordance with the growth of the population and the industry of the city of Mexicali.

After carrying out the corresponding analysis for each alternatives, alternative Nº I was selected and which is being submitted by the State Public Service Commission of Mexicali to the BECC. This proposal defines improvements to the Mexicali I System and to

the Mexicali II System, and presents several projects for the city collector system. Basis for designing alternative Nº 1 are the following:

- *It is the most cost effective proposal with regard to capital, operation and maintenance*
- *It has the least amount of impacts including the alternative of No Action*
- *It utilized the lowest amount of energy at its facilities*
- *Is presents the most flexibility in terms of future expansions and operation*

Based on analysis of the Environmental Assessment, the proposed alternative reaches a high level of environmental protection due to the following reasons:

- *BOD, metals, and other substances are removed by the treatment on a basis of lagoons, significantly improving quality of the treated wastewater.*
- *The impacts on public health are significantly decreased should bacterial levels in the discharges are reduced once projects are implemented.*
- *The treatment system's efficiency levels ensure quality of wastewater.*

2.a. Transboundary Environmental Impacts

2.a.1.Background

The treated wastewater of the city, in the case of the Mexicali I System is discharged into the New River and with the rehabilitation works for the treatment Plant located in the Colonia Zaragoza, the quality of this wastewater will dramatically improve. This will lead to a reduction in the contamination of the New River with improvement to the environment on the U.S. side as well as the Mexican side of the border.

In the case of the Mexicali II System, wastewater discharges are diverted to drain without any treatment; the drain leads to the New river, causing constant contamination problems. Project implementation will avoid untreated water being discharges and the water quality of the New River will improve. Environmental conditions along both the U.S. and Mexican side of the border will also increase.

The New River flows north out of Mexico and into the United States into the Colorado River Basis. Part of the Basis is located in the southeast region of the state of California. The area of Colorado River Basin in the United States covers approximately 13 million acres (20,000 sq. miles), which includes the Salton Sea a salt water lake into which the New River discharges. In Mexico the extension of the New River covers the area known as the Hydrological Region RH-7 and has a surface are of 5,923 Km^2 , (see attached plan 3.C.1.)

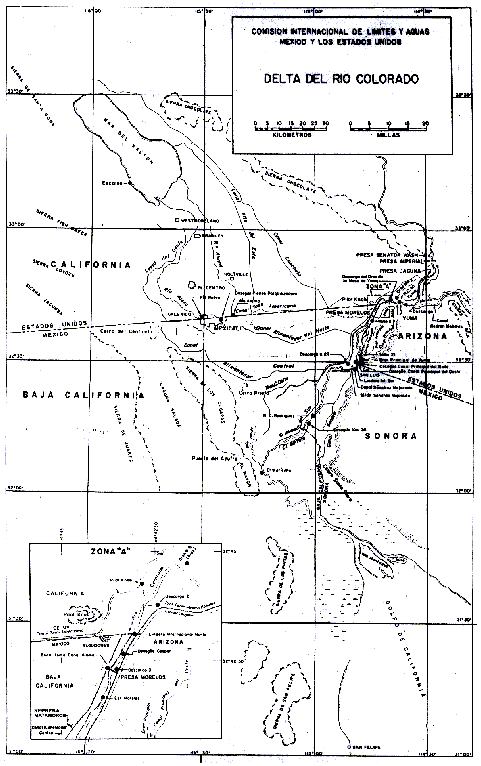
The New River was formed in approximately 1840 due to floods in the Colorado River. Floods were intermittent until the practice of the agriculture was developed in Mexico around 1950.

The main water currents in the region are the Colorado River, Hardy River, and the New River. The first one has an annual flow into Mexico in the amount of 1,850,234,000 cubic meters, in accordance with the agreement reached with the United States, The currents of the Hardy River are a result of the mountain stream runoff which are located on the western edge of the valley (Cucapah and El Mayor). In the case of the New River, it feeds of the agricultural drains from the Valley of Mexicali.

Both in the United States as well as in Mexico, the New River is used as a drainage. In the United States it is utilized as an agricultural drain serving the western zone of the Imperial Irrigation District (IID) which periodically drains a third part of all of the water used for irrigation into the New River and which in turn discharges into Lake Salton.

In accordance with provisions contained in the Environmental Assessment prepared by CH2MHILL, Section 3.- Affected Environment, Chapter 3.1.2.- Quality of the Water, states that the New River receives water from the agricultural drains consisting mainly of underground drains which reduce the salinity and problems related to the quality of the underground water. The water from the agricultural drain discharged into the New River causes it to rise up to three times its normal flow between the border line and the outfall into Lake Salton. This situation indicates that the flow sent by Mexico is only 25% of the total water discharged by the New River into Lake Salton.

In accordance with the Colorado River Basin Plan, beneficial uses have been designated for the bodies of water. These include use by man, vegetation and wild life. The beneficial uses for rivers and drains in the Imperial County and for Lake Salton are also established pages 3-10 of the study. The large amount of the uses are designed for agriculture, recharging fresh water supplies, non contact recreational activities, and wild life habitats. Lake Salton is appropriate for fresh water recharging since water from the New River has been designated as water that cannot be used for contact and non contact recreational purposes.



Delta of the Colorado River

New River water use is limited due to the quality. Should water quality improve once Mexico permanently stops discharging untreated and inadequately treated wastewater into the river, the following uses are expected to increase:

- *Habitat for fish and wild life*
- *Recreational use for non contact activities*
- *Generation of energy*
- *Cooling and supply of water for the production of geothermal energy*

The quality standards established for monitoring of quality of New River waters are based on IBWC Minute 264 which were approved in December 1980.

The quality standards established under Minute 264 for the New River are the following:

1. *The waters of the New River must be free of untreated domestic and industrial wastewater.*
2. *The water must be free of substances that might be discharged into the river as a result of human activity, in concentrations that might be toxic or dangerous for the humans, animals or aquatic life, or that might result in any damage for the beneficial uses of the water.*
3. *The water of the river must be free of trash, oil, foam or other floating material caused by human activity in sufficient amounts that might damage or cause adverse effects on human life, fish and wild life. Any persistent foam must be avoided.*
4. *The water must be free of pesticide concentrations that might cause dangerous effects on human, fish and wild life.*
5. *The river bed must be free of any sludge resulting from domestic or industrial wastewater.*

In this regard, SPSCM in coordination with other municipal, state and federal agencies has carried out actions which include some of the following:

- *Two studies are being developed by the firm CH2MHILL in coordination with IBWC, for the SPSCM, characterization of wastewater and industrial discharge control. In addition all necessary actions for the SPSCM to have all conditions required to carry out surveillance and monitoring of industrial discharges. This will avoid the elimination of any illegal discharges of untreated water.*
- *Outfitting projects for the New River are being carried out in the urban area. This will eliminate all types of garbage and debris discharges which could potentially pose a threat to the ecosystem. These conditions should enhance conditions of the New River.*

2.a.2. Transboundary Benefits

Imperial County is the ninth largest county in the State of California, with approximately 4,597 square miles and a population of 109,303 inhabitants according to the 1990 Census. Approximately 43% of the county has not been developed and under federal jurisdiction and property; one fifth of the land is irrigated for agriculture. The County has seven incorporated cities: Calipatria, Holtville, Imperial, Brawley, El Centro, Westmoreland, and Calexico. The New River runs from south to the north from Mexico through the city of Calexico and discharges in Lake Salton, a popular destination for migratory birds as well as wild life observers.

The city of Calexico is located on the U.S. side of the international border with Mexico, land use in Calexico is divided approximately as follows: 82% residential, 12% commercial and 6% industrial.

The southwest side of the city (south of highway 98 west of the highway 111) includes the International Airport of Calexico, Imperial County Landfill, and the wastewater treatment facilities; land use to the west of the airport is for agriculture and is outside the city limits.

As part of the regional vision, the County is seeking to "promote aquatic activities in Imperial County along areas such as the New River, Alamo Canal, Colorado River, and Lake Salton", and "identify and obtain funding sources to implement clean up activities for the New River, Alamo Canal, and Lake Salton".

In accordance with the goals established in the General Plan of the City of Calexico, construction of a regional park is being proposed along the New River in the area north of the Calexico International Airport. The planning and development of this Regional Park has not made progress due the contamination problems in the New River.

Safety officials under the General Plan of Calexico have identified the contamination problem of the New River as a public health hazard and are searching for the means to inform and protect the public from having any contact and ingestion of this water. The objectives include "Working with the State and Federal Agencies to Implement a Plan to treat and clean the New River and the Surrounding Area of the City of Calexico" as well as "Work with the Appropriate Federal Agencies and collaborate with any Program that Strives to Clean and Treat the New River with the Baja California and Mexico Governments". (Environmental Assessment CH2MHILL October, 1997).

In accordance with the objectives established under the Sanitation Program submitted to the BECC, the projects that will implemented will have an impact on the entire zone from the New River In Mexicali; wastewater treatment will provide benefits that will be reflected on both sides of the river, from Mexicali to its outfall in Lake Salton. It will further protect human health and improve conditions for wild life and other types of activities. With regard to condition in Lake Salton, the project to be carried out in Mexicali will be reflected in the quality of the treated effluent before in reaches the international boundary. From this point forward, the United States must be in charge of implementing controls for discharges into the New River and verify condition along the course of the river.

D. Compliance with applicable Environmental and Cultural Resource Laws and Regulations

1. In the Official notice Nº D-0205/VIII/97 dated August 1, 1997, the National Institute of Anthropology and History, Central Baja California, has stated there is no problem in issuing the official notice wherein land use is approved for the construction of the Mexicali II System wastewater treatment plant, and that there are no cultural resources that could be affected by the project.

2. In the Official notice Nº DGE-MXL-1050/97 dated October 16, 1997, the Environmental General State Agency authorized to the Environmental Impact Study as well as execution of the works considered under this project.

3. The systems in which the potable water and the sanitary sewer system of Mexicali, as well as the designated areas for the construction of the expansion of the Mexicali I System wastewater treatment plant at the Colonia Zaragoza including the protective area, are considered within the planning program included for the implementation of the Urban Development Program of the City 1993-2007 carried out by the XV City Council of the city of Mexicali.

The land where the Mexicali II System wastewater treatment plant will be located is out of the city limits in accordance with planning mentioned above.

4. Technical Feasibility

A. Appropriate Technology

1. *Wastewater Treatment*

The Rehabilitation of the Mexicali I System wastewater treatment plant is necessary given that the capacity of design of the plant is 22.4 MGD and the capacity required is 30 MGD. The works encompasses installation of baffles, deeper facultative lagoons up to 1.70 meters, and modification of the hydraulic operation which involves modifying the existing parallel system to a serial flow system.

Implementation of these measures will provide an increased retention time which will result in a more efficient treatment process in order to comply with the specific discharge conditions established for the City of Mexicali. These measures will be reflected in improved conditions of the New River.

Operation of the Mexicali II System wastewater treatment plant will consist in the use of biological filters and a natural lagoon process. Design will be based on Federal Regulation NOM-001-ECOL-1996 and quality standards established for the New River under Minute 264, August 28, 1980, by the International Boundary and Water Commission from Mexico and the United States (IBWC-CILA). The first stage will have a treatment capacity of 20 MGD and the final stage of 40 MGD. Currently, the collectors of the Mexicali System are discharging approximately 8 MGD of raw wastewater to the Mexicali channel, which convey the wastewater to the New River.

The design data used for the project design of the Mexicali II wastewater treatment plant the following:

Parameter	Unit	NOM-001-ECOL Monthly average at discharge	Minute 264 in the New River
Ph	Uph	---	6.0 to 9.0

Floating matter		**none**	**none**
Sedimentable solids	**ml/l**	**2**	**Absent**
Oil and grease	**mg/l**	**25**	**---**
Total suspended solids	**mg/l**	**175**	**---**
Total BOD_5	**mg/l**	**200**	**30**
Total QOD	**mg/l**	**---**	**100**
Ntk	**mg/l**	**25**	**---**
P total	**mg/l**	**5**	**---**
Dissolved Oxygen	**mg/l**	**---**	**5.0**
Fecal Coliforms	**NMP/100 ml**	**1,000**	**30,000**

The treated effluent may be reclaimed for agricultural irrigation or diverted into channels that eventually discharge to the New River.

2. *Utilization of Raw Wastewater and Treated Effluent*

Receiving Bodies

The **New River** *is the receiving water body. Currently it receives the water produced by the agricultural drain and surplus from the Colorado River Irrigation District 014. It also receives about 9 MGD of improperly treated wastewater from the González Ortega lagoons (Mexicali II zone). Furthermore, 26.3 MGD flow into the river coming out from the Mexicali I zone. From that figure, approximately 2.3 MGD spills from the sanitary collectors to the storm water sewer system.*

The receiving waters of the effluent of the González Ortega plant is the Tula agricultural open channel. The channel runs across the project area from east to west and eventually discharges to the New River.

Mexicali I and Mexicali III Systems

In 1985 CNA implemented a reclamation project to use the treated effluent for agricultural irrigation of 2,792 ha.

Mexicali II System

For this zone, the CNA carried out studies that resulted in two alternatives for reclamation of the Mexicali II effluent. Both alternatives discharge into the Hardy River, one of them includes partial reuse in irrigation while the other includes irrigation and agricultural return.

However, the Master Plan developed by the CAN recommends disposal of wastewater flow surpluses as a combination of reclamation and discharge to receiving waters. For the receiving waters use of the New River as opposed to the Hardy River was recommended.

3. *Technical Process*

With regard to the technical process of the Mexicali II WWTP:

Based on the "Revision of the Executive Project of the Mexicali II System Wastewater Treatment Plant", developed by the National Water Commission and the firm Montgomery Watson Mexico, S.A. de C.V., under the contract Nº SGC-AP-96-238-I in June 1997, the process selected for wastewater treatment of the Mexicali II System, was determined to include two phases. The first stage would consist in a natural lagoon system with a 34 day delay period.

The Phase II has taken provisions in land required and the necessary preparations for the head-works. The second stage of operations would include a biological process for BOD rough dressing based on a percolated filters or a high rate activated sludge and the possible inclusion of a floating process with dissolved air. This second stage will be required approximately by the year 2008. Relevant design parameters are described below:

- *Topography Surface of 250 ha.*
- *Geo-technical: Soil of high plasticity clay classification SUCS "CH"*
- *Quantity and quality of raw water*

Medium Flow=880 l/s (1st stage; 1,760 l/s (2nd stage)

BOD_5 = 250 mg/l

TSS = 200 mg/l

Total Coliforms = 1.0 x 10^8 NMP/100 ml

Fecal Coliforms = 1.0 x 10^7 NMP 100 ml

Lagoon System Characteristics (1st. Stage)

Parameter	*Unit*	*Influent*	*Effluent*		
			Anaerobic	*Facultative.*	*Maturate.*
Flow	**l/s**	**880**	**880**	**880**	**880**
BOD_5 Influent	**mg/l**	**250**	**250**	**138.5**	**26.5**
Temperature	**C**	**12.3**	**12.3**	**12.3**	**12.3**
Volumetric Charge	**g/m^3-d**	**-**	**49**	**7.0**	**2.5**
Area	**ha.**	**-**	**9.7**	**88.34**	**88.4**
Depth	**m**	**-**	**4.00**	**1.70**	**0.90**
Delay Time	**days**	**-**	**5.1**	**19.6**	**10.5**
BOD_5 Effluent	**mg/l**	**-**	**138.5**	**26.5**	**12.2**
Fecal Coliforms	**NMP/100ml**	**1.0 E+07**	**2.16E+07**	**1.09E+05**	**2.37E+03**
TSS	**mg/l**	**210**	**60**	**60**	**60**

Source: National Water Commission (CNA)

As seen in the last column, the quality of the treated water at the outlet of the maturation lagoon, will meet quality parameters established in the Mexican Official Regulation NOM-001-ECOL-96, as well as international agreements between both sections of the IBWC in the Minute 264.

With regard to the technical process of the Mexicali I WWTP

The WWTP consists in a parallel distribution system, dividing the total flow into three anaerobic lagoons. Subsequently, the lagoon effluent is conveyed to the facultative lagoons in two lagoon modules.

Rehabilitation and expansion of the plant consists in: installation of baffles, increase operational depth of the facultative lagoons up to 1.70 m and modify its hydraulic operation in order to modify it to a serial flow system. The main objective in increasing the depth is to have a longer detention time and improve the treatment process.

The purpose of introducing baffles into the facultative is to be able to regulate the direction of the flow and obtain a minimal amount of short-circuits and dead zones in the lagoons.

With regard to the distribution of the flow, a serial system is being considered. The system has been divided into two modules in order to keep the same area for both modules. The north module would handle 40% of the flow while the south module would handle 60%. The average flow obtained would be 30 MGD and the special maximum flow would be 85 MGD.

The quality of the effluent of the Mexicali I plant is:

Parameter	*Unit*	*Effluent*
BOD_5 calculated	**mg/l**	**18**
TSS	**mg/l**	**45**
Detention Time Module A	**days**	**21**
Detention Time Module B	**days**	**19**
Total Coliforms	**NMP/100ml**	**1.8E+06**
Fecal Coliforms	**NMP/100ml**	**1.8E+06**

Source: Final Engineering Design CNA

1. *Sludge Disposal and Handling*

A certain amount of sludge will be deposited in the lagoons, the largest amount is expected in the anaerobic lagoons. After the maximum period of sludge storage, when these residues are stabilized, the removal, collection and disposal will be the next step, using the methodology and considerations described below. Removal will be carried out every 5 or 10 years and will be transported to the final disposal site that will be determined by regulating authorities.

Sludge generated during the operation of the treatment plant will not require an additional treatment process. The majority of the suspended solids will be deposited on the bottom of the anaerobic lagoons. The anaerobic decomposition process of the sedimented sludge will also take place in the lagoons.

The anaerobic lagoons were designed to have a volumetric charge lower than the one specified for these units, resulting in a higher value than required. In this manner an additional volume in the lagoon where the generated sludge will be processed and stored will be ensured, thus avoiding that any space to be occupied by the residues affect the efficiency of the lagoons.

Treatment of sludge stored at the bottom of the anaerobic lagoons is done without oxygen but with anaerobic and facultative microorganisms that digest the organic matter. Sludge processed by this method presents relatively stable characteristics and reaches a low level of decomposition with minimum odors; with these characteristics sludge management can be permanent without causing adverse conditions on the environment.

Emptying water in the lagoon.

Once the estimated time for the stabilization of the sludge of the lagoon has elapsed, pretreatment works of the anaerobic lagoons will be regulated so that the flow of incoming water into the lagoon which is in the emptying process, will be blocked. In this manner, the flow will be distributed in equal portions to the anaerobic lagoons in operation. The mechanism utilized to remove the water from the lagoons will be a siphon line, complemented with other pumping systems. The discharge site, of the siphon as well as the pumping line, will be the anaerobic lagoon adjacent to the one described below. Another option is the distribution channel of the facultative lagoons.

Sludge Extraction

Extraction of the sludge deposited in the lagoon previously discharged, will be carried out with mechanical equipment that will collect and transport the sludge from the bottom of each lagoon up to the loading area where vehicles will transport it to the appropriate site. Operators will remove and pile any sludge that the machine is not able to collect, specifically, from corners and the area next to the feeding pipes.

The sludge has the potential of being utilized in the following areas: composting for use in agriculture. They may be applied in liquid form or after being composted. Another possibility is to apply them in landfills, evaporation lagoons, or in soil mixtures.

Additionally, it will be necessary to take samples of the sludge at the plant to perform laboratory tests (CRETIB) in order to determine the existence of hazardous wastes. If required, sludge will be handled and disposed in accordance whit the appropriate sludge management regulations.

2. *Operation and Maintenance Plan*

During initial operation stages for the Mexicali I project (rehabilitation of pumping stations, rehabilitation and expansion of the Mexicali I WWTP located in the Colonia Zaragoza, and construction of the wastewater treatment plant for the Mexicali II System) the preventive maintenance program will be established. The program will indicate the equipment maintenance schedule. The schedule will cover prior processes as well as flow distribution facilities in the system.

Furthermore, during initial system operations a preventive maintenance program will indicate the equipment maintenance schedule that will include any oil changes and replacement of any parts to extend life of equipment.

The equipment acquisition program will include a line item for "replacement parts" in order to be able to rely on stock parts during initial operations. The amount of parts to be kept in stock shall be agreed between the constructor and the operator in accordance with recommendations submitted by suppliers. During operations, stock will be maintained at a constant level in order to resolve problems immediately.

The operation budget must be include a line item for equipment renewal. Taking all necessary preventive actions described above will ensure continuity of the services under the quality parameters described in the project.

3. *Start up Operations Program*

With regard to the wastewater treatment plants, the training program may be classified in two fundamental aspects:

- *Knowledge of plant*
- *Knowledge of operation techniques*

Knowledge of plant

In order to operate and maintain the plant, complete knowledge of its design is required, as well as the treatment process of the plant. Training will be provided by the equipment and metering system suppliers. All operations and maintenance personnel in the lagoon system will be included in the water utility budget.

During initial operations, a list of processes to be followed along with a schedule will be established. Also included will be the characteristics of equipment requiring maintenance and actions to be taken in case of a contingency.

Knowledge of operation techniques

Personnel contracted for operation will receive a training course in order to learn the handling and the basic operation of the equipment as well as the maintenance.

1. *Contingency Plan*

The wastewater treatment process based on a lagoon system requires little operation and maintenance. All essential equipment for continuous operations will have replacement and support parts in stock. In the case of an emergency, system operations will not be interrupted.

2. *Safety Plan and Contamination Prevention*

The personnel will receive accident prevention and security training in order to reduce any work hazards. The security system will include fire extinguishers in areas where equipment is located; a telephone or two-way radio should be available for communications in case of an emergency.

Visible warning signs will be posted in the appropriate places as well as in the lagoon area to ensure that all persons entering the area are aware of risks involved should contact with wastewater occur.

All personnel shall be provided with safety equipment including gloves, safety belts, protective eyewear, safety boots and uniforms.

3. *Closure and Post Closure Plan*

In accordance with how the lagoons function and because they do not become obsolete and are no longer able to function on a specific date no closure plan has been established. Lagoons can be maintained at the initial design efficiency levels with proper maintenance.

The designated area for the lagoons is in the Urban Development Program of Population Center 1993-2007, and has a protective barrier around them.

C. Conformance with all Applicable Design Norms and Regulations

The National Water Commission (CNA) issued Official notice Nº BOO.E.31.2/715 dated August 4, 1997, regarding the Mexicali I Wastewater Treatment Plant project. Approval and authorization was given to the project.

Included in the Urban Development Program of Population 1993-2007 carried out by the XV City Council of the City of Mexicali, which regulates and establishes land use for urban structure of the area as well as the policies and programs that consolidate the urban development of the city, the selected area for the expansion of the capacity of the Mexicali I System wastewater treatment plant, located in the Col. Zaragoza, it's designated for this use considering the creation of a protection zone around the plant in order to mitigate the impacts produced in the process, the Treatment Plant of Mexicali II System is located outside of the urban area.

The project will comply with applicable design norms from the beginning of the works and will be regulated by State Construction Regulations and the guidelines established by the Cadastre Dept. of the City of Mexicali, under the building permits area.

Within the Ley de Equilibrio Ecológico and Environmental Protection of the State of Baja California and in accordance with the Article 5, sections V and VII of the Regulations of the Ley de Equilibrio Ecológico and Environmental Protection of the Baja California State in environmental impact matter, the project is considered as a sanitation project.

As such, the region is considered to have sufficient technical capacity and experience required for project implementation which will rely on the most advanced existing technology required to comply with national environmental regulations as well as regulations established in international agreements.

5.- Financial Feasibility and Project Management

4. *Financial Feasibility*
5. *Background*

It must be noted that the determination to develop and implement the works involved in the projects as well as their general costs are based on actions coordinated by the International Boundary Water Commission (IBWC) of México and the United States, within the framework of the international agreements reached in Minutes 264 and 294.

Both Commissions have developed coordinated actions to address the shared sanitation needs. In this regard, the Binational Technical Committee (BTC) was established in October 1996 to address the sanitation needs of Mexicali. The committee has the participation of local, state and federal authorities from both countries.

BTC members defined the concept and monetary requirements for implementation of the sanitation actions which was to be submitted as Step I Format to BECC. This re-defined format was submitted to BECC on May 27, 1997, in which the Mexicali I System and Mexicali II System projects were bundled and totaled approximately $50 million dollars which included a preliminary grant proposal with equal contributions by México - United States.

6. *Project Costs*

Total project costs have experienced several changes in accordance with completion of the preliminary projects and executive projects, specifically the Mexicali II WWTP executive project which was concluded on August, 1997 by the C.N.A.. Taxes and construction administration have also affected final project costs.

BECC as well as SPSCM, both sections of IBWC and NADBank collaborated in the review and analysis of final project costs. The costs presented in this document were calculated in Mexican currency based on the exchange rate effective April 1997, and based on the index costs of the National Water Commission (CNA). In obtaining the index costs, the most recent and accurate information has been used however, once the executive project is completed these figures will reflect more accurate information.

After review and discussion, the final amount of $398,126,479 pesos was estimated on April, 1997, equivalent to $50,395,757 dollars. The following table shows the breakdown of these amounts divided for the Mexicali I and Mexicali II projects.

CONCEPTO	TOTAL	
	MN	USD
Mexicali I		
Rehabilitación y ampliación de la PTAR Zaragoza	11,720,000	1,483,544
Rehabilitación y reemplazo de alcantarillado	152,911,363	19,355,869
Telemetría	1,200,000	151,899
Subtotal	165,831,363	20,991,312
Mexicali II		
PTAR Mexicali II	68,004,300	8,608,139
Colectores y líneas de alcantarillado	83,097,500	10,518,671
Estación de bombeo #4 y emisor a presión	45,000,000	5,696,203
Subtotal	196,101,800	24,823,013
TOTAL MEXICALI I & MEXICALI II	361,933,163	45,814,324
I.V.A. (10%)	36,193,316	4,581,432
TOTAL	**398,126,479**	**50,395,757**

Source: SCPSM

Currency exchange rate: 7.9 pesos/dollar

7. *Financial Feasibility*

The project's financial feasibility was determined through the analysis of the information provided in the historical financial statements of the State Public Service Commission of Mexicali (SPSCM). Analysis of these considers the income statement, historical earnings and disbursements, and the project costs for both the Mexicali I and Mexicali II Systems.

The financial analysis of the project has given consideration to an $8.70 million contribution by the US EPA through IBWC Minute 294 Minute and a contribution by the State Government of Baja California which will be defined through the Public Works and Human Settlements Secretary of the State (SAHOPE) and the SPSCM. Another possible contribution may come from the Mexican federal government grants through the CNA and a possible contribution by the USEPA.

The SPSCM and BECC carried out the "Study to Determine Payment Capacity for the Sanitation Works of Mexicali". Several scenarios with possible grant programs, loans, project completion dates, rate and fee increases and interest rates.

In determining the project's financial feasibility, the SPSCM and BECC evaluated different scenarios which consider funding by the US EPA and the Mexican federal government. These scenarios reflect the following premises:

Premises:

- *The funds contributed by the SCPSM via loans or capital will be matched by a grant contribution made by SAHOPE (Secretaria de Obras Públicas del Estado de BC).*
- *The funding amount contributed jointly by SPSCM and SAHOPE will be matched by the Mexican federal government in an amount that has not yet been defined.*
- *The contribution by the Act 294 are $8.7 million in dollars.*
- *The possible contribution of federal funds in grants by the United States and Mexico's governments (excluding Act 294) are still to be define. A first attempt shows a match 50-50 in those funds.*
- *The resources provided by SCPSM are maximized based on its earnings and expenditures budget and the financial projections.*

Investment recovery and coverage of the increase in operation and maintenance costs are based on the new infrastructure.

1. *With regard to the investment amount:*

   The SPSCM will recover the loan amount through the economic benefits resulting from the project. Users benefiting directly by the new service will be charged for construction costs and a connection fee which has already been established by the 1997 State Earnings and Expenditures Law.

2. *With regard to the O & M costs:*

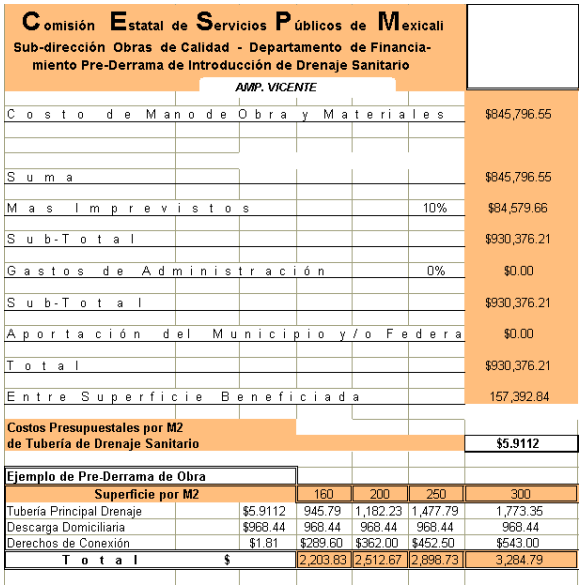
   The SPSCM has annual pre-authorizations for rate increases based on a formula that includes increases in the main O & M costs. This updating process is carried out monthly until the established limit is reached. When the accumulated rate and fee increases exceed the limit, approval by the State Congress is required.

   In this manner, the capital and/or loans contributed by the SPSCM do not affect the rates and fees charged to the general public. Rates will only be affected by an increase in O&M costs already included in the Organism's Earnings Law.

   Evaluation results were submitted at the 2nd public meeting held by the SPSCM in the city of Mexicali at the CANACO Auditorium on October 9. At the meeting concerns of over 300 attendees were addressed. In addition, public approval regarding the rates and fees to be applied was obtained.

The highly unfavorable condition for the SPSCM was presented during the October 9th public meeting in order to cover any possible decision regarding further grant contribution both federal governments via USEPA and C.N.A. may achieve. This scenario corresponds to a $6.4 million dollar contribution by the SPSCM, equal to 13% of the total project costs.

Furthermore, during the second public meeting the SPSCM made a presentation of current costs related to the introduction of the sanitary sewer service in several colonias of the city. The basic information related to the works included in the Program and with and with any required changes to be made later.



Comisión Estatal de Servicios Públicos de Mexicali
Sub-dirección Obras de Calidad - Departamento de Financiamiento Pre-Derrama de Introducción de Drenaje Sanitario

AMP. VICENTE

Costo de Mano de Obra y Materiales	$845,796.55
Suma	$845,796.55
Mas Imprevistos 10%	$84,579.66
Sub-Total	$930,376.21
Gastos de Administración 0%	$0.00
Sub-Total	$930,376.21
Aportación del Municipio y/o Federa	$0.00
Total	$930,376.21
Entre Superficie Beneficiada	157,392.84
Costos Presupuestales por M2 de Tubería de Drenaje Sanitario	**$5.9112**

Ejemplo de Pre-Derrama de Obra						
Superficie por M2			160	200	250	300
Tubería Principal Drenaje		$5.9112	945.79	1,182.23	1,477.79	1,773.35
Descarga Domiciliaria		$968.44	968.44	968.44	968.44	968.44
Derechos de Conexión		$1.81	$289.60	$362.00	$452.50	$543.00
Total	**$**		2,203.83	2,512.67	2,898.73	3,284.79

SPSCM offers 12, 24 and 36 month installments plans based on users' payment capabilities.

The following is a possible financial structure premised in this section; also described is the same investment recovery system and program to cover increases in the O&M costs by the SPSCM.

In addition several tables indicate the Source and Application of Resources for each of the agencies participating in the project. The final structure will be prepared by the USEPA and the Mexican federal government and NADBank.

Given that the Mexicali I and II projects have different funding sources, as well as the application guidelines, three tables have been prepared as follows:

Table 1: Structure for the Mexicali I System

Table 2: Structure for the Mexicali II System

Table 3: Mathematical sum for both structures

Table 1. Mexicali I System

SOURCE	AMOUNT		%
	pesos	USD	
Grant			
Federal	$50,163,987	$6,349,872	
State (SAHOPE)	$25,081,994	$3,174,936	
Others	$0	$0	
Fed & State	**$75,245,981**	**$9,524,808**	**41.3%**
EPA (Act. 294)	$0	$0	
Others	$82,086,525	$10,390,699	
EPA & Others	**$82,086,525**	**$10,390,699**	**45.0%**
Subtotal	**$157,332,506**	**$19,915,507**	**86.3%**
Credit			
CESPM	$18,241,450	$2,309,044	10.0%
Subtotal	**$18,241,450**	**$2,309,044**	**10.0%**
Capital			
CESPM	$6,840,544	$865,892	3.8%
Subtotal	**$6,840,544**	**$865,892**	**3.8%**
TOTAL	$182,414,499	$23,090,443	100.0%

Under this structure CESPM and SAHOPE funds are maximized. In this case, the SPSCM would make its total contribution a loan contribution. The Mexican federal government contribution is being proposed as a matching contribution to the state's contribution.

Table 2. Mexicali II System

SOURCE	AMOUNT		%
	pesos	USD	
Grant			
Federal	$53,072,613	$6,718,052	
State (SAHOPE)	$26,536,306	$3,359,026	
Others	$0	$0	
Fed & State	**$79,608,919**	**$10,077,078**	**36.9%**
EPA (Act. 294)	$68,730,000	$8,700,000	
Others	$40,836,755	$5,169,209	
EPA & Others	**$68,730,000**	**13,869,209**	**50.8%**
Subtotal	**$148,338,919**	**23,946,288**	**87.7%**
Credit			
CESPM	$9,074,834	$1,148,713	4.2%
Subtotal	**$9,074,834**	**$1,148,713**	**4.2%**
Capital			
CESPM	$17,461,472	$2,210,313	8.1%
Subtotal	**$17,461,472**	**$2,210,313**	**8.1%**
TOTAL	$174,875,225	$27,305,314	100.0%

Under this structure the Act 294 funds in 55% have a match 45% in Mexican grants shared equally federal & state to reach the 100%. Likewise, the proposal that State funds are matched by Mexican federal funds is included.

Table 3. Mexicali I & II Systems (INTEGRATED)

SOURCE	AMOUNT		%
	pesos	USD	
Grant			
Federal (Mex)	$103,236,600	$13,067,924	25.9%
State (SAHOPE)	$51,618,300	$6,533,962	13.0%
Others	$0	$0	0.0%
Fed & State	$154,854,900	$19,601,886	38.9%
EPA (Act. 294)	$68,730,000	$8,700,000	17.3%
Others	$122,923,279	$15,559,909	30.9%
EPA & Others	$191,653,279	$24,259,909	48.1%
Subtotal	$346,508,179	$43,861,795	87.0%
Credit			
CESPM	$27,316,284	$3,457,758	6.9%
Subtotal	$27,316,284	$3,457,758	6.9%
Capital			
CESPM	$24,302,016	$3,076,205	6.1%
Subtotal	$24,302,016	$3,076,205	6.1%
TOTAL	$398,126,479	$50,395,757	100.0%

This table shows the mathematical sum of the structures to be applied for the Mexicali I and II Systems. As can be observed, all the premises exposed at the beginning of this section are considered maximizing CESPM resources as further described below:

- *Funds contributed by the SPSCM via loans or capital are matched by the funding amount contributed by SAHOPE*
- *Funds contributed by the SCPSM and SAHOPE are matched by the federal government*
- *Funding contributed by SCPSM is maximized based on the financial projections*

This proposed financial structure makes the project financially feasible, maximizing potential benefits while also utilizing available SPSCM resources as well as projected earnings.

An important result of the financial runs made is that while grant funding sources are reduced, the project's construction period is extended from the original three years up to 15 years.

It must also be noted that the project will be defined by NADBank in conjunction with the US Environmental Protection Agency and the Mexican federal government.

In conclusion, quantities used in the analyses are in pesos at April 1997 prices. When funding application occurs, prices must be revised to reflect any increase in the Consumer Price National Index (INPC) which could affect the project.

1. *Origin and Application of the Resources (Preliminary)*

The next table shows preliminary in which components of the Mexicali I & II Systems would funding sources be applied.

ITEM	TOTALES		AMOUNTS IN DOLLARS			
	MN	USD	EPA(294)	CESP	SAHOPE	Others
Mexicali I						
Rehabilitation & expansion of Mexicali I	11,720,000	1,483,544	-	-	-	1,483,544
Sewer rehabilitation	152,911,363	19,355,869	-	3,320,724	3,320,724	12,714,422
Telemetry	1,200,000	151,899	-	-	-	151,899
Subtotal	165,831,363	20,991,312		3,320,724	3,320,724	14,349,865
Mexicali II						
Mexicali II WWTP	68,004,300	8,608,139	4,734,477	-	-	3,873,663
Trunk sewer and secondary sewer	83,097,500	10,518,671	41,703	2,619,242	2,619,242	5,238,484
Pump station #4 and force main	45,000,000	5,696,203	3,132,911	-	-	2,563,291
Subtotal	151,101,800	24,823,013	7,909,091	2,619,242	2,619,242	11,675,438
TOTAL Mexicali I & II	316,933,163	45,814,324	7,909,091	5,939,965	5,939,965	26,025,303
(Tax)	31,693,316	4,581,432	790,909	593,997	593,997	2,602,530
TOTAL	348,626,479	50,395,757	8,700,000	6,533,962	6,533,962	28,627,833

ORIGIN AND APPLICATION OF THE RESOURCES (PRELIMINARY)

This table shows where each participating organization's funding will be applied.

The column 'Others' corresponds to the possible grants pending by the USEPA and the Mexican Federal Government.

2. *Operation and Maintenance Budget*

The operation and maintenance costs, both historical and projected, are shown in the attached "Study to Determine Payment Capacity for the Sanitation Works of Mexicali". The study determined the O&M costs for the new Mexicali II wastewater treatment plant to treat in its initial stages 880 l/s. The cost is $0.35 pesos per cubic meter of treated water. Added to this cost was the estimated cost for operation of Pumping Station N° 4 as well as some of the complementary works. This cost was finally estimated at $0.50 pesos per cubic meter of treated water.

In addition to this O&M cost, an incremental cost was also added to the general O&M expenses of the SCPSM. The additional cost reflects the increase incurred with the new infrastructure and includes both potable water as well as sanitary sewer services resulting from the system's normal expansion required to maintain coverage.

Projections were made through a 25 year period in order to cover the loan terms to be negotiated by the SPSCM.

3. *Sensitivity Analysis*

The sensitivity analysis carried out considers the impact the project will have with changes in the critical variables described below:

- *Grant funds*
- *Extended construction period*
- *Growth in population*

The major sensitivity indicator was obtained with a variation in grant funding. In this regard, if grant funds are reduced by 10%, the SPSCM will be forced to delay the construction period for one year in order to obtain funding from the State during the next fiscal year. With a 20% decrease, it is delayed 1½ years. The less attractive scenario does not include grant funds, which would result in the extension of the construction period to more than 15 years.

1. *Financial Break Even Analysis*

This scenario would be presented should there be an increase in the contribution made by the SPSCM in the order of $1 million dollars. As such, in the financial structure proposed herein the SPSCM contributes $6.50 million dollars, and with an increase to $7.5 million, the project would require elimination of the loan amount in order to make the project financially feasible.

2. *Rate and Fee Model*

The following table shows the historical rate model for 1996 as well as the current 1997 rates charged to the users by the SPSCM for both potable water services and sanitary sewer services:

Fees (pesos)		1996	1997
Average Tariffs			
Avg Residential	$/m3	1.26	1.44
High rate residential	$/m3	1.26	1.44
Commercia	$/m3	5.71	6.78
Industrial	$/m3	5.93	6.22

The SCPSM has pre-authorized rate increases based on a formula that includes the main O&M costs experienced. This revision is done on a monthly basis until the established limit is reached. When the accumulated rate and fee increases exceed the limit, approval by the State Congress is required.

The next table shows the fee revision form published in the Periódico Oficial (Official Daily) on December 31, 1996, and to be applied during 1997. The table specifies that rates and fees will be increased proportionally in accordance with increases in the main expenses, and will be applied during the first month of the year, and will undergo monthly modifications to obtain 100%.

ITEM	PERCENTAGE
Wages	46.0%
Electrical Energy	10.0%
Fuel and lubricants	3.0%
Chemical substances, materials and supplies	35.0%
C.N.A. Rights	6.0%
TOTAL	100.0%

When the accumulated increase in rates and fees exceeds the authorized amount, approval of the State Congress is required for revision.

3. Project Management

The SCPSM has technical and administrative capacity to carry out its functions. Over the last several years it has applied an improvement program to increase operational and commercial efficiency levels, as well as to increase collection efficiency and the recovery of late payments. In recent years, audited financial statements of the SCPSM have shown positive figures, which highlights that the new administration that took office in 1996 has been working on the organization for several years which ensures the continuity of these programs and their effectiveness.

In this regard, the SPSCM has its own Institutional Strengthening Program which includes and adheres to several aspects of the BECC criteria.

Furthermore, it must be noted that the NADBank is working in coordination with the CNA and the SPSCM on an Institutional Development Plan through the PRODIN, in the amount of $250,000 dollars. The Plan will be scheduled over two fiscal Bank years and with funding provided by the C.N.A.

6. Community Participation

A. Comprehensive Community Participation Plan

On July 10, 1997, the SPSCM submitted a Comprehensive Community Participation Plan to the BECC. The purpose of the Plan is to fully inform the community of Mexicali regarding the proposed project as well as ensure community wide approval. The Plan was approved by the Community Outreach Section.

On July 14, 1997, the Steering Committee was created with representatives of several sectors including the industrial, commercial, services, academic, as well as three representatives of the NGO's, professional associations, and neighborhood representatives.

The Community Participation Plan includes information strategies through meetings with sectors and the media. Some of the Plan actions include:

- *Committee with 40 members*
- *Public process started on September 2nd with meetings by sector and media campaign*
- *Media campaign ran between September 2nd through September 20th*
- *17 meetings with sectors and visits to 46 colonias were made*
- *Information was directly provided to 2,000 people*
- *21 newspaper articles appeared*
- *714 radio spots and 202 TV spots were transmitted*
- *The project was presented to media directors; 9 radio and 5 TV talk shows were held*
- *A report and opinion survey was sent in the water service bills*
- *Flyers were distributed to the population at large*

Committee participation included representatives from communities in Imperial County acting as observers. A community meeting in Imperial was held on October 3rd and a second community meeting will be held on October 16th at the same location.

There was extensive coordination with the Bi-national Technical Committee which is made up of representatives from appropriate agencies from both countries who are in charge of carrying out follow up activities for the development of the Integral Sanitation Project of Mexicali, B.C. Members of the committee were invited to attend the project follow up meeting.

A.1. Public Meetings

The first Public Meeting was held at the CANACO Auditorium with 700 people in attendance. At the meeting it was determined that the majority of the population supports the project. However, a group of local farmers from the Farm El Choropo, though they support the project, raised their concern regarding the location of the Mexicali II treatment plant. The Ejido, located between 500 and 1,000 meters away from the plant site, is home to approximately 250 residents. It was apparent there was a lack of information among this group of local farmers, represented at the meeting by almost 20 people. It must be noted that this village is located outside the city limits, approximately 10 km away.

On October 9th a meeting with representatives of Ejido El Choropo was held. The meeting was held after BECC staff member, Ing. Edgar Tovilla, SPSCM officials and an IBWC engineer visited the area on Saturday, October 4th. At this meeting the National Water Commission provided a detailed presentation of the selection process and reviewed the 12 options evaluated. It was further explained that the plant does not have any negative impacts on the human health and that it does not generate bad odors. In addition, coordinated actions among appropriate agencies to regulate irregular discharges caused by a local slaughterhouse and an egg farm located next to this village which represents a source of contamination.

The 2nd Public Meeting was held with 300 persons in attendance. The meeting was held in order to present the financial aspects of the Integral Sanitation of Mexicali. The project's financial program was presented which includes approximately $50 million dollars in project costs; the presentation also covered project impact on users and new service connections. Public comments reflected approval of the financial and cost recovery program.

Later during the meeting, residents from the Ejido El Choropo raised their concerns with signs and comments. They presented their opposition to the location of the treatment plant. The technical presentation regarding the project site and the benefits on human health was also made. Most of the public comments made were in the context of the position taken by the residents of the Ejido El Choropo.

The Community Participation Report which was submitted by the SCPSM on October 11th, shows that the community was properly informed, that access to project information was guaranteed, and with regard to the survey results, the majority support the project and has an understanding of its benefits and impacts.

It was recommended the community continue addressing the concerns raised by the group of local farmers from the Ejido El Choropo by taking measures described below:

- *NGO's carry out efforts to ensure public awareness through NGO representatives on the Steering Committee who have already had contact Ejido leaders*
- *Actions with the children and the teachers at the elementary school on the Ejido in order to present information regarding the project benefits and particularly about the treatment plant as an option to the sanitation and improvement of the condition of life of the population.*
- *On ½ hectare, next to the plant site, a landscaped area could be developed that could be watered with the treated effluent and could include courts and fields for several games in order to strength the education process.*
- *Promote a workshop regarding the wastewater treatment plant's operation and maintenance, particularly for those that operate as an Eco-Parks, like Ecoparque in Tijuana or the Ecobosque project of San Luis Colorado River. This workshop should be aimed at members of the Steering Community and their Technical work group, and requesting members from all sectors to provide their support to the Mexicali II Treatment plant.*

1. **Report Documenting Public Support**

The SPSCM prepared and submitted a written report to the BECC in which successful implementation of the Comprehensive Community Participation Plan is detailed. The report includes all support information, a list of Steering committee members and the activities carried out by each, a list of the local meetings carried out, copies of the public meeting announcements, the Minutes of the public meetings, videos of the main events, and other documents that demonstrates the extensive scope of the Plan.

The report shows that the public understands and supports the project's environmental, health, social, and financial costs and benefits. The preliminary evaluation of the surveys carried shows that between 83% and 93% of the community supports the project.

7. Sustainable Development

2. **Definition and Principles**

As a fundamental principle, this project focuses on human beings as the central point of all the objectives of sustainable development, who have the right to lead a healthy and productive life in harmony with nature.

Project implementation will contribute substantially to the reduction of the contamination levels in the New River. Discharges of untreated wastewater into the channels that flow to the New River will be halted. Improvement to the surrounding environment of the New River as well as benefits in both countries will be experienced.

The quality of life of residents of Mexicali will improve substantially once sanitary sewer services are provided and the use of latrines and septic tanks that have constantly caused health problems to nearby inhabitants will be eliminated.

Construction, rehabilitation and lining of collectors will prevent problems in the system that presents risks to the health of the residents.

With the rehabilitation of the pumping station, equipment failure will be avoided and the discharge of untreated wastewater into the New River will be prevented, so the conditions in the river will be maintained within the established parameters.

The conditions along the New River will improve once the Mexicali II System no longer discharges raw wastewater directly into the Mexicali drain. This drain flows to the New River; raw wastewater will instead be conveyed to the new Mexicali II wastewater treatment plant for treatment and will contribute to the decontamination and environmental recovery of the river on both sides of the international border.

The project will meet the present and future needs related to wastewater treatment for the city of Mexicali, which presently has 90% coverage of the sanitary sewer and intends to increase coverage to a percentage similar to the potable water which is 95% at the present.

3. **Institutional and Human Capacity Building**

In order to build the organization's capacity, the SPSCM has developed the following programs:

4. *Update of users directory in order to have control of the system users*
5. *Industrial Water Pre-treatment Program and Recommendations for Implementation. Prepared by CH2MHILL in 1997*
6. *Characterization of Municipal Wastewater. Developed by CH2MHILL in 1997*
7. *Industrial Discharge Control Border Program for Mexicali. Developed by the State Ecology Department and the SPSCM in 1995.*
8. *Recovery of late charges and delinquent accounts Plan. This plan gives special attention to these users by trying to establish payment arrangements. This has shown tremendous success in increasing Utility earnings and making account adjustments.*
9. *The Utility has been providing training courses for employees and management.*
10. *Equipment for Macro and Micro metering have been installed to better control water received and levels of water consumption by users. This has benefited the invoicing and collection systems.*
11. *Institutional Strengthening Program that NADBank in coordination with the National Water Commission (CNA) is carrying out for the SPSCM.*
12. *Conformance With Applicable Local and Regional Conservation and Development*

The Urban Development Program of population Center of the city of Mexicali 1993-2007, developed by the XV City Council outlines the areas covered by the city's sanitary sewer services. Furthermore, the project is also compatible with the Comprehensive Environmental Plan of the Border XXI program that the Mexican and the United States Government are carrying out.

The plan was carried out in the Land Uses Bureau, Urban Control and Environment, headed by Sergio Montes M., with offices in the City Hall of Mexicali, telephone: (65) 58-1631, Fax (65) 58-1600.

13. *Natural Resource Conservation*

The rehabilitation and expansion project for the Mexicali I Wastewater Treatment Plant, as well as construction of the Mexicali II Wastewater Treatment Plant, take into consideration reforestation of areas adjacent to the plant and mitigation actions for any possible impacts caused to the dispersion of odors.

In this section is important to point out that the elements that contemplate the Industrial Discharge Control Program were established in coordination between both State agencies directly involved with its control, the State Ecology Department and the SCPSM. In that program the following points are stressed:

- *Inventory of industries and probable contamination sources*
- *initial characterization of the discharge*
- *identification based on inventory*
- *definition of the regulation to apply*
- *selection of the methodology and sampling periods*
- *establishment of tectonics analeptics required for the detection and quantification.*
- *development of the process*
- *scheduling several activities of the program*
- *development of the emergency plan*

1. *Community Development*

The impact caused by project implementation will be definitively beneficial to the community. There will be an improvement in the quality of life of the residents of the colonias where the sanitary sewer service will be introduced, health problems will be reduced to the minimum and there will be an increase in land space allowing for residents to expand use of their homes.

Furthermore, with the introduction of sanitary sewer services, in 3 years it will be necessary to connect close to 7,500 hook ups in addition to the 4,200 hookups that the SCPSM annually serves. The SPSCM will undertake a Program aimed at new users that includes a focus on the community with the new infrastructure, information to potential new users, the procedure and mechanism for establishing connections, the payment for services, as well as a program of connections to the system. The next table is a projection of new users that will be benefited.

New Users	1998	1999	2000	2001
Nº of houses	5,811	5,976	4,582	4,715

Inhabitants	**21,791**	**22,410**	**17,183**	**17,681**

Source: SCPSM

In the financial projections and in the income and expenses budget of the SCPSM such activities are contemplated as well as the operation and maintenance budget. It must be noted that this program has been carried out as one of the organization's routine activities.

One of the more important impacts is the vast improvement to the quality of the wastewater that flows into the New River that will benefit residents on both sides of the border and will be a noticeable as soon as the plant operations get underway.

The collector project will allow the system to improve the efficiency and stop the discharging of untreated wastewater into the New River. Current conditions of the New River will substantially improve and benefits to both sides of the border will be gained.