

Border Environment Cooperation Commission Expansion of the Water and Wastewater Systems in Tijuana and Playas de Rosarito, Baja California

1. General Criteria

1.a Project Type

Project Name:	Expansion of the Water and Wastewater Systems in Tijuana and Playas de Rosarito, Baja California.
Project Sector:	Domestic Water and Wastewater Hookups

1.b Project Category

Category:	Community Environmental Infrastructure Project – Community-Wide Impact
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1.c Project Location and Community Profile

Community:	Municipality of Tijuana and Playas de Rosarito, Baja California, México.
Location:	The project is located in the municipality of Tijuana and Playas de Rosarito in the northwestern side of the State of Baja California, Mexico. Tijuana borders the United States–San Diego, California Metropolitan Area– to the north, the municipality of Playas de Rosarito to the south, the Pacific Ocean to the west, and the municipality of Tecate to the east. Playas de Rosarito is located approximately 20 km (12.5 mi) south of the international border, it limits to the north and east with Tijuana, to the south with Ensenada and to the west with the Pacific Ocean.
Location within the border:	The projects are located within the 100 km (62.3 mi) border area. The proposed projects are within a range of 5 to 20 km (3 to 12.5 mi) south of the international border.
Figure:	The following figure shows the location of the city of Tijuana and Playas de Rosarito.

Wastewater Collection System

Wastewater collection service coverage²: 87.1 %
 Current length of wastewater pipelines: 2910 Km
 Number of wastewater hook-ups: 423,936

Wastewater Treatment

Wastewater treatment (WWT) coverage: 81%

WWT facilities and treatment technologies:

Plant	Type	Capacity
SAB	Activated sludge	1,100 lps (25 MGD)
IWWTP	“	1,100 lps (25 MGD)
La Morita	“	254 lps (5.8 MGD)
Monte de los Olivos	“	460 lps (10.5 MGD)
Tecolote-La Gloria	“	380 lps (8.7 MGD)
Rosarito Norte	“	210 lps (4.8 MGD)
Rosarito I	“	60 lps (1.4 MGD)

Currently, most of the wastewater generated by Tijuana is collected by the existing wastewater collection system and conveyed by gravity and lift stations to the International Wastewater Treatment Plant (IWWTP) and the San Antonio de los Buenos (SAB) plant. Both plants discharge into the Pacific Ocean. The construction of Monte de los Olivos Wastewater Treatment Plant (WWTP) was completed in September 2008 and is currently in a trial period. The construction process for La Morita facility is underway, and it is expected to start operations by the end of 2009 while the Tecolote-La Gloria WWTP recently started construction. Most of the wastewater generated in Playas de Rosarito is treated at the Rosarito Norte and Rosarito I WWTP, both plants discharge into the Pacific Ocean; Rosarito Norte via the Reforma creek, and Rosarito I via the Huahuatay creek through the ocean outfall.

Solid Waste

Solid waste collection: 99%
 Final disposal: Sanitary landfill

Street Paving

Street paving coverage: 44%

² Source: CESPT as of December 2008

1.d Legal Authority

Project Sponsor:	Comisión Estatal de Servicios Públicos de Tijuana (CESPT)
Legal representative:	Eng. Hernando Durán Cabrera
Legal instrument to demonstrate legal authority:	Decree No. 44, V Legislature of the State of Baja California
Date of instrument:	December 16, 1966
Compliance with agreements:	<ul style="list-style-type: none"> - 1889 International Boundary Convention - 1944 Water Treaty - 1983 La Paz Agreement, or Border Environment Agreement - 1990 Integrated Border Environmental Plan (IBEP) - 1994 North American Free Trade Agreement (NAFTA) - Border 2012 Program - Minute 283 (CILA/IBWC)

1.e. Project Summary

Project description and scope:	<p>The project consists of the installation of drinking water and wastewater collection infrastructure in currently unserved areas of Tijuana and Playas de Rosarito. The project also includes the construction of two water storage tanks, one wastewater collector and two force mains, as well as the expansion of the Rosarito I WWTP.</p> <p><u>Drinking Water</u></p> <ul style="list-style-type: none"> - Construction of two storage tanks of 1000 m³ (.26 million gallons) and 8000 m³ (2.11 million gallons). - Water distribution system expansion to unserved areas. <p>The project includes the installation of approximately 53,000 meters (173,884 ft) of pipelines using PVC piping in diameters ranging from 4 to 8 inches.</p> <p><u>Wastewater Collection</u></p> <ul style="list-style-type: none"> - Construction Wastewater Collection System. <p>The project includes the installation of 133,000 meter (436,350 ft) of sewer pipelines using PVC piping in diameters ranging from 8 to 12 inches. Wastewater generated and collected in the project</p>
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areas will be treated at the Rosarito Norte and Tecolote-La Gloria WWTPs. The Rosarito Norte WWTP is currently in operation and has enough treatment capacity.

The Tecolote-La Gloria WWTP is currently under construction and will have sufficient treatment capacity to cover the long term needs in the area (San Antonio de los Buenos and San Antonio del Mar basins). Both plants will discharge the treated effluent into the Pacific Ocean.

- Installation of approximately 25,618 meters (84,048 ft) collector, using PVC/Polyethylene piping in diameters ranging from 20 to 38 inches.
- Installation of a lift station and approximately 1,882 meters (6,174 ft) force main “La Encantada”, using PVC piping of 36 inches diameter.
- Installation of a lift station and approximately 2,902 meters (9,521 ft) force main “Florido”, using PVC piping of 20 inches diameter.

Wastewater Treatment

- Expansion wastewater treatment plant Rosarito I

The project includes the expansion of the Rosarito I WWTP from 60 lps to 120 lps (1.4 to 2.8 MGD). The treatment system consists of an activated sludge process with extended aeration (oxidation ditch). The project includes two pretreatment modules, one for discharges from wastewater trucks and one for discharges from the wastewater collection system, the construction of an aerobic reactor, clarifier and UV disinfection chamber and a sludge digester.

Currently, the treated effluent complies with the Mexican Norms for water quality NOM-001-SEMARNAT-1996 and it is discharged into the Arroyo Huahuatay where the effluent is conveyed to the Pacific Ocean for final disposal through an ocean outfall. This outfall has a capacity of 150 l/s and it is located 22 km (13.6 miles) south of the international border and extends approximately 500 m (0.3 miles) offshore. The treatment plant will continue complying with this norm.

The sludge generated by the treatment plant will be managed, transported and disposed according to the norm NOM-004-SEMARNAT-2002. The stabilized and dehydrated sludge will be disposed at the

location (Punta Bandera) assigned by the CESPT and authorized by the *Secretaría de Protección al Ambiente* (Baja California State Environment Department).

Benefitted Population :

The following table shows the benefitted population according to the project type:

Project	Benefitted Population
Water distribution system	32,731
Wastewater collection system	64,552
Storage tanks	102,273
Collector and pressurized lines	501,353
Expansion Rosarito I WWTP	21,802

Number of connections:

The following table shows hookups and connections according to project type:

Project	Hookups/Connections (new)
Water distribution system	7,659
Wastewater collection system	15,667

Project cost:

MX\$ 513 Million Pesos

Project map:

The following figures show the location of the proposed project.

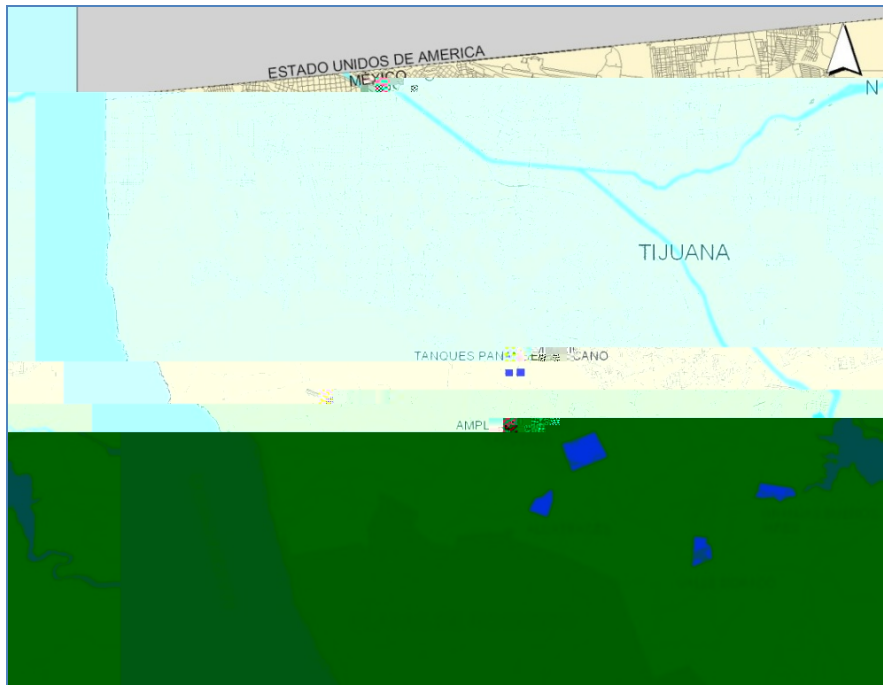


Figure 1. Drinking Water Projects in Tijuana and Playas de Rosarito , Baja California

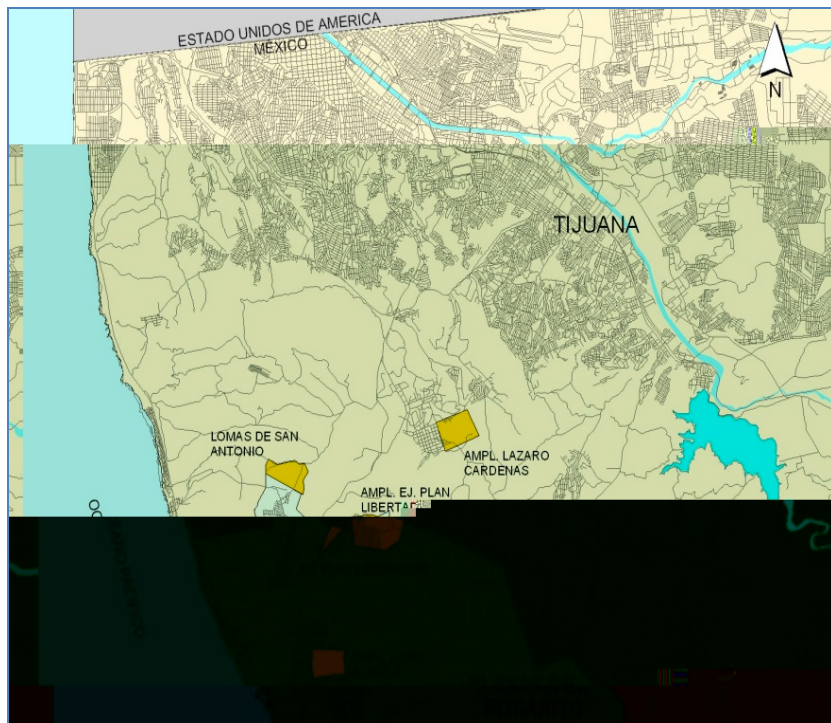
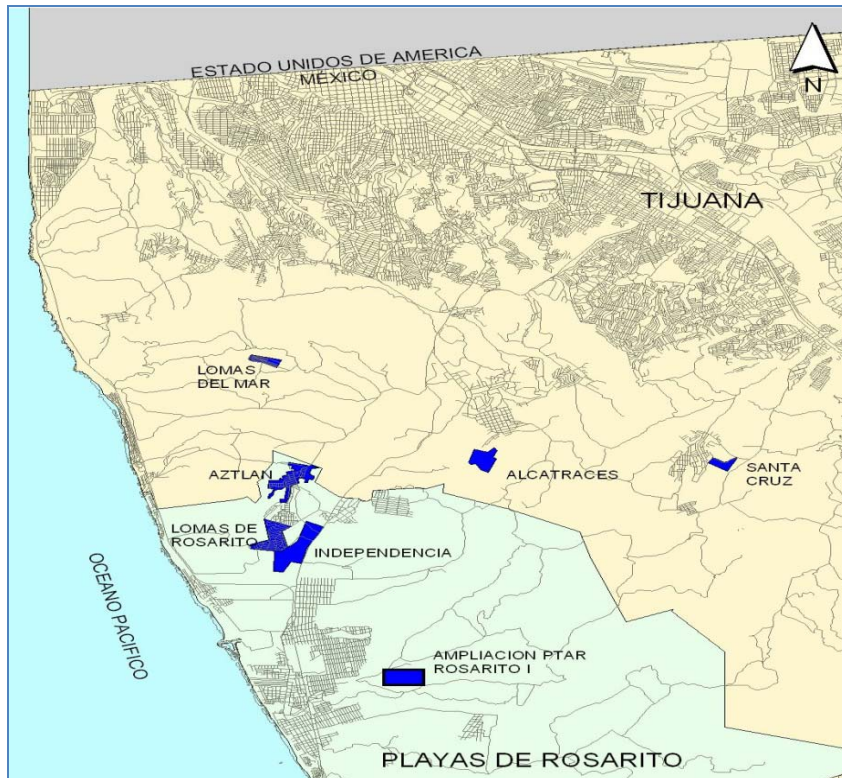


Figure 2 and 3. Wastewater Collection and Treatment Projects in Tijuana and Playas de Rosarito, Baja California

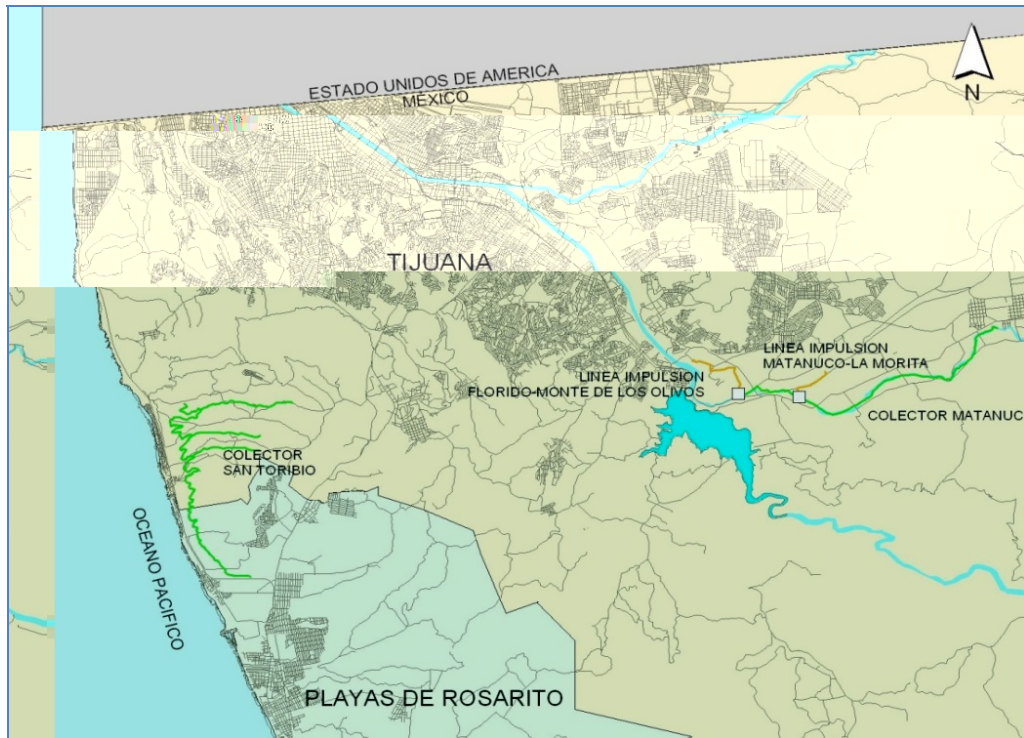


Figure 4. Collectors and Force Mains Projects in Tijuana and Playas de Rosarito, Baja California.

1.f Project Justification

Project justification:

- The proposed projects will provide drinking water and wastewater collection services to areas in both cities that currently rely on hauled water and discharge their wastewater on latrines, septic tanks and open drains.
- The proposed projects will also provide appropriate water distribution, wastewater collection, and treatment services to approximately 722,000 inhabitants. These actions will reduce health risks associated to the lack of drinking water sources properly treated and will reduce human contact with contaminated water as well as with vectors of waterborne diseases such as pests and other organisms. The risk of infections due to poor water quality and inadequate storage will also be reduced.
- The city of Tijuana and Playas de Rosarito have an estimated 3% and 15% deficiency in their water distribution and wastewater collection services, respectively. The implementation of the project will help to reduce this backlog by installing approximately 7,659 drinking water hook-ups and 15,667 new wastewater connections.
- Approximately 131 lps (3 MGD) of wastewater generated in the project areas will receive treatment prior to be

discharged into the Pacific Ocean. By eliminating the use of latrines, septic tanks, and open drains, the proposed project will contribute to reduce the potential groundwater and surface water contamination resulting from the inappropriate discharge of untreated wastewater.

Urgency of the project or consequences of no action:

- The lack of these services jeopardizes the health of area residents, inasmuch as they are exposed to having contact with wastewater or poor quality water being at risk of acquiring associated diseases. According to morbidity statistics for Tijuana and Playas de Rosarito (see Table 2.1), intestinal diseases show the highest incidence among all types of diseases.
- The inappropriate discharge of untreated wastewater in the project area results in wastewater runoff, a portion of which eventually reaches the Pacific Ocean, contributing to water contamination.

Pending Issues:

None

Criterion Summary:

The project complies with BECC's General Criteria

2. Human Health and Environment

2.a Compliance with Applicable Environmental Laws and Regulations.

Environmental and Public Health needs addressed by the proposed project:

- Drinking water provision. Currently, the different project areas do not have a water distribution system and depend on hauling trucks for the service and utilize inadequate storage recipients.
- Appropriate wastewater collection and treatment. Project area residents currently lack sewage services and discharge their wastewater to open drains or rely on latrines and cesspools.
- Reduce the risk for communicable waterborne diseases caused by the lack of drinking water and/or human contact with raw wastewater runoff as a result of the lack of wastewater collection in the different project areas.
- Reduce soil and surface water contamination, inasmuch as it has been estimated that a portion of the runoff resulting from inappropriate wastewater discharges in the project area will eventually discharge to the Pacific Ocean.

The project meets the following applicable environmental laws and regulations:

- Official Mexican Standard NOM-001-SEMARNAT-1996, which establishes the maximum permissible levels of contaminants for wastewater discharges into national waters and territories.
- Official Mexican Standard NOM-002-SEMARNAT-1996, which establishes the maximum permissible levels of contaminants for wastewater discharges to urban or municipal wastewater collection systems.
- Official Mexican Standard NOM-003-SEMARNAT-1997, which establishes the maximum permissible levels of contaminants for reclaimed water use for non-potable uses.
- Official Mexican Standard NOM-004-SEMARNAT-2002, which establishes the maximum permissible levels of contaminants for biosolids reuse and final disposal.
- Official Mexican Standard NOM-127-SSA1-1994, which establishes treatment processes and quality standards for drinking water for environmental health and human use and consumption.

2.b Human Health and Environmental Impacts.

Human Health Impacts

- Direct and indirect benefits:**
- The project will help to reduce groundwater and surface water contamination.
 - The project will reduce soil contamination.
 - Reduce the potential to acquired diseases due to lack of drinking water.

Health statistics:

Waterborne diseases are caused by pathogenic microorganisms that are directly transmitted as a result of inadequate wastewater disposal practices and unsafe water supplies. An individual may become ill after drinking water that has been contaminated with these organisms; eating uncooked foods that have been in contact with contaminated water; or through poor hygiene habits that contribute to the dissemination of diseases by direct or indirect human contact. Waterborne diseases may be caused by protozoan, viruses, bacteria, and intestinal parasites.

Supporting figures:

The following figure shows waterborne disease statistics for the city of Tijuana and Playas de Rosarito. As shown below, the number of cases has dropped throughout the years despite the population's growth

Projects to improve water services, such as the provision of wastewater collection and treatment services contribute to improve the communities' public health.

No. of Cases						
Disease	2002	2003	2004	2005	2006	2007
Intestinal diseases by other organisms	52699	36130	22110	36930	33084	31858
Other Helminthiases	4215	3513	2500	1812	1651	1928
Intestinal Amoebiasis	3699	2881	1485	1715	1636	1202
Scabiosis	3605	2140	1391	1187	1275	2103

Table 2.1 – Waterborne Disease Statistics for Tijuana, B.C.

Source: Secretariat of Health, Epidemiological Surveillance Coordinating Unit, General Morbidity, New Cases. Tijuana 2002-2007

No. of Cases					
Disease	2002	2003	2004	2005	2007
Intestinal diseases by other organisms	2112	578	829	3166	1694
Other Helminthiases	266	177	191	200	87
Intestinal Amoebiasis	-	-	147	73	60
Scabiosis	125	-	41	-	25

Table 2.2 – Waterborne Disease Statistics for Playas de Rosarito, B.C.

Source: Secretariat of Health, Epidemiological Surveillance Coordinating Unit, General Morbidity, New Cases. Playas de Rosarito 2002-2007

Environmental Impacts	
Direct and indirect benefits:	The construction of new water distribution and wastewater collection systems in Tijuana and Playas de Rosarito will reduce health and environmental risks associated to inadequate wastewater collection and lack of wastewater treatment. The proposed project will help CESPT distribute drinking water, collection and treatment of wastewater generated in the project areas in compliance with existing federal and state laws and regulations.
Environmental impacts:	<p>The project's implementation will provide drinking water services and will help eliminate wastewater discharges to latrines or open drains, which may positively impact ground and surface water bodies, as long as wastewater produced in the project areas will be collected and treated at the Rosarito Norte and Tecolote-La Gloria WWTP's, improving the quality of the water in rivers and creeks, and ultimately ocean waters in Tijuana and Playas de Rosarito.</p> <p>Minor environmental impacts are anticipated from implementation of the different project phases, provided that the project tasks are implemented in accordance with the specifications of Mexico's Environmental Impact Assessment Document <i>Manifestación de Impacto Ambiental</i> (MIA by its initials in Spanish) and taking into account the mitigation measures established in it.</p> <p>Potential impacts specified in the MIA include the following:</p> <p><u>Construction Phase</u></p> <ul style="list-style-type: none">- Fugitive dust emissions.- Gas emissions from construction machinery.- Temporary roadway blockages, presence of workers in the area.
Mitigation measures:	<p>Mitigation measures included in the MIA are:</p> <ul style="list-style-type: none">- Application of treated wastewater to reduce fugitive dust emissions.- Vehicle tune ups to reduce emissions.- Placement of warning signals to prevent potentially hazardous situations.
Impacts:	The environmental impact resulting from the project's implementation will be positive overall, as the project increases drinking water and wastewater collection coverage, reducing environmental contamination and improving the quality of life of area residents by curtailing potential health hazards.
Transboundary Impacts	
	Due to the proximity of Tijuana and Playas de Rosarito to various communities in the San Diego County in the United States, there are frequent border crossings between cities. The construction of new

drinking water and wastewater collection systems in currently unserved areas will have a positive impact on the health of residents of cities such as San Ysidro and San Diego California and the entire region, since these actions will reduce the risk of waterborne diseases caused by inappropriate wastewater management and/or the lack of drinking water. Furthermore, the project will reduce human contact with raw wastewater. Additionally, the project's implementation will reduce the potential for contamination of local and shared water bodies, including the Tijuana River and the Pacific Ocean.

Formal Environmental Clearance

Environmental clearance:

Pursuant to the provisions of the Law of Environmental Protection for the State of Baja California and Mexico's General Law on Environmental Equilibrium and Protection (LGEEPA, by its initials in Spanish) regarding the environmental impacts of these projects, the Secretary of Environmental Protection for the State of Baja California (SPA) and Mexico's Secretariat of the Environmental and Natural Resources (SEMARNAT, by its initial in Spanish) established, through official communications, that the water and wastewater collection projects require a *MIA*, an Environmental Impact Statement in the General Modality, and that the collector and treatment plant projects require a *MIA*, an Environmental Impact Statement in the Particular Modality.

The studies were prepared and submitted to the SPA and SEMARNAT on December 01, 2008, and on April 3rd, 2009, respectively. Authorization from the SPA for these projects was issued in different documents on April 17th and June 11th, 2009 through official documents No. SPA-TIJ-1750/09, SPA-TIJ-0929/09, SPA-TIJ-936/09, SPA-TIJ-939/09, SPA-TIJ-920/09, SPA-TIJ-1741/09, SPA-TIJ-0930/09. The *MIA* for the Rosarito I WWTP including the expansion was prepared and submitted to the SEMARNAT on September 01, 2005, and it was authorized in the official document DFBC/SGPA/UGA/DIRA/I3468/05 issued on February 14, 2006 after a determination was made that the project complies with all the requirements of the Mexican environmental clearance process. The *MIA* for the project "Matanuco Collector" is under review and authorization from SEMARNAT still pending.

Pending Issues

MIA Authorization from SEMARNAT for the project Matanuco Collector .

Criterion Summary:

The project complies with BECC's Human Health and Environment criteria.

3. Technical Feasibility

3.a Technical Aspects

The project consists of the installation of drinking water and wastewater collection infrastructure in unserved areas of Tijuana and Playas de Rosarito. The project includes the construction of two water storage tanks, one wastewater collector and two force mains, as well as the expansion of the Rosarito I wastewater treatment plant.

Project Development Requirements

Design criteria:

The project's final designs were developed pursuant to the wastewater collection technical standards issued by Baja California's Secretariat of Infrastructure and Urban Development, and the technical specifications contained in the Water, Wastewater Collection and Treatment Manual prepared by CONAGUA. The designs, (as applicable) also comply with Official Mexican Standard NOM-001-CNA-1995 "Sanitary Sewage System – Specifications for Hermeticity and the Mexican Norm NOM-127-SSA1-1994 which establishes treatment processes and quality standards for drinking water for environmental health and human use and consumption. Final designs were reviewed by CONAGUA, BECC and NADB.

Drinking Water

- **Construction of two storage tanks of 1000 m3 (.26 MG) and 8000 m3 (2.11 MG).**

Project	Location	Benefitted Population	Capacity
Storage Tanks 'Panamericanos'	Tijuana	102,273	.26 MG 2.11 MG

- **Expansion water distribution system to unserved areas**

Length: 53,000 metros (173, 884 ft)

Diameter: 4-8 inches

Material: PVC

Unserved Area	Location	Benefitted Population	Hookups
Granjas Buenos Aires	Tijuana	13,569	3293
Valle Dorado	Tijuana	3,885	943
Ampliación Ejido Lázaro Cárdenas	Tijuana	9,258	1962
Ampliación Alcatraces	Tijuana	3,601	874
Lomas del Mar	Tijuana	2418	587

Wastewater Collection

- **Construction of sewer lines**

Length: 133,000 metros (436,350 ft)
 Diameter: 8-12 inches
 Material: PVC

Wastewater generated and collected in the project areas, 131 lps (3 MGD) will be treated at the Rosarito Norte and Tecolote-La Gloria Wastewater Treatment Plants. The Rosarito Norte WWTP is currently in operation and has enough treatment capacity. The Tecolote-La Gloria WWTP is currently under construction and will have sufficient treatment capacity to cover the long term needs in the area (San Antonio de los Buenos and San Antonio del Mar basins). Both plants will discharge the treated effluent into the Pacific Ocean.

Wastewater collection system expansion comprises the following unserved areas:

Areas	Location	WWTP	Benefitted Population	Hookups
Lázaro Cárdenas	Tijuana	Tecolote-La Gloria	9,258	2,247
Lomas Del Mar	Tijuana		1,084	263
Ampliación E. Plan Libertador	Rosarito	Rosarito Norte	20,978	5,092
Ejido Plan Libertador	Rosarito		5,100	1,238
Ampliación Lucio Blanco	Rosarito		3,865	938
Lomas de Rosarito	Rosarito		2,014	490
Independencia	Rosarito		4,528	1099
Aztlán	Rosarito		6,806	1660
Lomas de San Antonio	Tijuana		7,318	1,766
Alcatraces	Tijuana		3,601	874

- **Construction of collector “Matanuco”**

Length: 25,618 meters (84,048 ft)
 Diameter: 20-38 inches
 Material: PVC/Polyethylene

- **Construction “ Encantada-LaMorita” force main**

Length: 1,882 meters (6,174 ft)
 Diameter: 36 inches
 Material: PVC
 Lift station: 1
 Capacity: 797 lps (19 MGD)

- **Construction “El Florido-Monte de los Olivos” force main**

Length: 2,902 meters (9,521 ft)
 Diameter: 20 inches
 Material: PVC
 Lift station: 1
 Capacity: 454 lps (11 MGD)

Project	Location	WWTP	Benefitted Population	Capacity
<i>Force Mains and lift stations</i>				
Encantada-La Morita	Tijuana	La Morita	139,500	797 l/s (19 MGD)
Florido-Monte de los Olivos	Tijuana	Monte de los Olivos	68,500	454 l/s (11 MGD)
<i>Collectors</i>				
Matanuco	Tijuana	La Morita and Monte de los Olivos	501,354	1021 l/s (24.4 MGD)

The wastewater flows generated in the Matanuco and Florido basins will be collected and conveyed through the Matanuco collector and will be intercepted by the force mains La Encantada and El Florido that will distribute the flows to the treatment plants La Morita and Monte de los Olivos respectively.

Wastewater Treatment

- **Expansion of Rosarito I Wastewater Treatment Plant**

Capacity: 60 lps to 120 lps (1.4 to 2.8 MGD).
 Technology: Activated Sludge

The project includes the expansion of the Rosarito I WWTP from 60 lps to 120 lps (1.4 to 2.8 MGD). The treatment system consists of an activated sludge process with extended aeration (oxidation ditch). The project includes two pretreatment modules, one for discharges from wastewater trucks and one for discharges from the wastewater collection system, the construction of an aerobic reactor, clarifier and UV disinfection chamber and a sludge digester.

Project	Location	Benefitted Population	Capacity
Expansion PTAR Rosarito I	Playas de Rosarito	21,802	2.8 MGD

The WWTP design parameters are:

Reuse (NOM-003-SEMARNAT-1997)

Monthly Average

Coliforms NMP/100mL	Oils and grease M/L	BOD ₅ mg/L	TSS mg/L
1,000	15	30	30

The expected effluent quality for the Rosarito I WWTP would be in compliance with the Mexican Norms: NOM-001-SEMARNAT-1996 for discharges into the Ocean and NOM-003-SEMARNAT-1997 for reclaimed water use for non-potable uses. The following table indicates the permitted discharge limits and the current water quality.

Parameter	Units	Maximum Limit		Avg. Value Jan to Sept 08
		Monthly	Daily	
(BOD)	mg/l	30	150	8
Oil and Grease	mg/l	15	25	4
Fecal Coliform	MPN/100ml	1000	2000	30
Total Suspended Solids	mg/l	30	125	24
Settleable Solids	mg/l	1	2	0.1
Floating Matter	mg/l	Not present	Not present	N/A
Temp	°C	40	40	21
pH	Units	5-10	5-11	8
Phopshorous	mg/l	20	30	4
Nitrogen	mg/l	40	60	28
Arsenic	mg/l	0.1	0.2	N/A
Cadmium	mg/l	0.1	0.2	N/A
Cyanide	mg/l	1	2	N/A
Copper	mg/l	4	6	N/A
Chromium	mg/l	0.5	1	N/A
Mercury	mg/l	0.005	0.01	N/A
Nickel	mg/l	2	4	N/A
Lead	mg/l	0.2	0.4	N/A
Zinc	mg/l	10	20	N/A

Currently, the treated effluent complies with the Mexican Norms for water quality for discharges into the ocean NOM-001-SEMARNAT-1996 and it is discharged into the Arroyo Huahuatay where the effluent is conveyed to the Pacific Ocean for final disposal through an ocean outfall with capacity of 150 l/s. This outfall is located 22 km (13.6 miles) south of the international border and extends approximately 500 m (0.3 miles) offshore.

The sludge generated by the treatment plant will be managed,

transported and disposed according to the norm NOM-004-SEMARNAT-2002. The stabilized and dehydrated solids will be disposed at the official location (Punta Bandera) assigned by the CESPT and authorized by the former Dirección General de Ecología (Currently Secretariat of Environmental Protection in Baja California).

Currently, the sludge (solids) generated by all treatment plants operated by CESPT, as well as the sludge generated at the South Bay International Treatment Plant in San Diego are being disposed at a location called Punta Bandera, approximately 4.2 miles (6.8 km) south of the international border.

Punta Bandera facilities have a surface area of approximately 400,000 m², and include piles for additional sludge dewatering and 8 sludge disposal cells with capacity of 23,726 m³/year (dry base), each. During 2008, this facility received approximately 34,368 m³ (44,953 yd³) of wet sludge that was reduced to approximately 12,274 m³ (16,054 yd³).

The final design includes the implementation of green building practices as part of the technical construction specifications. For example, the final design considers the use of materials that will provide a good cost-benefit ratio between PVC and cement; it also considers the use of materials in the region to avoid transportation costs and emissions.

The final design specifications describes the availability of materials and its characteristics so the contractors have the option to make a selection with low toxicity such as paint, plaster, pipes, packages etc. It requires the use of equipment with low energy consumption, and sensor to control light operation.

It was requested to document any change in materials or actions that imply energy savings or improvements to the environment, during the project execution.

Appropriate Technology

Assessment of Alternatives:

As part of the project's development, various alternatives were evaluated based on the following parameters:

- Cost
- O & M Cost
- Material and Equipment Reliability
- Environmental Impacts
- Social/Community Acceptance
- Technology and sustainable practices

The alternative analysis considered the use of pipe materials in compliance with norms and current regulations. PVC and

Asbestos-cement pipes were evaluated according to the soil type.

In order to reduce costs and make the best use of the project area topography, the shortest routes were considered for pipe alignments. Crossings through paved avenues were also reduced to the minimum as well as crossing with drinking water pipes and telephone lines. Pipe diameters were calculated using slopes and velocities accordingly to avoid silt and at the same time minimize excavation and the use of lift stations. Maximum flow rate was also considered for pipe requirements.

Treatment capacity was also considered and pipe layout was designed based on existing right of ways, according to urban land use plan.

Based on the design criteria mentioned above, final designs were developed, considering any direct environmental impact, according to the specifications of the MIA requested by the Baja California SPA and SEMARNAT.

Property and Right-of-Way Requirements

Requirements:

- Inasmuch as water distribution and wastewater collection lines will be laid on existing municipal rights of way and easements, no additional land needs to be purchased for the projects.

- The utility needs permits from the municipality to construct in the right of ways and street closures. The right of way for the collector Matanuco is being coordinated with the CONAGUA since the collector will follow the path of the Matanuco creek, therefore is federal property.

Project Tasks and Timelines

- Wastewater discharge permit (CONAGUA).
- Final Design validations (CONAGUA).
- Federal Environmental Clearance.
- State Environmental Clearance.

Reviewing agencies:

- BECC
- NADB
- CONAGUA.

Pending Issues:

None

Criterion Summary:

The project complies with BECC's Technical Feasibility criteria

4. Financial Feasibility

4.a Verification of Financial Feasibility

Financial Conditions

Information Presented: CESPT's Financial Statements.

Summary of Financial Analysis: CESPT has enough revenues to service the proposed debt.

Project total cost, financial structure and other capital investment plans

Concept:

Construction Costs: \$463.0 million pesos

Construction management, supervision and contingency costs: \$50.0 million pesos

Total Cost: \$513.0 million pesos

Financial Structure:

Source	Type	Amount	%
CESPT	Equity	\$133,000,000	26
NADB	Loan	\$380,000,000	74
Total:		\$513,000,000	100

Dedicated Revenue Source

Revenue Source: CESPT's Revenues.

4.b Legal Considerations

Project Administration: The project will be managed by the CESPT, who has trained staff to manage the proposed infrastructure and address any potential emergency related to the operation and maintenance of the project.

Financing status: Loan contract to be signed once project is certified.

The loan authorized through this certification is not limited to fund the projects described in this document, it can also fund future projects certified by BECC including BEIF projects.

Pending Issues:

None.

Criterion Summary:

The project complies with BECC's Financial Feasibility criteria

5. Public Participation

5.a Community Environmental Infrastructure Projects – Community-wide impact

Local Steering Committee

Date of Establishment: The Steering Committee was formally installed on October 10th, 2008 at a meeting held in CESPT facilities.

Steering Committee Members: At this meeting, a board of directors was elected, comprised of the following individuals:

Chairperson:	José Luis Contreras Valenzuela,
Secretary:	Filiberto Enríquez Juárez,
Treasurer:	Alonso Vázquez Hernández
Alternates:	Manuel Becerra, Daniel Romero Mejía Karla Camacho, Gustavo Hernández

Date of approval of Public Participation Plan: The Comprehensive Community Participation Plan developed by the Steering Committee was approved by the BECC on October 11, 2008.

Public Access to Project Information

Public access to project information: The project's technical and financial information was made available to the public for review. The Steering Committee, with assistance from the project sponsor, prepared the following:

- Flyers
- Power Point Presentation

The above was used to inform the community about the project.

Additional outreach activities:

- Development and distribution of a project fact sheet
- Project surveys to document the community's concerns or support for the project

Public Meeting: Advance notice to announce the Public Meeting was published in "El Mexicano," a local newspaper, on October 5th, 2008.

The meeting was used to inform the public about the technical and financial aspects of the project. The meeting was held at 10:00 hrs on November 5th, 2008 at the CESPT parking lot. Attendees included the Local Steering Committee, as well as CESPT representatives. The meeting was attended by more than 200 residents of which 83 answered a project survey. 99% of those surveyed said they were able to fully understand the project and explicitly expressed their support.

Final Public Participation Report

Final report:	The Local Steering Committee and the sponsor prepared the Final Public Participation Report to demonstrate that the proposed objectives were fully met to BECC's satisfaction.
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Post-Certification Public Participation Activities	
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Post-Certification Activities:	The project sponsor, in coordination with the Local Steering Committee, provided a general description of public participation activities that may be carried out after the project's certification to support its implementation and long-term feasibility.
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Pending Issues:

None

Criterion Summary:

The project complies with BECC's Public Participation Criteria
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6. Sustainable Development

6.a Human and Institutional Capacity Building

Project operation and maintenance:

The project sponsor will be the agency responsible for operating and maintaining the system as it relates to:

- Wastewater treatment
- Water distribution
- Wastewater collection

The applicant has the basic institutional and human capacity to operate and maintain the following:

- Proposed wastewater treatment system
- Proposed wastewater collection system
- Proposed water treatment system
- Proposed water distribution system
- The sponsor has as pretreatment program

Human and institutional capacity building:

Actions within the scope of the project that contribute to institutional and human capacity building for the Comisión Estatal de Servicios Públicos de Tijuana (CESPT) include:

- Provide and improve drinking water distribution, wastewater collection, and treatment services in a continuous, efficient, and cost-effective approach.
- Operate a drinking water distribution, wastewater collection and treatment system that meet applicable local, state, and federal regulations.
- Operate a wastewater collection and treatment systems that meet regulations applicable to the utility's operating staff throughout its different areas, providing essential services for the needs of the community.
- Provide training and continuing education to the utility's operating staff throughout its different areas, to offer essential services that meet the needs of the community.
- Optimize the use of scarce water resources, and raise public awareness about the importance of water for the development of the community.
- Basic technical training to the operations and maintenance staff responsible for the new infrastructure that will be built as a result of the project's implementation.

Additional plans or programs:

The sponsor currently manages an educational program called "Cultura del Agua" (Water Education), which aims to promote water conservation and the efficient use the water resource among the community.

There is also a water reclamation program call "Proyecto Morado" (Reuse Program) this program includes the development of treated

wastewater studies to find reuse alternatives and proper implementation.

Currently the sponsor uses the effluent from the Rosarito Norte WWTP for irrigation and landscaping purposes and intends to use part of the treated effluent from Rosarito I WWTP for irrigation in Playas de Rosarito "City Park."

6.b Conformance to applicable Local, State, and Regional Regulations and Conservation and Development Plans.

Local and Regional Plans addressed by the project:

The proposed project conforms to applicable plans and actions described in the following documents:

- Master Plan for Improvements to Water, Wastewater and Collection Services
- State Development Plan
- Municipal Development Plan
- The Municipal Development Plan sets the need to develop basic sanitary infrastructure in Tijuana, such as wastewater collection and treatment services.
- The implementation of the project will eliminate risks inherent to inappropriate wastewater management, and treated water will be available for reuse.
- From a regional planning standpoint, the project incorporates actions and tasks included in the National Hydraulic Program (*Programa Nacional Hidráulico*, PNH), such as the reduction of water contamination in a watershed deemed to be a priority to the PNH due to its bi-national condition due to shared water body in the Pacific Ocean.
- The project adheres to the U.S.-Mexico Border 2012 Environmental Program by meeting Goal 1 (Reducing water contamination) and Objectives 1 (promoting an increase in the number of household connections to wastewater collection and treatment services) and 4 (promoting improve water utility efficiency). One of the program's guiding principles is to reduce major risks to public health and conserving and restoring the natural environment.

Laws and regulations met by the project:

The project meets applicable federal regulations pursuant to wastewater collection, treatment, and final disposal.

Impacts to neighboring communities in the U.S.:

The development of this project will prevent untreated wastewater from being discharged into the Pacific Ocean.

6.c Natural Resource Conservation

- The project contributes to reduce environmental deterioration

by installing pipelines that will collect and convey wastewater to treatment facilities, so as to reduce contamination to water bodies and human health hazards resulting from the discharge of raw wastewater.

- The final design includes the implementation of green building practices as part of the technical construction specifications.
- The project contributes to reduce environmental deterioration by expanding existing wastewater collection lines and providing the necessary means to connect 100% of the project area to this service. Wastewater will be collected and conveyed to the new WWTP to improve its quality, so as to reduce aquifer contamination and human health hazards resulting from the discharge of raw wastewater to streams or agricultural drains.

6.d Community Development

- The completion of this project is crucial for the development of the community. The tasks proposed by the project will contribute to the appropriate disposal of wastewater, which will reduce the proliferation of water-borne and arboviral diseases.
- The implementation of wastewater collection systems will promote community development, as it will reduce contamination in the city and improve the quality of life for local residents.
- Treated wastewater will be available for other uses, including agricultural and urban public purposes.
- The project will help the city achieve greater wastewater collection coverage, which will enhance the development of the community, since it will reduce contamination on the streets caused by wastewater runoff. In addition, it supports the harmonious growth of areas that currently lack this service by promoting the development of other infrastructure such as street paving.

Pending Issues:

None

Criterion Summary:

The project complies with the Sustainable Development Criteria

Available Project Documents:

- Final Design Drinking Water Projects for Granjas Buenos Aires, Ampliación Ejido Lázaro Cárdenas, Tanque Panamericano I, Línea de Impulsión la Encantada y Colector Matanuco, Ampliación Alcatraces, CESPT 2008.
- Final Design, Wastewater Collection systems Aztlán, Independencia and Lomas de Rosarito and WWTP Rosarito I Expansion, CESPT, 2008
- Datos Básicos de proyectos y datos demográficos Tijuana y Playas de Rosarito, CESPT 2008. (Basic Information and Demographic data)
- Análisis y proyecciones de agua residual y saneamiento para Tijuana y Playas de Rosarito. (Wastewater generation and treatment analysis and projections)
- Master Plan for Water and Wastewater management, CDM 2003
- Environmental Assessment Tijuana and Playas de Rosarito Potable Water and Wastewater Master Plan, CDM 2003
- Estudio transfronterizo de impactos ambientales – “Transboundary Environmental Assessment (EA) for the Expansion of the wastewater collection system to unserved areas in the city of Tijuana and Playas de Rosartio, Baja California”, Marzo 2009