A DREAM FOR THE NEW CENTURY

Salton Sea Restoration

Lower Colorado River Water Supply

Power Transmission Component

Economic Development in Mexico

EXECUTIVE SUMMARY

The Salton Trough in the United States and Mexico has been a treasure trove of opportunity during the past century for people in Mexico and the United States. Today, new challenges have arisen and new vision is needed to see the opportunities that these challenges provide.

These opportunities include:

1. **A way to restore the Sea in a manner that makes economic and environmental sense;**
2. **A hydro-electric pumped storage component that could add from 86 to 400 MW of peak period generation to the Imperial Irrigation District (IID) and southern California power system;**
3. **A new transmission path that could support geothermal development in the south-eastern Salton Sea area;**
4. **A new water supply for the Colorado River Basin of as much as 600,000 AFY;**
5. **Economic development for the Cucupah Tribe in Mexico through operating a new flat water recreation area; and,**
6. **A deep water port for Mexicali spurring economic development for northwest Mexico and the southern United States.**

EXECUTIVE SUMMARY

History shows us that comprehensive plans are needed to provide a road map for future action. Water resource development in the Colorado River Basin is a prime example of this approach. 70 years ago a USDOI publication provided such a rad map, A copy is available on the tablethe front of the room for your Inspection.

EXECUTIVE SUMMARY

This publication, dated March 1946 (almost exactly seventy years ago) formed the framework for the great dams and water projects that exist today. It was not perfect in that plans were modified to reflect evolving values. An example is the proposed dams in the Grand Canyon, Marble Canyon Dam and Bridge Canyon Dam. After a historical raft trip down through the Grand Canyon, Sierra Club President David Brower and Reclamation Commissioner Floyd Dominy agreed that these hydro-electric dams would not be built and pumping power or the Central Arizona Project would be provided by the Navajo Generation Station

The ideas proposed in this presentation need to be looked at in a similar context, They need to be vetted through the forums of public opinion and technical refinement. They are offered as a "dream for Calvin," my grandson, who is an eighth grader at Mesa Middle School in El Centro. Luckily, he does not yet suffer from Asthma and my dream is that these ideas can keep him from getting the respiratory illnesses now suffered by so many in the Mexicali and Imperial Valleys.

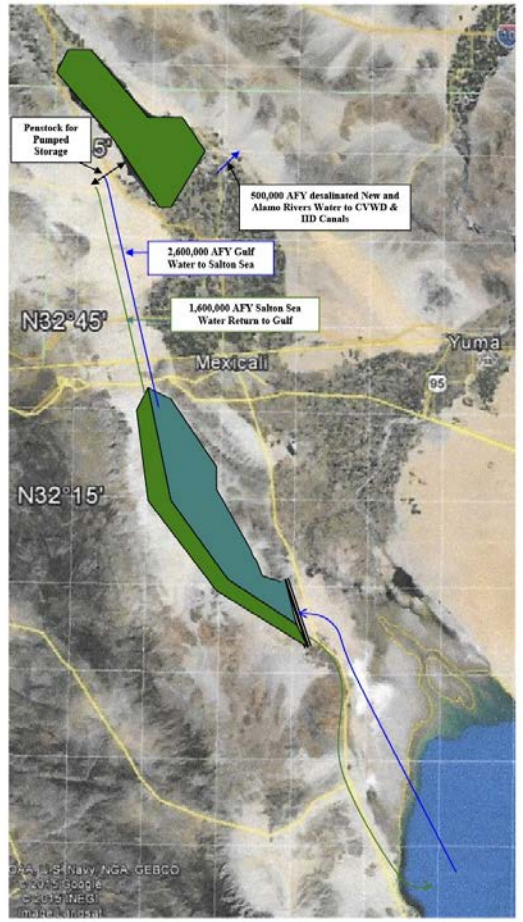
This presentation describes an integrated vision to address interrelated needs and challenges, as follows

Salton Sea Component:

To bring water from the Gulf to the Sea, a 100’ (30 m) high dam would be built at the mouth of the Laguna Salada, providing a source of water near the US/Mexico Boundary. The Cucupah Tribe, which has demonstrated its capability at the Santa Clara Slough would be given the perpetual right to manage all recreational aspects of this impoundment.

A tunnel, power canal, penstock and hydro-electric power would provide peaking power to the southern California electric grid. Discharge from the peaking power plant would be routed along the western and northerly shores of the Sea to minimize disruption of the Sea limnology.

Using the concentrating nature of evaporation from the Sea, the heavier saline water at the bottom of the Sea would be collected into a sump where it would be pumped back to the Gulf using a segregated part of the Laguna Salada impoundment located along its western bank. A canal would take the return water to a location south of San Felipe where an ocean outfall discharge at depth would allow this saline water to be swept south to the Pacific by prevailing currents.



Salton Sea Component – Environmental Considerations

It is recognized that biota transfer between the Gulf and The Sea as well as between the Sea and the Gulf must be prevented. Accordingly, at the north and south ends of the tunnel, fine-mesh traveling fish screens would be installed with the wash water from those screens being sent back to where the water came from. Traveling fish screens allow fish eggs and larvae to pass through posing a further biota contamination concern. The tunnel under the international border will contain an ultraviolet sterilization system to sterilize and kill any fish eggs and larvae before they enter the other country.

The route of the power canal and the return water canal in the United States passes near the El Centro Naval Bombing Range on the West Mesa of the Imperial Valley. Desert Tortoise and other species of concern are also present in this area. Close coordination with the Navy, BLM, FWS, CA G&F and private land owners will be needed as final routes are selected.

Salton Sea Component – Water and Salt Balance

In addition to the salt load coming into the Sea from the Gulf, a sustainable management plan needs to remove the approximately 3.1 million tons per year of salt that enters the Sea from the Mexicali Valley, the Imperial Valley and the Coachella Valley. The following table estimates the quantities of water and salt involved on the proposed program:

Project Water and Salt Balance

Component	Volume (KAFY)	Operates (Hrs/yr)	Capacity (cfs)	Salinity (mg/l)	Salt (1,000 Tons)
Two Laguna Salada Pumping Plants	2,600	8,400	7,490	35,300	124,729
Power Canal & Penstock	2,600	5,000	6,292	35,300	124,729
Return System	1,600	3,400	5,694	58,788	127,829
Net Change	1,000				-3,100

Salton Sea Component – Power and Energy Balance

The 86 MW Pumped Storage Program has a net positive energy value of about $220 million per Year. However, the off-peak base load pumping at the Laguna Salada Dam as well as to remove salt from the Sea results in a net generation deficit of 44 MW. Further analyses may suggest that the generation system should be sized to generate in the 4 hour/day (1,000 Hrs per year) period now being suggested by the CA ISO resulting from expected solar and wind resources – this would increase the peak generation to nearly 450 MW. The following table estimates the quantities of power, energy and value involved on the proposed program:

Project Power, Energy and Value Analysis					
	Dispatch	KW	KwHrs/yr	Value (Cents / KwHr)	Value ($/yr.)
Generation	Peaking for 5,000 Hrs/Yr.	86,370	431,849,392	60	$259,109,635
Return Pumping	Base Load	74,826	374,131,232	6	-$22,447,874
Laguna Salad Pumping	Base Load	55,184	275,920,465	6	-$16,555,228
Net		-43,640	-218,202,304	48	$220,106,533

Salton Sea Component – Cost Estimates

Note: All cost estimates in this document are reconnaissance grade and have not been peer reviewed

Item #	Component	Units	Cost/Unit	Quantity	Total Cost	Basis for Estimate
1	Dredged Channel from Gulf to Laguna Salada Dam ~ 14,000 cfs, 40.88 miles (215,850' dead Level Invert @ -20')	lin. Ft.	$450	215,850	$97,133,000	
2	Pumping Plant ~ 3,200 cfs, TDH=80', 36,300 hp	LS	$17,720,000	2	$35,440,000	
3	Laguna Salada Dam ~ 60' high, 12 miles long (63,560')	mile	$55,000,000	12	$660,000,000	SS Saddle Dam
4	Return Outfall to Gulf ~ 2,500 cfs channel, 97.17 miles (513,100')	lin. Ft.	$120	513,100	$61,572,000	
5	Sheet Pile Separator ~ 65.82 miles long (347,500') 65' long sheet piles.	Sq. Ft.	$40	22,588,000	$903,520,000	
6	Tunnel beneath International Boundary, 6,300 cfs capacity, 8 miles long (42,240'), 35' diameter tunnel	lin. Ft.	$10,000	42,240	$422,400,000	
7	Power Canal ~ 6,300 cfs, 37 miles long (195,360')	lin. Ft.	$550	195,360	$107,448,000	
8	Penstock ~ 21.4' Dia., 6,300 cfs, 4.28 miles long (22,600')	lin. Ft.	$5,000	22,600'	$113,000,000	
9	Power Plant at base of Penstock ~ 6,300 cfs, TDH=310', 250,600 hp	LS		1		
10	Sheet Pile Discharge Training Wall in Sea ~ 29.80 miles (157,300') 40' long sheet piles	Sq. Ft.	$40	6,293,800	$251,752,000	
11	Density Current Collection Channel in Sea ~ 26.42 miles (139,500;)	lin. Ft.	$500	139,000'	$69,500,000	
12	Pumping Plant at base of Penstock ~ 5,700 cfs, TDH=338', 250,600 hp	LS	$61,400,000	Each	$61,400,000	
13	Return Canal ~ 5,700 cfs, 37 miles long (195,360')	lin. Ft.	$530	195,360	$103,541,000	
				Subtotal	**$2,886,706,000**	
				Contingency (30%)	$866,011,800	
				Subtotal	**$3,752,717,800**	
				Engineering, Legal, Adm. (15%)	$433,005,900	
				Estimated Sea Restoration Component Capital Cost	**$4,185,723,700**	

Salton Sea Component – Institutional Considerations

Relationships with Entities in Mexico **– No "sea to sea" project can occur without the active and supportive involvement of entities in Mexico. The specter of wind-blown hazardous dust reaching the million plus people in the Mexicali Valley may be sufficient incentive to encourage State and Federal officials in Mexico to support the program. Also, the economic development potential of Project construction, operation and maintenance activities should be a further incentive. Furthermore, granting the Cucupah Tribe the exclusive and permanent concession for recreation at the new Laguna Salada Lake would improve the economic situation of these indigenous people. Basically, the Parties in the United States (Federal, State and Local) need to work with their counterparts in Mexico to refine the project concepts and help reach agreement on an implementation plan.**

Project Financing **– Annual revenues from the pumped storage program in the $200 million per year range could support tax free revenue bonds having a face value of two to three billion dollars. IID, as the local power provider is a logical entity to fund and implement the US portions of the Project. It is suggested that international humanitarian organizations be approached to fund the facilities in Mexico.**

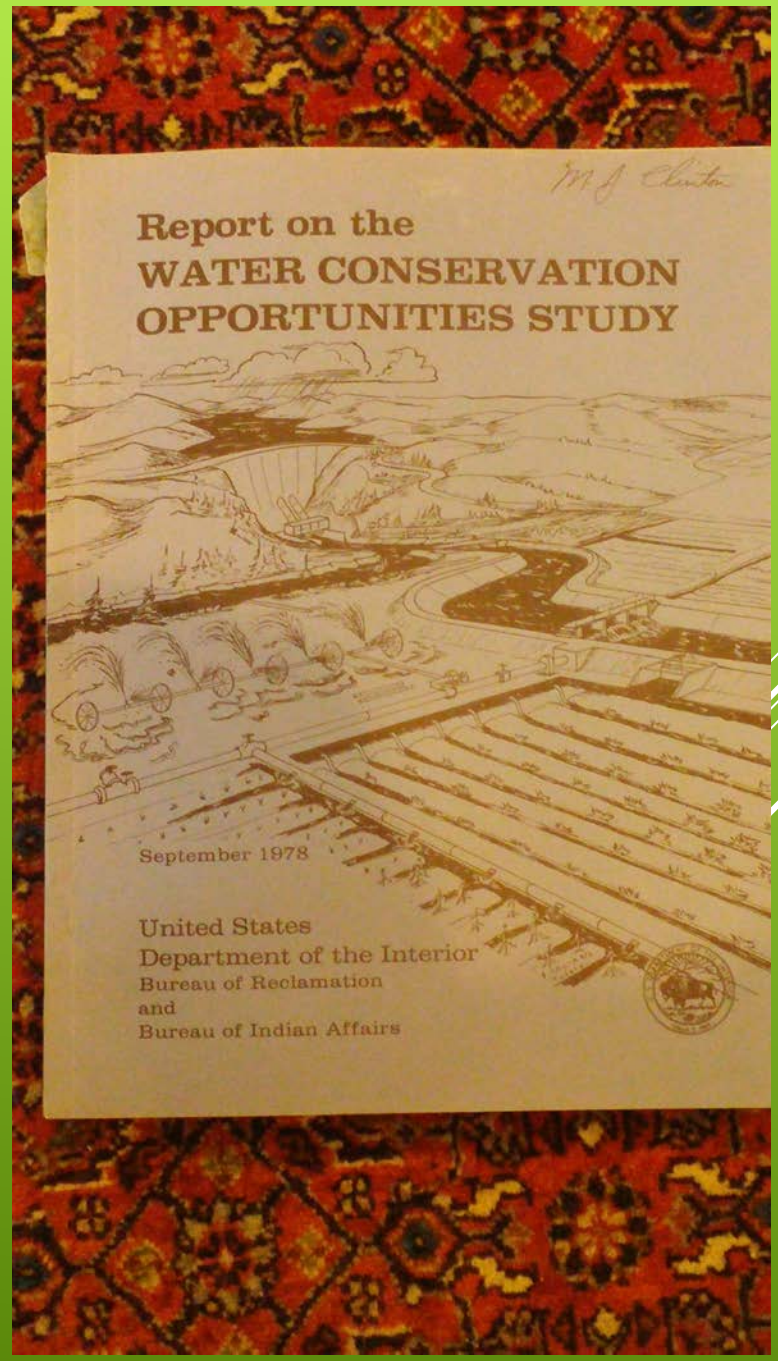
Implementation Schedule **– Assuming that feasibility and environmental studiy funds ($250,000) are available by fall of 2016, a feasibility study and EIR could be completed by the end of 2017. With a three year implementation program, water could be flowing to the Sea by 2020.**

Lower Basin Water Supply Component

IID Water Conservation Potential **– In 1978, a report of the Department of the Interior identified USBR and BIA Projects having water Conservation potential.**

Table I. - Water conservation project rankings
Four futures summary - by regions and areas

Rank	Identification	Study areas	State	Total irrigated acres	Water lost to further use (AF)	Estimated annual reduction in diversion (AF)	Total investment cost ($k)	Study cost ($k)	Total score
Pacific Northwest Region - Reclamation									
1	*PN08	Black Canyon Irrigation District, Boise Project	ID	47,758	29,200	162,000	31,675	100	2,145
2	*PN04	North Unit Irrigation District, Deschutes Project	OR	46,522	42,156	90,000	58,200	150	2,120
3	*PN06	Okanogan Project	WA	3,991	3,918	11,900	5,250	75	2,067
4	*PN01	Hermiston Irrigation District, Umatilla Project	OR	7,596	12,200	43,120	10,655	75	2,047
5	PN02	Vale-Oregon Irrigation District, Vale Project	OR	34,338	11,315	86,700	28,460	100	1,956
6	PN03	Minidoka Irrigation District, Minidoka Project	ID	63,247	82,300	216,000	57,985	200	1,905
7	PN05	Mann Creek Project	ID	4,710	1,525	10,125	5,696	75	1,890
8	PN07	Post Falls Irrigation District, Rathdrum Prairie Project	ID	2,678	640	4,300	3,675	75	1,772
		Totals		210,840	183,254	624,145	201,596	850	
Mid-Pacific Region - Reclamation									
1	*MP04	Langell Valley Irrigation District, Klamath Project	OR	15,653	0	32,000	10,535	200	2,516
2	*MP02	Orland Project	CA	17,249	0	64,100	47,852	200	2,294
3	MP01	El Dorado Irrigation District, Central Valley Project	CA	5,748	0	16,000	22,500	300	1,880
4	MP03	Madera Irrigation District, Central Valley Project	CA	92,577	867	39,475	42,863	500	1,830
5	MP05	Newlands Project	NV	62,919	6,000	30,000	3,000	600	1,677
		Totals		194,146	6,867	181,575	126,750	1,800	
Lower Colorado Region - Reclamation									
1	*LC03	Imperial Irrigation District, Boulder Canyon Project	CA	449,296	93,800	350,000	238,300	800	2,303
2	*LC02	Valley Division, Yuma Project	AZ	44,743	0	92,700	26,867	650	2,024
3	LC01	Reservation Division, Yuma Project	CA	11,729	0	35,000	34,322	350	1,755
		Totals		505,768	93,800	477,700	299,489	1,800	
Upper Colorado Region - Reclamation									
1	*UC01	North Fork Water Conservancy District, Paonia Project	CO	12,171	0	25,500	8,300	750	1,959
2	*UC07	Scofield Project	UT	22,433	3,600	6,000	4,548	750	1,951
3	*UC02	Florida Project	CO	16,016	0	14,000	17,000	500	1,900
4	*UC04	Weber River Project	UT	87,160	0	11,300	5,660	750	1,886
5	UC06	Pine River Project	CO	50,537	0	93,100	83,000	1,000	1,741
6	UC08	Collbran Project	CO	19,946	0	20,700	9,700	500	1,700
7	UC05	Deer Creek Division, Provo River Project	UT	39,270	0	10,200	14,654	750	1,683
8	UC03	Strawberry Water Users Association, Strawberry Valley Project	UT	40,670	0	11,100	6,134	750	1,625
		Totals		288,203	3,600	191,900	148,996	5,750	
Southwest Region - Reclamation									
1	*SW01	Tucumcari Project	NM	34,782	35,000	16,000	4,725	500	2,254
2	*SW04	W. C. Austin Project	OK	42,357	14,000	5,700	1,300	600	2,176
3	SW06	Balmorhea Project	TX	6,680	4,200	1,800	232	60	2,112
4	SW08	San Angelo Project	TX	7,880	1,750	2,000	0	60	2,108
5	SW02	Fort Sumner Project	NM	5,554	9,400	13,000	600	200	1,928
		Totals		97,253	64,350	38,500	6,857	1,420	



Lower Basin Water Supply Component

IID Water Conservation Potential –

Lower Colorado Region - Reclamation

1	*LC03	Imperial Irrigation District, Boulder Canyon Project	CA	449,296	93,800	350,000	238,300	800	2,303
2	*LC02	Valley Division, Yuma Project	AZ	44,743	0	92,700	26,867	650	2,024
3	LC01	Reservation Division, Yuma Project	CA	11,729	0	35,000	34,322	350	1,755
		Totals		505,768	93,800	477,700	299,489	1,800	

The 1978 DOI Study identified a potential of 350,000 AFY of on-farm and system improvement water conservation potential within IID.

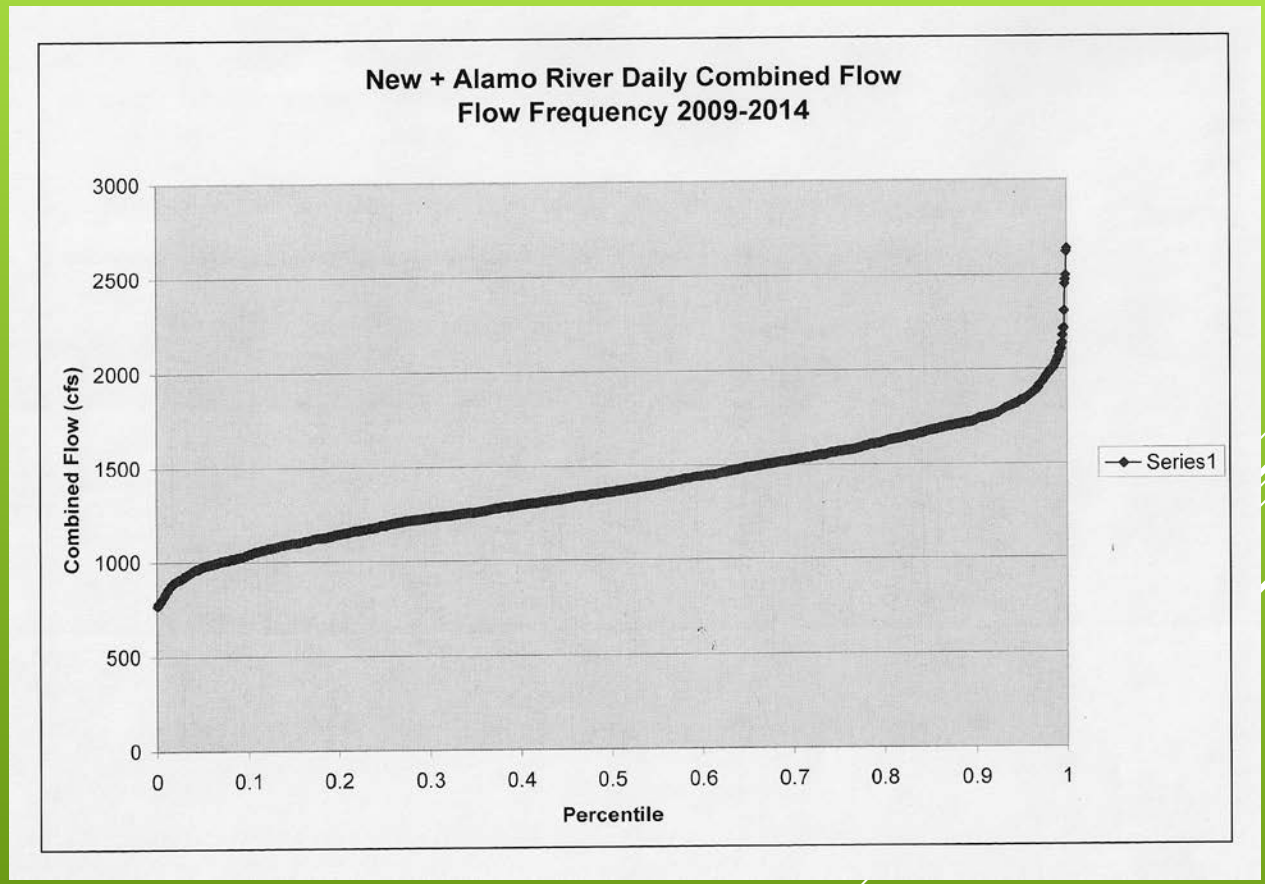
A subsequent study by the Ralph M. Parsons Corporation entitled "1985 Water Conservation Plan, Imperial Valley, California" estimated the overall IID water conservation potential to be about 1 million acre-feet per year.

Since the QSA has already committed 400,000 AFY of in-valley conservation to MWD, SDCWA and CVWD, there remains undeveloped a potential of 600,000 AFY of in-valley conservation

Lower Basin Water Supply Component

IID Water Conservation Potential –

Potential additional water conservation projects include lining of the East Highline Canal (~100,000 AFY) and desalinating water from the New and Alamo Rivers (~500,000 AFY or about 700 cfs). A desalination plant operating at 90% efficiency and producing 700 cfs of product water would require about 800 cfs of supply. The flow frequency analysis below suggests that the combined daily flow of the New and Alamo Rivers near their mouths generates at least 800 cfs almost every day.



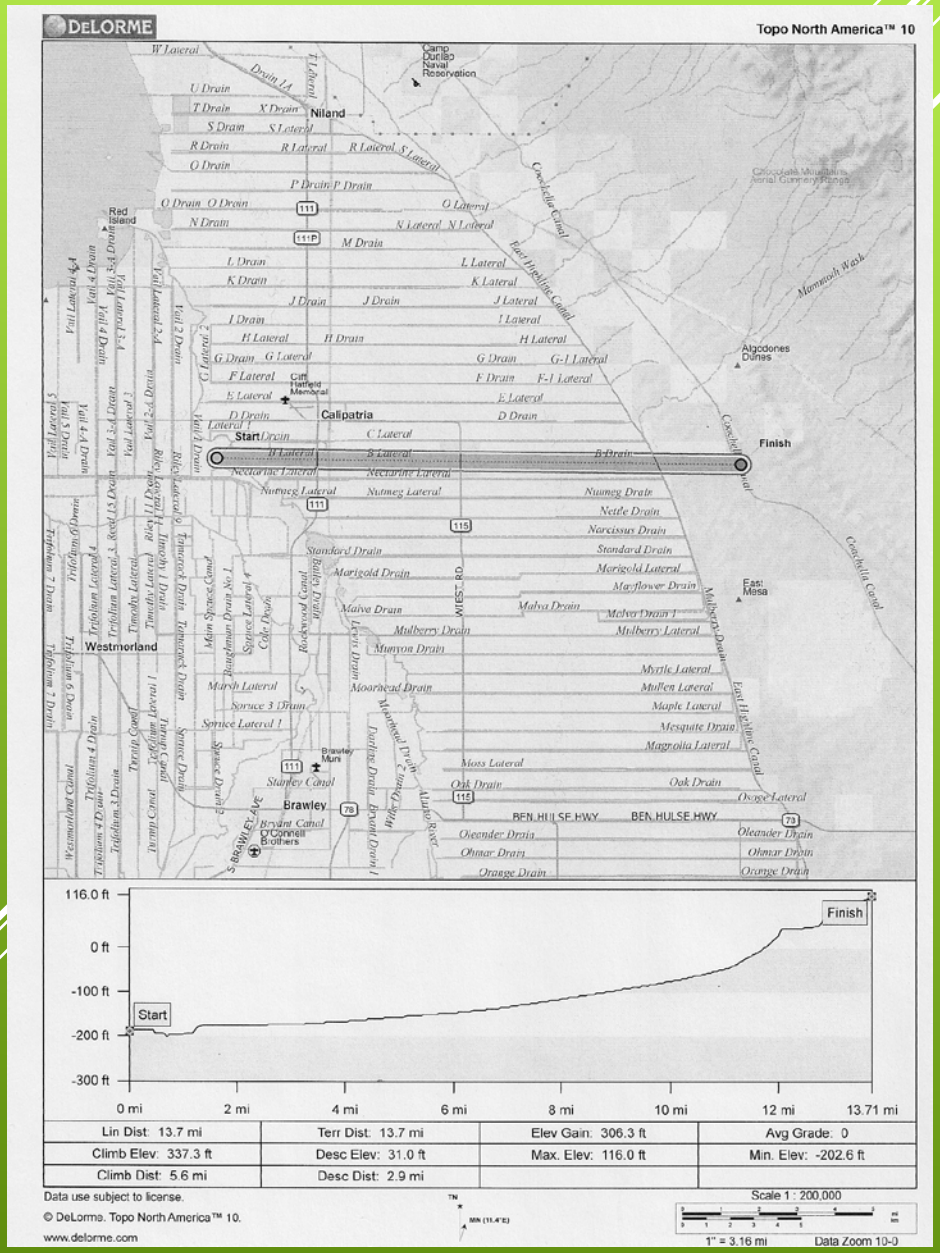
Lower Basin Water Supply Component

Desalination of the New and Alamo Rivers' flow – Plant Site and Discharge Lines – The distilled water from the desalination facility needs to be mixed with a Colorado River supply so it can be effectively used.

The pumping plant and stainless steel pipeline would deliver 500,000 AF/yr. (about 725 cfs) of5 mg/l water to the Coachella and lined East Highline Canal.

CVWD Canal	200,000 AFY
E. Highline Canal	300,000 AFY
Total	500,000 AFY

200,000 AFY of Coachella Canal Colorado River water will be delivered into the E. Highline Canal resulting in each canal having a blended salinity of about 300 mg/l.



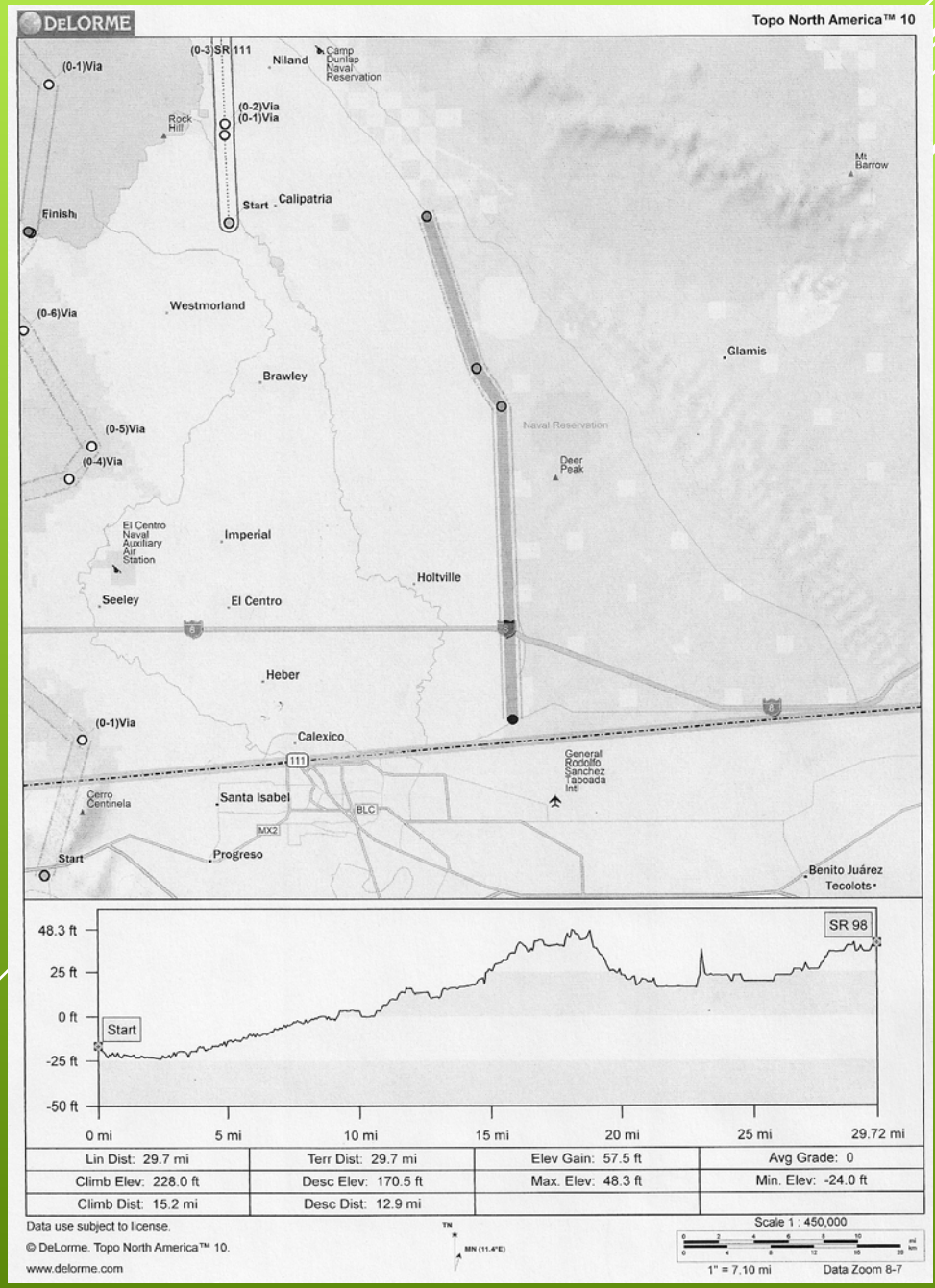
Lower Basin Water Supply Component

East Highline Canal Lining –

The East Highline Canal Lining is expected to result in 100,000 ASY of conserved water available for diversion at Imperial Dam.

Only a small part of the 500,000 AFY of 300 mg/l product water can be used in the lined East Highline Canal. Therefor, the newly lined canal will be designed with "pump checks" to allow that water to be pumped up the canal and delivered into the All American Canal. A part of this water could be delivered to Mexicali for domestic use.

Total diversions at Imperial Dam will be reduced by 600,000 AFY providing a new water supply for the Lower Colorado River Basin.



Lower Basin Water Supply Component – Cost Estimates

Item #	Component	Units	Cost/Unit	Quantity	Total Cost	Basis for Estimate
17	Desalination Plants, 50 mgd each (Treating 2,500 mg/l New & Alamo River Agricultural Brackish Drainage Water)	LS	$300,000,000	12	$3,600,000,000	Kay B. Hutchinson Plant - Texas
18	Reject Stream Delivery Pipeline ~ 40 cfs, 19.5 miles long (102,960') 36" pipeline	lin. Ft.	$220	102,960	$22,651,200	
19	Reject Stream Delivery Pumping Plant , 725 cfs, 307' static head	LS	$14,645,000	1	$14,645,000	
20	Desalination Product Stainless Steel Delivery pipeline ~ 725 cfs, 13.71 miles (72,400') 120" diameter	lin. Ft.	$1,200	72,400	$86,880,000	
21	Desalination Product DeliveryPumping Plant ~725cfs, Static Head 306'	LS	$1,200	72,400	$86,880,000	
22	East Highline Product Delivery Canal ~ 750 cfs, 29.72 miles (156,900')	lin. Ft.	$300	156,900	$47,070,000	
				Subtotal	**$3,771,246,200**	
				Contingency (30%)	$1,131,373,860	
				Subtotal	**$4,902,620,060**	
				Engineering, Legal, Adm. (15%)	$565,686,930	
				Estimated Water Supply Component Capital Cost	**$5,468,306,990**	
				Capital Cost per Acre-Foot	$9,113	
			Carlsbad Capital Cost per AF		$20,000	

Lower Basin Water Supply Component – Institutional Considerations

Funding Strategy **–During his remarks to the CRWUA in December 2015, Deputy Secretary Michael Connor told the participants that if the needed water conservation was not accomplished by the Basin States, the United States would do it. PL 90-537 makes delivery of water to Mexico a National Obligation. Therefore, the United States should fund the construction and operation of the facilities. Alternatively, IID could fund and operate the facilities at a profit selling the conserved water at a profit to southern California municipalities and others.**

Relationships with Mexico **– Restoration of the Colorado River Delta in Mexico has become an objective of both Nations. The study authors suggest that 10% of the new Lower Basin water supply (60,000 AFY) be acquired by the United States, matched by an equal amount from Mexico, and used to continue the success demonstrated through the recent "pulse flow" released from Morelos Dam into the Gulf.**

Water Purchase Contracts **– It is suggested that the conserved water be deposited in Lake Mead as "Intentionally Created Surplus" water and then made available for purchase by Lower Basin entities under 15 year agreements at prevailing market prices for desalinated ocean water.**

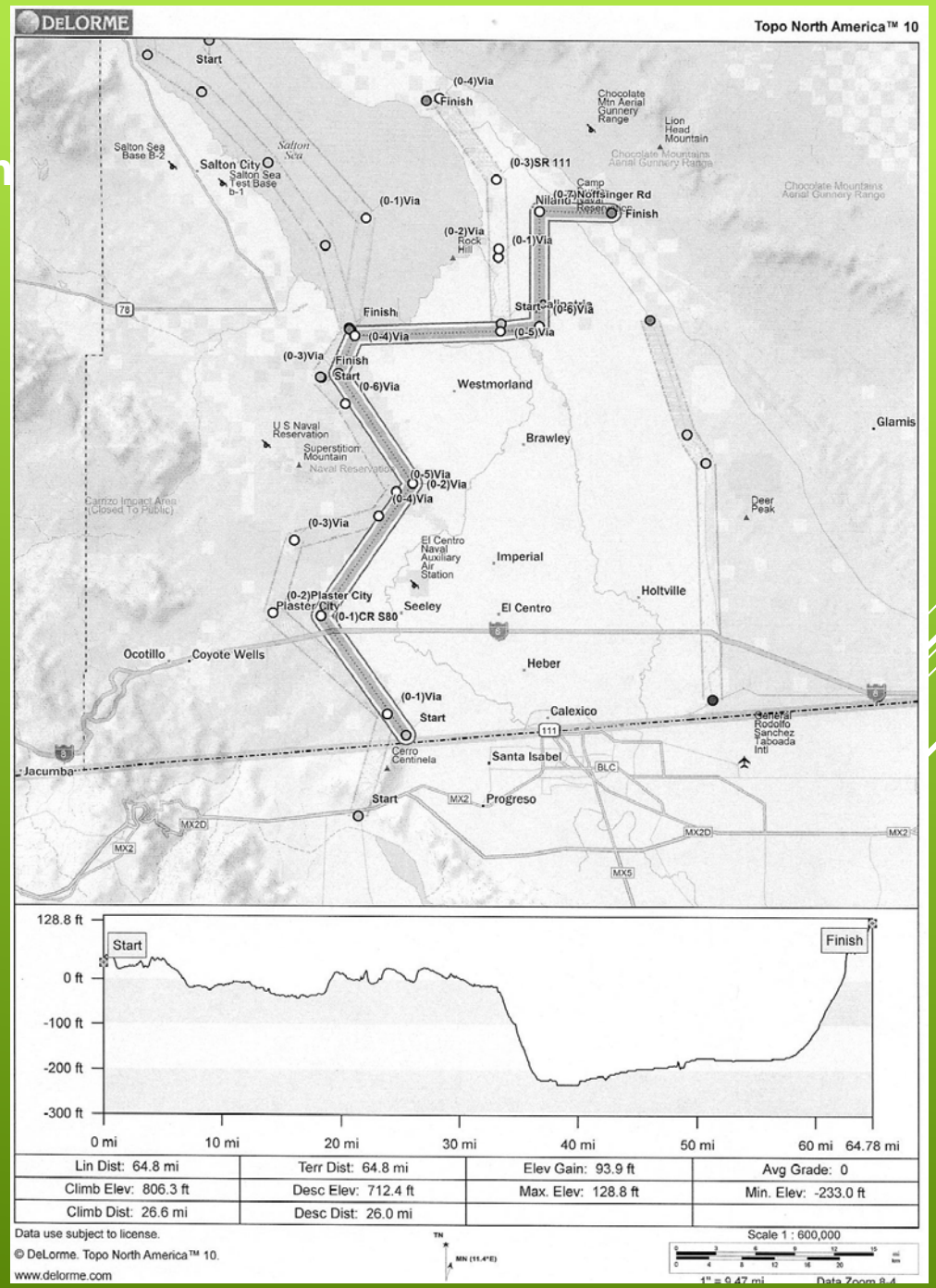
Implementation Schedule **– As with the Salton Sea Component, the first 50 mgd desalination unit could be on line by 2020 with one of the additional nine units going on line each year thereafter.**

Power Transmission System Component

Route and Capacity **– The transmission system would be configured as a single circuit 230 kV transmission system with substations at the pumped storage and desalination facility. It would connect to the regional grid at the SDG&E Imperial Valley Substation and the IID Midway Substation.**

Cost Estimates **– Derived from WECC October 2012 Publication on "Capital Costs for Transmission & Substations."**

Item #	Component	Units	Cost/Unit	Quantity	Total Cost
13	230 kV Single Circuit Transmission Line	mile	$927,000	64.76	$60,032,520
14	230 KV Substation	LS	$1,648,000	2	$3,296,000
15	115 / 230 KV Transformers	LS	$7,000	4	$28,000
16	Cost per Line/XMFR Position	LS	$1,442,000	4	$5,768,000
				Subtotal	**$69,124,520**
				Contingency (30%)	$20,737,356
				Subtotal	**$89,861,876**
				Engineering, Legal, Adm. (15%)	$10,368,678
				Estimated Capital Cost	**$100,230,554**



Power Transmission System Component

Support for Geothermal Development **– Were Imperial County, IID and the Salton Sea Authority desire to configure the transmission system to support geothermal development in the south-east Salton Sea area, the transmission system could be configured as a double circuit 500 KV (with 230 KV under-build to support the pumped hydro and desalination facilities). The larger transmission system would continue north from the IID Midway Substation to the SCE Mirage Substation replacing the existing IID KN and KS Transmission Lines.**

Funding Strategy **– As a part of the water supply system, the 230 KV transmission system would be financed by the United States. Were the double circuit 500 KV system to be constructed and agreements for its use entered with the geothermal developers, revenue bonds would be issued for the construction cost. Since the 500 KV system would provide a north-south route for delivering power to SDG&E through the recently completed Sunrise Power Link, SDG&E could also participate in funding the new Imperial Valley Substation to Mirage Substation system.**

Institutional Considerations **– The new transmission system would form an integral part of the IID transmission system so the IID would be the logical entity to buid, operate and dispatch the pumped storage hydro system. IID rights of way would be used for the entire system.**

Economic Development in Mexico – the Port of Mexicali (Puerto Mexicali)

A Deep Water Seaport to Provide Anchorage for Ships Too Large For the Expanded Panama Canal

Historical Background:

Residents of northwestern Sonora near San Luis, in northeastern Baja near Mexicali, as well as residents of southwestern Arizona near Yuma, have long dreamed of developing a deep water seaport to use the access provided by the Sea of Cortez (the Gulf). At the beginning of the 1900s, paddle-wheel steam boats traveled through the Delta and up the Colorado River as far as the Town of Saint Thomas in Southern Nevada. They also traveled up the Gila River as far east as the City of Phoenix in Central Arizona. With construction of dams on the Gila and Colorado Rivers, sufficient flow was no longer available to support this navigation and it ceased in the early 1930s. Although there have been ventures, some outlandish, to develop a deep water port for Yuma, none have had the economic or environmental viability needed for success.

Economic Development in Mexico – the Port of Mexicali

The Port Concept:

On the west side of Mexicali, extending south from the border with the United States about fifty miles to the Gulf, lies a sea-level playa, the Laguna Salada. A dam and lock system with approach channel into the Gulf would be constructed near the Laguna Salada outlet to the Gulf, parallel to the Mexicali/San Felipe highway. At the north end of Laguna Salada, about three miles of Highway 1 would be relocated to the north. On the east side of the Laguna Salada, directly west of the City of Mexicali, is a relatively flat area that is ten miles long and four miles wide. The port would be constructed in this area with about twenty anchorages and wharves for large container and commodity carriers.

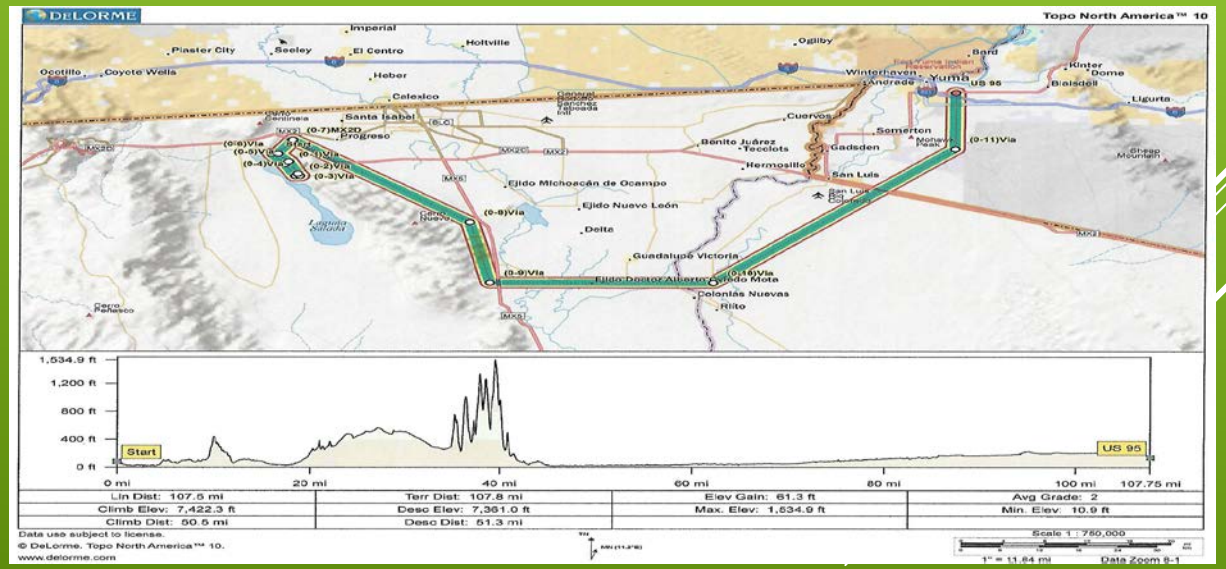
Ship Off-Loading and Loading

The port facility would be designed for direct transfer of containers and commodities from ship to rail as well as from rail to ship. Thus the traditional transfer of containers and commodities from between ship and truck would be eliminated, driving large economies of scale for the port facility. Since a major auto-ship unloading facility already exists on the Pacific coast of Baja at Ensenada, no auto unloading facility would be included in Puerto Mexicali.

Economic Development in Mexico – the Port of Mexicali

Transportation Links:

At the northeast corner of the port area, a short canyon leads to Highway 1, the main east-west highway serving the border cities from Tijuana, through Mexicali and San Luis and continuing to Nogales and points easterly. Highway access to the port would be through a connection to this thoroughfare. A new railroad with four tracks would be constructed parallel to and on the south side of Highway 1 through Mexicali and San Luis to (a) point in Mexico south of Fortuna Wash and east of Yuma Arizona. At that point, the rail system would go north to an inter-modal facility east of the town of Fortuna and connect to the main east-west line of the Union Pacific Railroad. The Mexican Railroad that begins in Mexicali and continues south onto Sonora would be connected to the new rail system to facilitate shipping of containers and commodities in Mexico.



Economic Development in Mexico – the Port of Mexicali

The Ships:

The Panama Canal Expansion Project locks are being designed to dimensions of 427 meters (1,400 feet) long, 55 meters (180 feet) wide and 18.3 meters (60 feet) deep. The Suez Canal is also being widened and the depth is being increased. The newer ships are being built much larger and require more depth, width and height than can be accommodated in the enlarged Panama Canal and most North American west coast ports.

Facility Sizing:

The locks and dam should be designed for a maximum length of 415 meters (1,350 feet), a width of 67 meters (220 feet), as well as a depth of 17 meters (55 feet). Although larger ships now exist, the physical characteristics of the Laguna Salada suggest that a larger dam and locks would be difficult to justify economically. Since the Upper Gulf experiences tides reaching ±20 feet, the approach channel as well as the southern lock basins would need to have a bottom elevation of -24 meters (-80 feet) mean Sea Level. Tanker ships and bulk commodity carriers of moderate size would be able to use the port.

Economic Development in Mexico – the Port of Mexicali

Cost Estimates – The following table reflects the estimated port facility costs

Item #	Component	Units	Cost/Unit	Quantity	Total Cost	Basis for Estimate
1	Gulf Approach Channel	LS	$300,000,000	1	$300,000,000	Panama Canal Expansion
2	Laguna Salada Dam ~ 60' high, 12 miles long (63,560')	mile	$55,000,000	12	$660,000,000	Salton Sea Saddle Dam
3	Lock Complex	LS	$1,100,000,000	1	$1,100,000,000	Panama Canal Expansion
4	Port Facility	LS	$1,000,000,000	1	$1,000,000,000	Other Port Expansions
5	Railroad to Yuma (4 Tracks)	Miles	$3,200,000	108	$345,600,000	Panama Railroad Reconstruction
				Subtotal	**$3,405,600,000**	
				Contingency (30%)	$1,021,680,000	
				Subtotal	**$4,427,280,000**	
				Engineering, Legal, Adm. (15%)	$510,840,000	
				Estimated Panamax Port Component Capital Cost	**$4,938,120,000**	

Economic Development in Mexico – the Port of Mexicali

Ecological Protections:

The Gulf is internationally recognized as a unique and precious ecological asset. Protecting its integrity must be a paramount objective of port design, maintenance and operation. At no time would any ship be allowed to discharge any fluids including, but not limited to, human wastes, bilge water and hydrocarbons. Navigation and environmental quality protection in the Gulf would be managed by the Coast Guard of Mexico.

During construction, modern environmental controls would be utilized to manage air pollution, runoff and dust generation. The overall design would be reviewed and approved by Baja Notre officials. An example of the environmental footprint of the facility is that the fill for the dam and locks at the outlet of the Laguna Salada would be derived from material excavated for the ship approach channel.

The Gulf is notorious for its shifting currents, enormous tides and infrequent but severe tropical storms. Accordingly, Mexico Coast Guard pilots would be required to steer all ships operating north of La Paz, the Capitol City of the Mexican State of Baja Sur. To deal with this situation, two Coast Guard pilots would be required to direct the navigation of all ships using the Port of Mexicali.

Economic Development in Mexico – the Port of Mexicali

Implementation:

The Port of Mexicali could be constructed only if business interests in Mexicali, Baja and Mexico are willing to make the needed investments. Additional studies including market analysis, potential traffic tariffs and economic viability will be needed.

Facility Financing:

It is possible that a consortium of interest could be assembled to finance construction of the port facility. For example, the Union Pacific Railroad would have an exclusive right to carry the freight from the new port without the congestion and inefficiencies they encounter at the ports of Los Angeles and Long Beach. Additionally, Pacific Rim shipbuilders and shippers would be advantaged by the shorter route to markets in the southern United States and the opportunity to use larger and more efficient ships to access US and Mexican markets. Most importantly, the business interests surrounding the maquiladoras activity in Mexicali would have new markets and they could take the lead in forming a financing consortium.