CERTIFICATION AND FINANCING PROPOSAL

DESALINATION PLANT
ENSENADA, BAJA CALIFORNIA

Submitted: November 28, 2012

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EXECUTIVE SUMMARY

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Project:	The proposed project consists of the design, construction and operation of a desalination facility with the capacity to produce 250 liters per second (lps) or 5.7 million gallons a day (mgd) located in the city of Ensenada, Baja California (the "Project").
Project Objective:	The purpose of the Project is to increase access to sustainable drinking water service through the development of an additional water supply source, contributing to the preservation of groundwater resources and human health.
Expected Project Outcomes:	The environmental and human health outcomes as a result of the Project include increased drinking water supply capacity by 250 lps (5.7 mgd), in compliance with drinking water quality standards, as well as a reduced demand on groundwater resources to comply with permitted extraction volumes (≤ 692 lps or 15.8 mgd).
Population Benefitted:	96,000 residents of Ensenada, Baja California.[1]
Sponsors:	The state water commission, *Comisión Estatal del Agua de Baja California* (CEA) and GS Inima Environment, S.A.
Borrower:	*Aguas de Ensenada, S.A. de C.V.*, the special-purpose vehicle (the "SPV" or "BOT Contractor") created by *OHL Medio Ambiente Inima S.A.U.*, the company awarded the Build-Operate-Transfer contract (the "BOT Contract") to carry out the Project.
Project Cost:	$637.1 million pesos (US$ 48.3 million).[2]
Loan Amount:	Up to $320.0 million pesos (US$ 24.3 million).

[1] The population benefitted is equivalent to the number of people served by the quantity of drinking water to be produced by the new facility.
[2] Unless otherwise noted, all U.S. dollar figures are quoted at an average exchange rate of $13.19 pesos to the dollar for the month of August 2012 according to Bloomberg.

Uses & Sources:
(Millions of pesos)

Uses	Amount*	%
Construction cost**	$546.0	85.7
Interest capitalization, VAT and other related financial expenses	91.1	14.3
TOTAL	**$637.1**	**100.0**
Sources	**Amount***	**%**
NADB Loan	320.0	50.2
FONADIN Grant	171.5	26.9
BOT Contractor contributions***	145.6	22.9
TOTAL	**$637.1**	**100.0**

* Figures have been updated for inflation by NADB from February 2011 prices, as stated in the BOT Contract

** Includes designs, land acquisition, construction and equipment, supervision, and other related costs.

***The equity contribution committed by the BOT Contractor meets the 25% minimum required in the bid documents in relation to the construction costs defined for that purpose, based on the structure of investment sources set forth in the BOT Contract.

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1. ELIGIBILITY

Project Type

The Project falls within the eligible category of drinking water.

Project Location

The Project is located in the city of Ensenada, Baja California, approximately 82 kilometers (51 miles) from the U.S.-Mexico border.

Project Sponsor and Legal Authority

The Project sponsor is the Baja California state water commission, *Comisión Estatal del Agua de Baja California* (CEA), a public entity legally constituted by state decree issued on March 3, 1999, which established the creation of an independent public authority, with legal capacity and assets, for the purpose of planning and coordinating the actions required to guarantee adequate water infrastructure to serve the community, as well as regulating, organizing and implementing policies to ensure sufficient water supply to meet the state's water service demand.

This Project is being carried out under a BOT Contract in accordance with applicable state legislation in Baja California. OHL Medio Ambiente Inima S.A.U. (Inima), a wholly-owned subsidiary of the South Korean company GS Engineering & Construction, was awarded the contract and is the co-sponsor of the Project. On June 2012, Inima's name was changed to GS Inima Environment, S.A.

Inima created a special purpose vehicle, *Aguas de Ensenada, S.A. de C.V.* (the "BOT Contractor") to implement the Project. Aguas de Ensenada, S.A. de C.V. is a Mexican company created on September 14, 2011. Its contact representative is Mr. Moisés Pariente.

2. CERTIFICATION CRITERIA

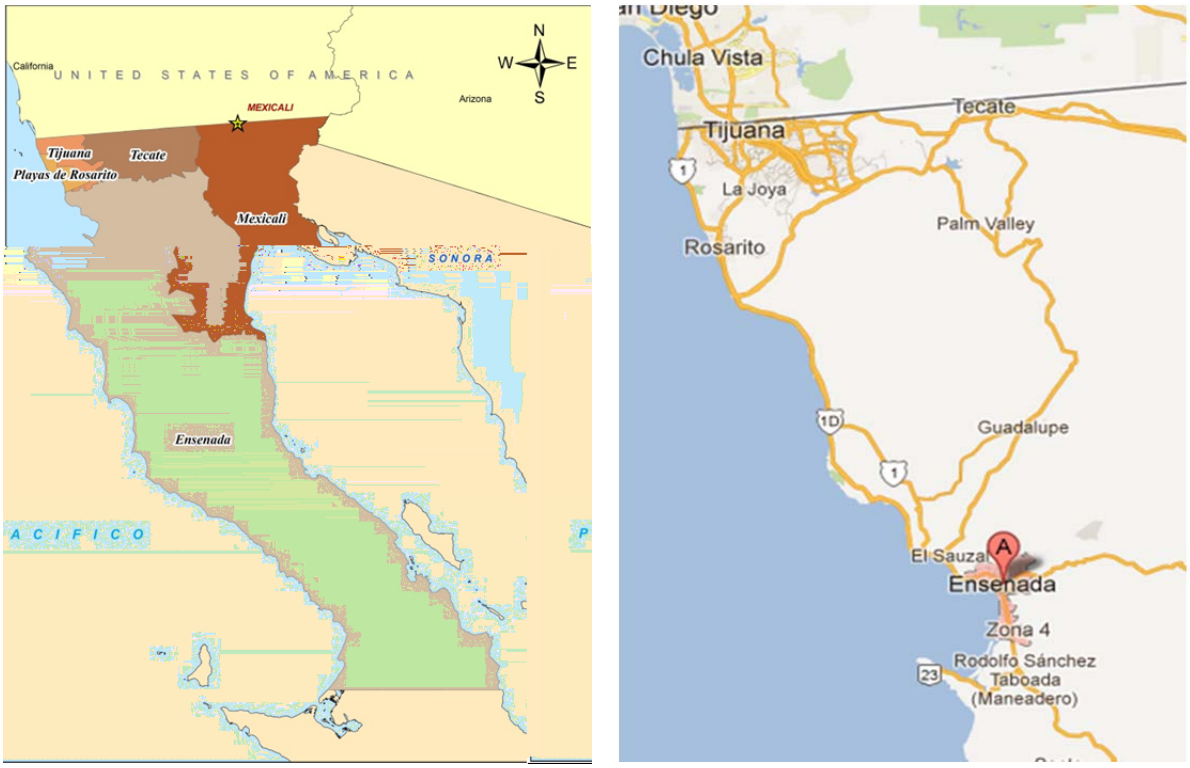
2.1 TECHNICAL CRITERIA

2.1.1. Project Description

Geographic Location

The Project is located in the city of Ensenada in the northwestern region of the state of Baja California, with the Pacific Ocean to the west and the municipality of Playas de Rosarito to the north. Figure 1 shows the approximate geographical location of the Project.

Figure 1
PROJECT VICINITY MAP



General Community Profile

According to population projections for 2012 from the Mexican national population council, *Consejo Nacional de Población (CONAPO)*, Ensenada is the third largest city in the state of Baja California with a population of 306,371.

Ensenada is the municipal seat of the municipality of the same name. The primary economic activity in the area is port services. Ensenada is also home to the most important wine industry

in Mexico. Although the municipality of Ensenada is the largest of the five municipalities in the state of Baja California, it accounts for 15% of the population and 13% of the economic activity.

Table 1 shows the status of current services in Ensenada.

Table 1
ENSENADA BASIC INFRASTRUCTURE

Water System			
Service coverage:*	99%		
Sources of supply:	34 groundwater wells extracting from the Guadalupe, La Misión, Maneadero and Ensenada Aquifers and surface water from the Emilio Lopez Zamora Dam (see water treatment facility below).		
Number of hookups:*	110, 685		
Treatment facilities:	**Plant**		**Capacity**
	Emilio Lopez		150 lps (3.4 mgd)
Wastewater Collection System			
Service coverage:*	91%		
Number of connections:*	96,657		
Wastewater Treatment			
Service coverage:	100 %		
Treatment facilities:	**Plant**	**Type**	**Capacity**
	El Naranjo	Activated sludge	500 lps (11.4 mgd)
	El Sauzal	Activated sludge	120 lps (2.74 mgd)
	El Gallo	Activated sludge	200 lps (4.57 mgd)
Solid Waste			
Solid waste collection:**	> 92.5 %		
Final disposal:	Landfill		
Street Paving			
Street paving coverage:**	65 %		

* Source: CEA, June 2012
** Source: http://www.e-local.gob.mx/work/templates/enciclo/.

Local Water Resources

Water and wastewater services are provided by the local utility, *Comisión Estatal de Servicios Públicos* (CESPE). The utility obtains drinking water from local aquifers that have been severely depleted and experienced seawater intrusion in recent years. The region's dry climate and the limited sources of water suitable for human consumption jeopardize the water utility's capacity to provide reliable and sustainable drinking water services to the growing population.

Ensenada obtains its water supply from both groundwater and surface water sources. Groundwater comes from the Guadalupe, La Mision, Maneadero and Ensenada Aquifers and surface water from the Emilo Lopez Dam, which collects storm water. The following table describes the installed infrastructure for providing drinking water to the city of Ensenada.

Table 2
ENSENADA DRINKING WATER SUPPLY INFRASTRUCTURE

Source	No. of Wells	Related Infrastructure	Delivery Point
Emilio Lopez Dam	0	Treatment plant (150 lps)	Valle Verde storage tank
Guadalupe Aquifer	10	35-km (21.7 miles) pressurized transmission line	Morelos storage tank
La Misión Aquifer	4	25-km (15.5 miles) pressurized transmission line	Morelos storage tank
Ensenada Aquifer	14		Direct to drinking water system
Maneadero Aquifer	6	25-km pressurized transmission line	Direct to drinking water system

Source: Comprehensive Water Program for Ensenada, March 2008.

The volume of water available for Ensenada through its allocation of water rights is around 692 lps (15.8 mgd), which come mainly from overexploited aquifers.[3] Table 3 presents 2012 data related to water extraction (demand) versus the permitted water allowance for the city of Ensenada. The table shows that demand in most of the aquifers has surpassed all allowable water pumping and indicates that in the last six months a water deficit of 61 lps (1.4 mgd) has been compensated by overexploiting the existing aquifers.

Table 3
WATER PERMITTED VS. WATER PUMPED
(Liters per second)

Source	Permit	Volumes
Guadalupe	150	173
La Misión	212	173
Pozos Ciudad	130	134
Maneadero	200	234

Source: CEA, June 2012

It is important to note that, although the flows reported for the La Misión Aquifer have not exceeded the allowable volumes for the city of Ensenada, the aquifer also provides water to other communities in the municipality.

[3] Source: *Programa Integral del Agua de Ensenada, marzo de 2008* (Comprehensive Water Program for Ensenada, March 2008)

The most overexploited aquifer is the Maneadero, which accounts for 30% of the city's water supply. According to a study conducted by the Mexican national water agency, CONAGUA, the aquifer is being depleted and the water quality has been compromised by seawater intrusion. CONAGUA reported an annual deficit of 4.96 Mm^3 (1.31 billion gallons) for this aquifer, which reduces storage volumes and allows seawater intrusion, jeopardizing the aquifer's hydraulic capacity to respond to emergencies and severe droughts.[4]

Currently, Ensenada's water utility serves approximately 300,000 residents in the urban area. By 2030, it is estimated that roughly 120,000 new residents will demand water service in Ensenada, which does not take into account commercial and industrial needs.[5] As Ensenada's water demand grows, additional water sources will have to be found, not just to reduce the high demand on groundwater and the associated environmental impacts, but also to provide safe drinking water, as the quality of the water in the aquifers is being compromised by overexploitation.

The Ensenada utility, in coordination with Baja California University, conducted water quality studies on the Maneadero and Guadalupe Aquifers. The water quality parameters were compared to the Mexican standard for drinking water (NOM-127-SSA1-1994) and indicated that groundwater from both aquifers complied with permissible limits for antimony (Sb), zinc (Zn), lead (Pb), copper (Cu), cadmium (Cd) and arsenic (As), but exceeded the permissible levels for selenium (Se), total dissolved solids (TDS) and nitrates. The studies also showed that the salinity of the aquifers has increased and that seawater intrusion and agricultural activities have influenced the water's characteristics.

The water coming from the Maneadero Aquifer complies with the bacteriological parameters, as well as the physical parameters for turbidity and odor; however, it exceeds the maximum allowable limits for hardness and chloride. There is also a problem of elevated dissolved solids, which is directly associated with seawater intrusion. Water samples showed a chloride concentration of 1,840 mg/liter, seven times the maximum limit of 250 mg/liter.

According to Ensenada's water management plan, an estimated 30% of the city's water supply does not comply with the standards for hardness and salinity levels. The Project is expected to decrease demand on groundwater supply, which is expected to help improve current aquifer conditions and the water quality.

Project Scope and Design

The Project consists of the design, construction and operation of a 250 lps (5.7 mgd) seawater desalination facility with all its appurtenances. The major Project components include:

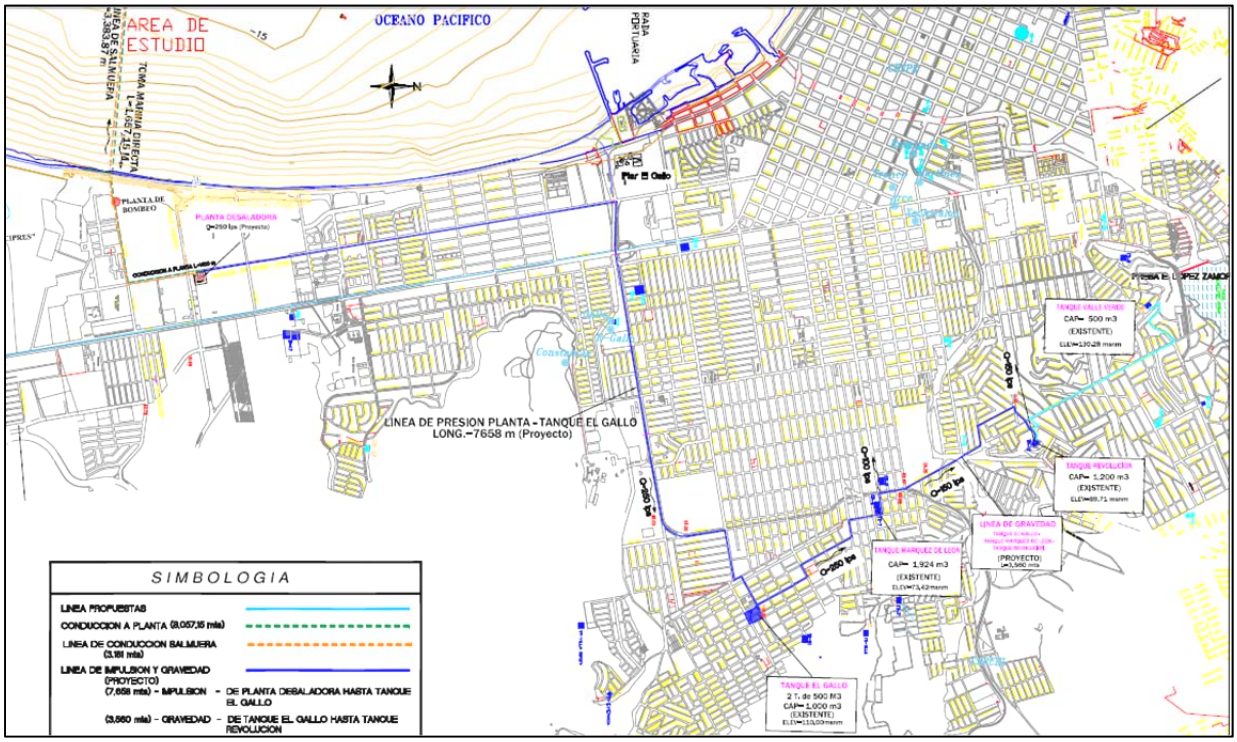
- A direct seawater intake;
- Pretreatment facilities, pump station and water lines;

[4] Source: CONAGUA, *Plan de Manejo Integrado del Agua para el Acuífero de Maneadero, B.C., 2003*, (Comprehensive Water Management Plan for the Maneadero Aquifer).
[5] Source: CEA, Cost-benefit analysis for the construction of the desalination plant in Ensenada, B.C., 2006.

- A reverse osmosis seawater treatment plant;
- Post treatment facilities;
- A conveyance system for discharging concentrate into the ocean;
- Storage tank, pump station and water lines to connect to Ensenada's drinking water distribution system; and
- Ancillary civil works (buildings, roads, etc.).

Figure 2 shows the general location of the Project components throughout the city of Ensenada.

Figure 2
MAP OF PROJECTS COMPONENTS



The desalination plant is located south of Ensenada's urban area. The plant site is currently zoned for industrial use and will require a specific zoning approval from the municipal authority, for which the Project sponsor has submitted a formal request. The desalination plant will occupy an area of approximately 18,893 m^2 (203,363 ft^2) which will include buildings, roads and other structures. The following figures show the location of desalination plant and the site layout.

Figure 3 (a)
LOCATION OF DESALINATION PLANT

Figure 3 (b)
LAYOUT OF DESALINATION PLANT

The selected desalination process uses reverse osmosis (RO) with an energy recovery system. Approximately 500 lps (11.4 mgd) of seawater will feed into the desalination plant through a 36-inch (91 cm) direct seawater intake structure that will be installed up to 16 meters (52.5 ft) deep and 1,657 meters (5,436.4 ft) offshore. A pump station and approximately 1,400 meters (4,593.2 ft) of pipeline will be installed inland to convey the flows to a pretreatment facility and then to the RO membranes through an RO feed pump and a booster pump system. The desalinated water produced by the seawater reverse osmosis process will be approximately 50% of the 500 lps from the seawater intake and the remaining concentrated solution will be returned to the ocean.

The concentrate will be discharged through a 24 inches (61 cm) diameter ocean outfall that will be installed 18 meters (59 ft) deep and 1,983 meters (6,506 ft) offshore. The conveyance line from the plant to the shore will be 1,400 meters (4,593.2 ft) long. The concentrate will be treated prior to discharge to comply with the quality requirements for discharges into the ocean, as well as with any other quality standards required by CONAGUA in the discharge permit. Additionally, the ocean outfall will have a set of diffusers to improve concentrate dilution and minimize negative environmental impacts on the them.0 Tc <0003>Tj /TT0 1 1 Tf 1.0569 .7172 0 TD

station will be installed to convey the drinking water to the primary delivery point established in the Water Delivery Agreement signed by CEA and CESPE (WDA), an existing storage tank called "El Gallo" from which pipelines will be installed to distribute flows by gravity to the Marqués de León and Revolución storage tanks.

In 2011, CEA initiated a bidding process to award a multi-year Build-Operate-Transfer (BOT) contract for implementation of the Project. In August 2011, CEA awarded the 20-year BOT Contract to OHL Medio Ambiente Inima S.A.U. to construct and operate the desalination plant. The company will transfer the asset to the State upon termination of the BOT Contract.

The BOT Contract includes design (including environmental clearance and permitting tasks), construction, equipment, testing, operation and maintenance over a 20-year period. Works are expected to begin in December 2012 and be completed by August 2014. The following table shows the proposed schedule for Project implementation.

Table 4
PROJECT MILESTONES

Key Milestones	Status
FONADIN grant	Secured
BOT Contract	Signed
Environmental Authorization from SEMARNAT	Issued
Land Use / Zoning Approval from Municipality	In progress
Land acquisition and right of ways	In progress
CONAGUA permits	In progress
Power supply contract	In progress
Development of final design and associated studies	To begin January 2013
Construction and commissioning	August 2014

SEMARNAT = Mexican Ministry of Environment and Natural Resources

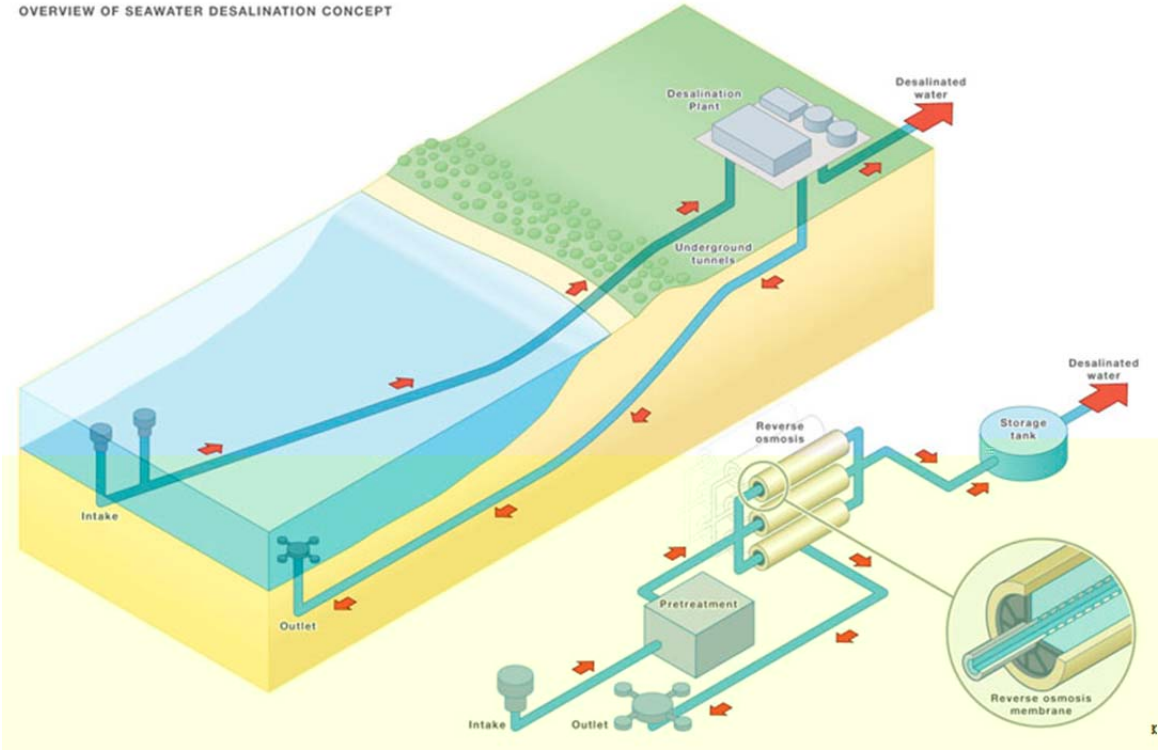
2.1.2. Technical Feasibility

As part of a

Selected Technology

Based on the studies that determined desalination was the most suitable option for increasing Ensenada's water supply, CEA developed the preliminary engineering provided to the bidders for consideration in their proposals. The technology specified for the desalination of seawater is reverse osmosis (RO). This process involves pressurizing seawater to force it through a semi-permeable membrane while the salts, microorganisms and other impurities are retained in the form of a concentrated solution that eventually will be discharged back into the ocean. Figure 4 illustrates a typical RO desalination process.

Figure 4
RO DESALINATION CONCEPT



CEA established bid requirements for the construction of the desalination plant, aimed at guaranteeing: 1) a minimum flow of 250 lps of drinking water; 2) maximum energy efficiency; 3) a salinity level of less than 500 ppm for the product; 4) minimum quantities for all chemical products required in the process; 5) no more than a week of downtime during each operating year for maintenance; 6) a minimum of 8 months between each general cleaning; and 7) a specified replacement rate for RO membranes. Inima's proposal was the most cost effective that complied with the bid evaluation criteria and the requirements for selection and award of the BOT Contract.

The most significant cost in operating a desalination plant is energy. Inima proposed using pressure exchangers and a volume regulation system to optimize energy use and hence reduce operation costs. This technology is widely proven by Inima, a company that has extensive

worldwide experience in the construction and operation of desalination facilities. Moreover, Inima has been successfully operating the 200 lps (4.57 mgd) desalination plant in Los Cabos, Baja California Sur, since 2006.

The Project's final designs will be developed based on the preliminary engineering, the characterization of the water, the design parameters and technical standards issued by CEA/CESPE, and the technical specifications contained in the Water, Wastewater Collection and Treatment Manual prepared by CONAGUA. Based on the approval of the Mexican Environmental Impact Statement (MIA), Inima will begin developing final designs.

The concentrate resulting from the desalination process will comply with Official Mexican Standard NOM-001-SEMARNAT-1996, as well as with any other quality parameter required by CONAGUA in the discharge permit.

Prior to entering the water distribution system, desalinated water will be treated to meet the requirements established by Official Mexican Standard NOM-127-SSA1-1994. This standard establishes treatment processes and quality standards for drinking water for human use and consumption.

In April 2012, CEA received a positive response from CONAGUA regarding the Project's technical feasibility evaluation (Document No. BOO.00.R02.05.1-028/088/0718). CEA, CESPE and the BOT Contractor will work together to obtain all permitting requirements for the plant site and for the seawater intake and disposal facilities. Based on the approval of the MIA, the intake and discharge permits from CONAGUA are expected to be ready for issuance.

Electricity infrastructure is already installed in the area, and in May 2012 the Mexican power utility, *Comisión Federal de Electricidad* (CFE), confirmed the feasibility of supplying 6.5 megawatts to operate the plant on condition that any required infrastructure works would be implemented by the BOT Contractor, including the construction of a substation.

2.1.3. Land Acquisition and Right-of-way Requirements

According to the 2012-2030 Ensenada's Urban Development Program, the site where the desalination facility will be constructed is located on private property zoned for industrial use and requires a special zoning authorization for the proposed use of the site. CEA has submitted its formal request to the municipality to consider the special use zoning approval appropriate for the Project. The project sponsor presented a letter from the municipality signed on October 25, 2012, which indicates that the process to change the land use and to authorize the construction of the project is currently under consideration and is anticipated to be completed within three months. Documentation on the land use and zoning approval is a requirement of the environmental authorization issued by the regulatory authority and will be required prior to loan disbursement.

CEA and CESPE will be responsible for securing the right-of-ways required for the conveyance lines and pump stations, desalination plant site, outfalls and electrical transmission lines. It is

expected that the conveyance lines from the desalination plant to the storage tanks will be installed through existing municipal right-of-ways.

CEA and the BOT Contractor are working on the acquisition of the land. A down payment for the land purchase has been made by the BOT Contractor and a letter of intent to sell has been provided by the land owner. Documentation related to formal land acquisition will be required prior to loan disbursement.

2.1.4. Management and Operations

Under the WDA, CEA, through the BOT Contractor, will sell and deliver 250 lps (5.7 mgd) of potable water to CESPE at the el Gallo storage tank delivery point. The BOT Contractor will be responsible for operating the system from the seawater intake to the delivery point, while CESPE will be responsible for the distribution and operation from that point on.

Inima, the BOT Contractor's parent company, is a global leader in reverse osmosis desalination concessions. Inima has been operating in the water industry since 1954 and has a long track record using desalination by reverse osmosis with facilities currently producing more than 200,000 m^3 per day worldwide, including the facility serving Los Cabos, Baja California Sur. Inima has expertise in developing and operating all types of water treatment plants, including drinking water, residential and industrial wastewater, pilot and experimental plants, tertiary and recycling treatment, sludge treatment, ultra-pure and special water plants and desalination plants. Inima is involved in all phases of the development process, including design, engineering, construction, finance, operation and maintenance.

Preventive maintenance will take precedence over corrective maintenance. This means that planned activities, specific objectives and procedures will be followed to guarantee the optimal and efficient operation of the plant. This goal will be achieved through well-trained and qualified technical staff and operators with in-depth knowledge of how the system and its related elements operate. The maintenance and operation system will be optimized by:

- Following a regular maintenance work plan to reduce emergency repairs by eliminating or limiting the risks associated with material defects and equipment breakdowns;
- Minimizing low process performance or unplanned plant downtime due to equipment problems by improving the conditions of its inputs for efficient operation;
- Undertaking repair work under the best possible conditions;
- Avoiding unnecessary and excessive energy consumption by keeping equipment in optimal working order

As-built plans and the Operations and Maintenance Manual will be available with all the information related to the system components, including vendor, brand, model, type, plans, installation and operating conditions, lists of spare parts and materials, greasing and lubricating specifications and other maintenance conditions. An adequate stock of spare parts, workshop areas and equipment will support this effort.

Under the WDA, CEA agrees to guarantee an annual delivery of 7.88 million cubic meters of bulk water (equivalent to 250 lps or 5.7 mgd) as defined in the BOT Contract, to CESPE for a specified fee. The bulk water delivery will start at the same time as operations begin under the BOT Contract. When the BOT Contract expires, CESPE will assume operation of the plant or contract its operation to a third party.

2.2 ENVIRONMENTAL CRITERIA

Environmental impacts are major factors in the design and implementation of desalination technologies. An acceptable desalination plant is expected to meet environmental regulations, and be cost-effective in terms of construction, operation and management, as well as the costs associated with monitoring and permit fees. Some major environmental concerns include issues related to the location of desalination plants and water intake structures, as well as concentrate management and disposal.

The main objective of the Project is to relieve the current water supply deficit in the Ensenada region (see Table 3), which faces an annual 2.5% water demand increase for urban and commercial use. Additionally, it is expected that Project implementation will help reduce the depletion of groundwater resources in the area. If a solution is not implemented by 2030, CEA estimates a water deficit of approximately 600 lps (13.7 mgd). [6]

2.2.1. Compliance with Applicable Environmental Laws and Regulations

Applicable Laws and Regulations

The construction of a desalination plant in Ensenada is subject to federal environmental authorization in accordance with Mexico's General Law of Ecological Balance and Environmental Protection and environmental impact assessment regulations. Additionally, seawater intake and ocean discharge permits are required in accordance with Mexico's National Water Law.

The Project must also ensure the ability of the infrastructure to meet the following applicable environmental laws and regulations:

- 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.
- Official Mexican Standard NOM-041-SEMARNAT-1996, which establishes the permissible levels for gas emissions of contaminants from vehicles that use gasoline as a fuel.
- Official Mexican Standard NOM-052-SEMARNAT-1993, which establishes the list and characteristics of hazardous solid wastes and establishes toxicity levels

[6] Source: CEA, Cost-Benefit Analysis for the construction of the desalination plant in Ensenada, BC, 2006.

- Official Mexican Standard NOM-080-SEMARNAT-1994, which establishes the noise permissible levels from motor vehicles under circulations and monitoring methods.
- Official Mexican Standard NOM-081-SEMARNAT-1994, which establishes the noise permissible levels from fixed sources and monitoring methods.
- Baja California Environmental Protection Law
- Mexico's General Law of Ecological Balance and Environmental Protection
- Environmental Impact Assessment Regulation
- Regulation on use and exploitation of national ocean waters, navigable water, beaches and federal zones.

Environmental Studies and Compliance Activities

Pursuant to the provisions of the General Law of Ecological Balance and Environmental Protection and environmental impact assessment regulations, SEMARNAT, required an Environmental Impact Assessment (MIA). The scope of work under the BOT Contract specifies that the BOT Contractor will be responsible for the following activities.

- Oceanographic conditions study
- Environmental impact study (MIA)
- Risk analysis study
- Environmental management plan
- Water intake permit
- Concentrate disposal discharge permit

The studies were prepared and submitted to SEMARNAT on June 28, 2012. The information presented to SEMARNAT was reviewed and additional information was required. On August 21, 2012, SEMARNAT issued Document DFBC/SGPA/UGA/DIRA/2843/12, requesting additional information related to the construction process, environmental impacts and mitigation measures within a period of 60 days in order to continue with the authorization process. The Project sponsor presented the requested information on September 28, 2012. SEMARNAT authorized the Project with the official document No. DFBC/SGPA/UGA/DIRA/3496/12 issued on October 31, 2012 after a determination was made that the project complies with all the requirements of the Mexican environmental clearance process.

CONAGUA determined that the Project is technically feasible and indicated that, in order to consider issuance of the intake and discharge permits, as well as any other right-of-way authorization under its jurisdiction, the environmental clearance must be submitted, along with other legal documentation and the payment of water rights.

Pending Environmental Tasks and Authorizations

- CONAGUA's water intake permit
- CONAGUA's concentrate disposal discharge permit

Compliance Documentation

The environmental impact assessment was authorized by the SEMARNAT. Documentation related to the environmental clearance authorizations of the proposed Project have been made available to the two institutions. Documentation of any pending rulings from CONAGUA will be received prior to the disbursement of funds.

Compliance documentation currently available for the Project includes:

- MIA resolution (MIA) – **No. DFBC/SGPA/UGA/DIRA/3496/12**
- SEMARNAT response letter requesting additional information, record No. DFBC/SGPA/UGA/DIRA/2843/12

2.2.2. Environmental Effects/Impacts

Existing Conditions and Project Impact – Environment

Additional water supply for the Ensenada region is critical. According to CEA, water demand has surpassed the region's water supply capacity since 2005, which has led to overexploitation of the aquifers.

As described in the section on *Local Water Resources,* supply sources for the city of Ensenada include groundwater and surface water. Groundwater comes from the Guadalupe, La Mision, Maneadero and Ensenada Aquifers, and surface water comes from the Emilo Lopez Zamora Dam, which collects storm water. Most of the aquifers are used for drinking water supply and agriculture, and the volume extracted has exceeded the permit limits established by CONAGUA for several years. This practice has resulted in negative environmental impacts to some of the aquifers in the region, as well as a threat to human health by influencing decreased water quality.

The most overexploited aquifer is the Maneadero. CONAGUA and CESPE have conducted several studies demonstrating that the current volume of extraction exceeds the recharge volume. Additionally, there are water quality problems as a result of seawater intrusion. It has been found that the water quality standard for hardness and chloride exceed permissible limits and the water extracted from this aquifer goes directly to the drinking water distribution system. Since the Maneadero Aquifer provides 30% of the city's water supply, finding a solution to protect this water source is critical.

As a result, future demand will have to rely on alternate sources of sustainable water supply such as desalination facilities, along with improvements in efficiencies and water reuse. To close the gap between demand and supply, CONAGUA envisions that almost a third of the water supply in the Baja California Administrative Region will come from desalination plants.[7]

[7] Source: CONAGUA, *Programa Hídrico Regional Visión 2030* (2030 Vision Regional Water Program), March 2012.

Desalination technologies were introduced about 50 years ago and were able to expand access to water, but at a high cost. Development of new and improved technologies has now significantly broadened the opportunities to access major quantities of safe water in many parts of the world. Costs are still significant but there has been a reducing cost trend, and the option is much more widely available. When the scenario is not having water or having inadequate water, in many circumstances it will be necessary to accept a higher cost.[8]

A list of environmental impacts and mitigation measures for the Ensenada desalination plant were described and evaluated in the environmental impact assessment submitted to SEMARNAT for review. Although the proposed Project offers several human health, socio-economic, and environmental benefits by providing a reliable supply of drinking water, there are also potential negative impacts. The negative impacts are associated with the seawater intake and the disposal of concentrate and chemicals which may impair coastal water quality and affect marine life. Additionally, concerns have been documented based on the link between the high energy demand of the desalination process and related air pollutant emissions.

Minor impacts are also anticipated during the construction process. These impacts include noise and pollutant emissions due to the use of motor vehicles, earthworks, pumps and building machinery; disruption to the environment due to the construction of the ocean intake, outfall and pipelines; and temporary roadway blockages.

Mitigation Measures

During the implementation and operation of the Project, measures will be taken to mitigate the temporary effects of construction, as well as to minimize negative impacts during operation. The mitigation measures proposed by the BOT Contractor are:

- *Construction process:*
  - Application of treated wastewater to reduce fugitive dust emissions.
  - Vehicle tune ups to reduce emissions.
  - Compliance with Mexican standard NOM-080-ECOL-1994, which establishes the maximum permissible levels of noise from motor vehicles, motorcycles, and 3-wheel motor vehicles, as well as noise measuring methods.
  - Stone materials required for construction should be obtained from local quarries.
  - Excavations will only be performed in areas previously identified by the Project.
  - In-fill activities will be performed, preferably, with the material from the excavations whenever appropriate.
  - All solid wastes will be classified and disposed according to applicable procedures and in facilities designated by the authorities. A specialized solid waste management contractor will be hired for this purpose.
  - Restoration of removed vegetation.

[8] Source: World Health Organization, Public Health and the Environment, “Desalination for Safe Water Supply”, 2007.

- Placement of warning signs to prevent potentially hazardous situations.
- Restoration of sandy shoreline.

- *Operation of desalination plant and ocean intake and outfall facilities:*
  - Analysis of existing streams and flow currents in the Project area to minimize streams or creek deviations.
  - Dilution of the reject stream or concentrate with treated wastewater from the El Naranjo WWTP, before discharging into the Ocean.
  - Dispersal of the discharge plume by installing a diffuser system at the end of the ocean outfall.
  - Inspection of quality and functioning of the equipment and infrastructure to avoid pollution or process disruption caused by equipment failures.
  - Implementation of operation and resting intervals in the desalination plant to allow natural restoration of ocean water and marine organisms.
  - Combination of meshed screens and low intake velocities to minimize impingement and entrainment of larger organisms.
  - Energy recovery devices such as a pressure exchanger system will be used to maximize energy efficiencies.
  - Implementation of an environmental management plan to monitor environmental impacts and implementation of mitigation measures including training of human resources to perform this task.

Additional measures or requirements stipulated by the regulatory agency include a special emphasis on avoiding impacts to the La Lagunita wetland located near the intake infrastructure, on providing monitoring reports for water quality of the sea water during construction and for the first 3 years of operation, and on following of all mitigation measures described in the MIA. Any violation by the BOT Contractor to implement the mitigation measures and to demonstrate proper follow up will result in a suspension of the authorization for the Project by SEMARNAT.

Natural Resources Conservation

The objective of the Project is to preserve groundwater aquifers in the region. Diversifying water sources provides an important benefit in conserving natural resources since the aquifers that supply water to the region are currently overexploited. Weather variability is high, which also makes it difficult to obtain water from other sources. The Project will improve water supply reliability and will increase resilience to drought or the potential effects of climate change in the region.

Although this project type does present risks of negative impacts, the BOT Contract indicates a priority for protecting the coastal ecosystem, as well as addressing any other environmental impacts and mitigation measures during the design, construction and operation of the Ensenada desalination plant. The Environmental Management Plan that will be required for the Project

will establish the necessary mitigation measures during the design, construction and operation phases of the Project.

Existing Conditions and Project Impact – Health

Access to sufficient quantities of safe water for drinking and domestic use, as well as for commercial and industrial applications, is critical to health and well-being, and offers the opportunity to achieve human and economic development. People in many areas of the world have historically suffered from inadequate access to safe water. As the world population grows, the availability of limited quantities of fresh water decreases.[9]

An individual may become ill after drinking water that does not meet drinking water standards, 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. Projects to improve access to potable water service help improve a community's public health.

Transboundary Effects

No negative transboundary impacts are anticipated as a result of the implementation of this Project.

2.3 FINANCIAL CRITERIA

2.3.1. Sources and Uses of Funds

The total cost of the Project is $637.1 million pesos, which includes engineering design, supervision, construction, equipment, testing and other related expenses. This figure is estimated by NADB based on the February 2011 prices established in the BOT Contract, as updated by inflation estimated for the construction period. The Sponsor has requested a loan from the NADB for up to $320.0 million pesos. The Project has been awarded a grant from FONADIN, to complete the financial package of the Project.[10] Table 5 shows a breakdown of the uses and sources of funds.

[9] Ibid.
[9] On May 12, 2008, the FONADIN Technical Committee awarded the grant for an amount equal to $162,353,787 pesos at February 2011 prices.

Table 5
PROJECT COSTS AND SOURCES
(Millions of pesos)

Uses	Amount*	%
Project construction cost**	$546.0	85.7
Interest capitalization, VAT and other related financial expenses	91.1	14.3
TOTAL	**$637.1**	**100.0**
Sources	**Amount***	**%**
NADB Loan	320.0	50.2
FONADIN Grant	171.5	26.9
BOT Contractor Contributions***	145.6	22.9
TOTAL	**$637.1**	**100.0**

* Figures have been updated for inflation by NADB from February 2011 prices, as stated in the BOT Contract.
** Includes designs, land acquisition, construction and equipment, supervision, and other related costs.
***The equity contribution committed by the BOT Contractor meets the 25% minimum required in the bid documents in relation to the construction costs defined for that purpose, based on the structure of investment sources set forth in the BOT Contract.

The Project's proposed payment mechanism is consistent with financial structures for BOT contracts implemented in Mexico. CESPE will pay CEA for the water produced by the Project, and CEA will transfer that payment to Aguas de Ensenada S.A. de C.V., the special purpose company created to build and operate the Project ("BOT Contractor"). The BOT Contractor will pay NADB the corresponding debt service, as well as the service fees corresponding for the operation of the Project and the return on investment.

CESPE will provide an irrevocable, contingent, revolving line of credit as a guaranty to cover the BOT Contract service fees. This line of credit is also collateralized by a pledge of the State of Baja California's federal tax revenue ("*participaciones*") as guaranty and/or alternate source of payment. A trust mechanism will be created for the flow of funds, including the source of payment and the guaranty.

NADB performed a financial analysis of CESPE as a source of payment and of the State of Baja California as the guarantor. The cash flow projections indicate CESPE and Baja California can undertake the financial obligations under the BOT Contract. However, the analysis reveals that CESPE needs to improve its operating results by either increasing its service revenue or reducing operating costs or both; otherwise its capacity to fund its needed capital expenditure plan may be jeopardized, and the contingent line of credit may have to be utilized.

Considering the Project's characteristics and based on the financial and risk analyses, the proposed Project is considered financially feasible and presents an acceptable level of risk. Therefore, NADB proposes providing a market-rate loan of up to $320.0 million pesos to Aguas de Ensenada, S.A. de C.V. for the Project.

3 PUBLIC ACCESS TO INFORMATION

3.1 PUBLIC CONSULTATION

BECC released the Project proposal for a 30-day public comment period beginning October 3, 2012. The following Project documentation is available for public access:

- *Manifestación de Impacto Ambiental, Captación y desalación de agua de mar, su potabilización, conducción y entrega de 250 lps y la disposición del agua de rechazo en el Municipio de Ensenada, Baja California. Aguas de Ensenada S.A. de C.V., June 2012* (Environmental Impact Assessment)

- *Estudio costo-beneficio de la construcción del proyecto de abastecimiento de agua en bloque mediante desalación de agua de mar para la ciudad de Ensenada, B.C., CEA, October 2006* (Cost-Benefit Analysis for the construction of the desalination plant in Ensenada, B.C.)

- *Programa Integral del Agua de Ensenada, CESPE, IMIP, Baja California, 2008* (Comprehensive Water Plan for Ensenada)

- *Proyecto para el uso sustentable del acuífero de Maneadero, Ensenada B.C., 2002* (Sustainable use for the Maneadero Aquifer, Ensenada, B.C.)

- *Plan de Manejo Integrado del Agua para el Acuífero de Maneadero, B.C., CNA, 2003* (Comprehensive plan to Manage the Maneadero Aquifer)

- *Estudios relacionados con la instalación de una planta desaladora de agua para la ciudad de Ensenada, B.C., CEA-CICESE, 2003* (Studies related to the installation of a desalination plant in Ensenada, Baja California)

- Oficio SEMARNAT DFBC/SGPA/UGA/DIRA/2843/12 (SEMARNAT's response letter)

- Oficios CONAGUA BOO.00.R02.05.1-028/088/0718, BOO.00.R02.04.1-0046/0086 (CONAGUA's response letters)

As a result of the public comment period, BECC received 2 comments related to the Project. All comments received for the Project were carefully evaluated and considered in the Project approval process. The themes addressed by the comments as well as a brief clarification related to those themes are presented below:

Procurement: The procurement process by the state water commission, CEA, was conducted following the Mexican federal law. Seven consortiums presented proposals and the contract was awarded to OHL-INIMA, ranked highest in accordance with the evaluation criteria. One bidder filed an appeal, which was reviewed and dismissed by the applicable federal authority.

Land Use / Zoning: The comment correspondence calls attention to the lack of formal approval for the appropriate zoning of the site proposed for the Project. This authorization is under the jurisdiction of the municipal council and has been requested by the CEA and Project Sponsor. The zoning authorization is anticipated to be determined within the next 3 months.

Environmental Impacts: The comment notes potential impacts to Special Conservation Areas, namely seashore dunes, due to the installation of in-take infrastructure. The Project Sponsor presented relevant mitigation measures in the MIA to minimize the impacts and restore the shoreline once the earthworks have been completed. SEMARNAT issued a MIA resolution authorizing the project in consideration of those proposed measures.

Water Management Practices: The final comment emphasizes the importance of strategies related to water conservation and reuse of water for agriculture and irrigation of public areas. In this case, the distribution infrastructure is the responsibility of the municipal utility. CEA expressed that the municipal utility is aware and working to improve efficiencies within the water infrastructure. The Comprehensive Water Program for Ensenada (March 2008) analyzed different strategies to ensure water supply with sufficient quality. The desalination plant was presented as one of the most cost-effective solutions to address the deficit of water and poor water quality experienced by the city.

3.2 OUTREACH ACTIVITIES

In addition to the public comment period, and as a normal business practice, Project information has been made available to community residents through general newsletters and media coverage of CEA's bidding process. Additionally, the Project Sponsor has conducted outreach efforts to disseminate Project information through presentations to professional and business associations and non-governmental organizations, as well as through press releases. The Project's technical and cost information was made available to the public for review on the CEA website and in PowerPoint presentations.

According to media articles, some organizations have expressed concerns about the environmental impacts of the Project, particularly with respect to the protection of local wetlands and better management of existing water resources through improved system efficiencies. Interest has also been expressed in hearing the authorities' response to these concerns, and the Project sponsor has been asked to communicate the results of SEMARNAT's review of the Project. A summary of the MIA is public information and can be consulted on the SEMARNAT webpage. The document ID is 02BC2012HD028.