TRANSALTON PROJECT - TRANSOCEANIC PROPOSAL FOR MASSIVE FRESH WATER IMPORTS TO THE SALTON SEA AND THE LOWER COLORADO RIVER BASIN FROM SOUTH MEXICO RIVERS

Rev: NC

TRANSOCEANIC LLC – USA
transoceanic.us

TRANSALTON PROJECT - A MASSIVE FRESH WATER IMPORTATION PROJECT FOR THE SALTON SEA IN CONJUNCTION WITH A LARGER TRANSOCEANIC LOWER COLORADO RIVER BASIN PROJECT

1. *Identification of Project Team*
   Members of the project team and their roles on the project should be identified.

   TRANSOCEANIC response: The project team for the TRANSALTON project will consist of the experts from TRANSOCEANIC LLC – USA and its associates, of the California State and federal agencies representatives who will be assigned to the project, as well as of the main water customer(s) who will participate in the project. Other team members can be included as required.

2. *Narrative description of project concept and how/when it will benefit the lake.*
   A brief description of the proposed project is required that includes a general discussion of the project concept, the business plan, and the implementation of the project. The project concept discussion should include a description of the project and how it will improve conditions at the lake. The business plan should include a discussion of the ownership of the proposed project and the plan for generating revenue from the project.

   TRANSOCEANIC response: The TRANSOCEANIC SALTON WATER IMPORTATION PROJECT (hereafter called **TRANSALTON** project) **is a FRESH WATER IMPORTATION PROJECT** that will be used mainly for agricultural irrigation and city water supply around the Salton Sea, while the irrigation and processed city drainage water will be collected and transferred to the Salton Sea for the control and stabilization of its level and playas with minimal increase of added salts.

   The TRANSALTON project is considered as part of a larger TRANSOCEANIC Lower Colorado River project intended to import a quantity of fresh water equivalent to about half of Colorado River flow (9 billion cubic meters - 7.3 million acre-feet, per year (AFY)) and to solve the water scarcity in the Western USA, the TRANSALTON project being allocated about 1/10 of this quantity, meaning 730 000 AFY.
   The fresh water is proposed to be imported from Southern Mexico's rivers on proprietary TRANSOCEANIC submersibles (see note 1) through the Gulf of California (see map on Annex 1). The designated fresh water source is the Balsas River in Southern Mexico, the water being loaded on the TRANSOCEANIC submersibles at an offshore station at Lázaro Cárdenas, Michoacán, Mexico. Other Mexican rivers can be considered, taking into account their water availability and quality. The fresh water will be delivered after being transported for 2100 kilometers (1300 miles) to an offshore station built into NW Mexico at the northern extremity of the Gulf of Mexico. The imported water will be shared with Mexico, and then will be delivered onshore to the USA's Lower Colorado Basin users.
   The required amount of water for stabilizing the Salton Sea level is expected to be 250 000 AFY per the measured evaporation of the Salton Lake between 2008 and 2018 and for

stabilization at -245ft level (see Note 2). This required water will come as used (agricultural and city) water returns after the use of the delivered 730 000 AFY of fresh water.
Because the required imported fresh water is about 10% of the deliveries of the proposed larger TRANSOCEANIC Lower Colorado River project, the estimated CAPEX portion for the TRANSALTON project is $869 million representing 10% of the estimated CAPEX of $8.687 billion for the larger TRANSOCEANIC Lower Colorado River project.
The beneficiaries of the project will be the California Governmental Agencies involved in the financing of the project, together with the participating federal agencies and with other partners of choice. Of course, the final sharing costs of the project and ownership will be established when all the beneficiaries of the larger Colorado River project will be established together with their participation.
The characteristics of fresh water deliveries are presented in Annex 2. It is expected that the delivered price of fresh water will be $186 per acre-ft ($0.15 per cubic meter). The imported water in its majority will be sold for irrigation or city utilities with the used water returns being received free of charge and transferred to the Salton Sea. It is expected that the TRANSALTON project will generate a certain net profit by the sale of water especially to Coachella Valley and other urban customers. However, the price of delivered water can be kept so low that it is also feasible to be sold for many agricultural uses.

As required, some TRANSALTON fresh water will be applied directly to the Salton Sea for improving the conditions of the playa and the lakeshore. It is proposed that some of the playas and parts of the Salton Sea be separated from the Salton Sea brine and filled with fresh water per the Perimeter Lake alternative by the Salton Sea Authority (see Note 2, Section 7), becoming a source of irrigation water and/or recreation lakes after applying the available imported water.

The TRANSALTON project is expected to need about 5 years for being implemented and its effects on the Salton Sea will start when the used imported water application happens.

Also, the TRANSALTON project does not require and we do not advise brine ejection from the Salton Sea into the Gulf of California, the brine ejection being unnecessary while water with low salinity is added as proposed by the TRANSALTON project. Presently the Salton Sea brine has about twice the ocean salinity and there are ecological concerns when ejecting concentrated brine in the ocean coastal areas, as the desalination plants do too.

A possible venue of the TRANSALTON project is to decouple it from the larger TRANSOCEANIC Lower Colorado River project, and eventually to include it in other specific TRANSOCEANIC fresh water delivery projects for southern California, Arizona, and NW Mexico; in this case, it is expected to have an increase of the CAPEX and unit price of delivered water.

During the implementation of the TRANSALTON/ larger TRANSOCEANIC Lower Colorado River project(s) their configuration will be optimized and it is expected to get better performance and cost than the present proposal.

3. *Planning and design process of project*
Describe the planning process completed to date and detail how the planning process will be completed. The description should include the following:

• Project Feasibility -- Documentation of the engineering feasibility of the project. Documentation should include at a minimum: system capacity; pumping requirements; channel and pipe size; water quality; other associated infrastructure such as desalinization, fish or trash screens, etc.; and expected energy use.

TRANSOCEANIC response: Annex 2 shows the engineering feasibility of the project. The main equipment of the TRANSALTON project consists of the submersible boats that transport the water for a distance of 2100 km (1305 miles) from the Balsas river to the northern part of the Gulf of Mexico. The submersible boats are manufactured of ballastable reinforced concrete hulls which enclose several very large collapsible bags for the transportation of fresh water. The proposed dimensions of the submersible boats are diameters of 120 meters (400 ft) and lengths of 840 meters (2750 ft), each being able to transport 9.5 cubic meters (2.5 billion gallons) of fresh water. The construction details of the hulls are presented in the same Appendix (1). The cost of one submersible boat is evaluated at $167 million. For the larger TRANSOCEANIC Lower Colorado River project it is necessary to build 50 submersible boats, with a 1/10 share assigned to the TRANSALTON project.
However, the offshore loading and unloading stations are important items too, and each has costs similar to the cost of a submersible boat.
The size of the main pipelines (in some areas replaced by opened canals) will be cost-optimized but is expected that the main offshore connecting pipelines to be about 20 ft in diameter. After landing, the water can be spread to the beneficiaries through new water systems connected to the legacy systems like the All America Canal. Some smaller installations, canals, and pipes will be provided for collecting the used water that will be transferred to the Salton Sea. All waterworks (beyond the main pipelines/canals and legacy facilities) are advised to be transferred to the local water customers.
Also, a coefficient of 1.8 was considered for increasing the CAPEX calculation by 80% due to the novelty and specific configuration of the project(s).
The energy use for over the ocean water transportation was presented together with other information in the attached spreadsheet of Annex 2 and it is equivalent to lifting the water to 176 meters (578 ft).
Any other required pumping is considered as operational costs, which are to be defined accordingly. The amortization of the TRANSALTON project hardware (considered for 30 years) is substantially equal to the energy costs for transportation.
The imported water quality is given by the water source river and it will be certified and afterward permanently monitored and tested for compliance. The water source contract(s) will require to keep the quality of the river water, thus improving the water quality of the whole river and ecosystem.

The estimated cost of water at the source ($0.07) is expected to be similar to its transportation costs.
There will be fish and trash screens at the loading of water, but these are minor subassemblies compared to the other systems required by the TRANSALTON project.
There is no desalination (and no desalination infrastructure) required; we let nature deliver fresh water from the source river(s).

• *Water Source Identification – Either provide documentation from the water rights holder that establish the willingness of the water rights holder to allow use of their water right or provide detailed description of process to establish those rights.*

TRANSOCEANIC response: For the TRANSALTON project, the only economical sources of fresh water are the South Mexican rivers located at acceptable transportation distance. We selected the Balsas river as the water source, having the required flow and being positioned away from the pollution sources. Closer sources are available but the water availability and quality should be evaluated.
Taking into account the quantity of water (7.3 million AFY) for delivery for the larger TRANSOCEANIC Lower Colorado River project and its transboundary nature, it is evident that the water access should be arranged at the intergovernmental/federal level with consultation and participation of the implied states (California, Arizona, Baja California, Sonora). Upper Colorado basin States (Nevada, Utah, Colorado, Wyoming) as well as New Mexico, should be invited to participate (also financially) if the future Colorado River water allocation will be positively affected by the larger Lower Colorado River project.

• *Land Use – provide project route alignment and status of land use permission for the conveyance route both in the United States and in Mexico.*

TRANSOCEANIC response: Like water rights, the land and sea use permission for the water loading and unloading should be established by agreement(s) at the federal and state level between the USA and Mexico. The land pipelines and canals are a federal issue (USA'S and Mexico's) as well as an issue at the affected state level for California, Arizona, Baja California, Sonora.
The offshore delivery terminal will be positioned in the Wagner Basin at depths required by the TRANSOCEANIC submersibles, and it will be connected to the shore by a pipeline landing close to San Felipe, Baja California, Mexico. This pipeline is dimensioned to serve the whole larger TRANSOCEANIC Lower Colorado River project.
It is necessary to build a similarly sized loading terminal(s) at the source river(s).
The land delivery pipelines/canals start at the offshore pipeline landing and are dimensioned for transporting almost all delivered water (less the one locally used) being positioned west from Highway 5 (Mexico), to Mexicali. After about 100 kilometers these large pipelines/canals transfer the water to multiple pipelines/canals and the All American Canal, and also to a dedicated branch going to the Salton Sea for direct water delivery.

Another possible routing is to land the offshore pipeline to Sonora state, crossing the Alto Golfo de California Biosphere Reserve on an efficient route and then going to the northeast of Highway 40 (Mexico) to Guadalupe Victoria, Mexico. After about 100 kilometers this large pipeline/canals transfer the water to multiple pipelines/canals, and also to a dedicated branch going to the Salton Sea for direct water delivery.
Other optimized routings can also be considered.
The access to Mexican coastal areas has to be approved by the Mexican federal and state authorities coordinated with the US government.

• *Environmental Impact – provide information on any anticipated environmental impacts from the project in both Mexico and the US and how those will be generally mitigated. This should include a discussion of any anticipated impacts to existing surface water use, groundwater basins, and wildlife resulting from the introduction of ocean water to existing, or new, river channels or canals. If the project is proposed within the Alto Golfo de California Biosphere Reserve, please identify any anticipated impacts to that area and expected mitigation measures.*

TRANSOCEANIC response: The TRANSALTON project transfers fresh water that is non-polluting. The footprint of the TRANSALTON project is kept minimal and consists mainly of underground fresh water pipelines, the only visible part being their markers. The ecosystem disturbance while positioning the pipelines should be minimal. The required canals will be built per regular procedures and are non-polluting too.
The TRANSOCEANIC submersible boats stay away from land and are low-speed boats having minimal impact on the environment. No ballast water is released due to the submersible proprietary construction and operation (see the TRANSOCEANIC patent of Note 1.)
The offshore and onshore pipelines routing will avoid the Biosphere Reserve of the Upper Gulf of California & Colorado River Delta as much as possible although the fresh water is non-polluting and would improve the neighboring environment in case of open canals; the onshore routing west from Highway 5 (Mexico) seems to be the one having no interference with the Biosphere Reserve.
It is important to take into account the seismicity on the project location and the mitigation of the possible seismic episodes.

• *Salton Sea Salinity – how does the project plan to deal with increased salinity at the Salton Sea from the imported ocean water? If the proposed project includes a desalinization system where will the resulting brine be deposited?*

TRANSOCEANIC response: The only used water for the TRANSALTON project is the imported long-distance fresh water; the resulting irrigation returns have slightly higher salinity, which is much lower than the salinity of seawater.
There is no imported ocean water/seawater required or proposed for the TRANSALTON project.

There is no desalination required or proposed for the TRANSALTON project.

• *Water Use – Describe the projected water balance including consumptive use, system loss, evaporation etc. and ability of the proposed project to operate successfully with decreased flows.*

TRANSOCEANIC response: We consider that beyond the present flows to the Salton Sea it is necessary to add 250 000 AFY per the measured evaporation of the lake between 2008 and 2018 and for stabilization at -245 ft level. This required water for the Salton Sea will come as water returns after use of the delivered 730 000 acre-ft of fresh water, the large difference covering the intended consumptive use and evaporation, while the system loss should be minimal.
The TRANSALTON project water deliveries will be adjusted accordingly for decreased flows from other sources by increasing the share of water from the larger TRANSOCEANIC Lower Colorado River project.

• *Cross Border Governmental Coordination and Permitting -- provide details of conducted or needed coordination and permitting from governmental agencies from both Mexico and the United States that deal specifically with cross border project development. Agencies include but are not limited to the International Boundary Water, Commission, Mexico federal agencies, tribal governments, and necessary United States agencies.*

TRANSOCEANIC response: The TRANSALTON project is complex and its complexity is increased when integrated into the larger TRANSOCEANIC Lower Colorado River project. The following aspects require the coordination and permitting from governmental federal and state agencies from both Mexico and the United States: (i) the water rights and export-import operations from Mexico, (ii) the harvesting and submersible boat loading of water, including the loading offshore station at the Southern Mexico location(s), (iii) the unloading of water at the offshore station in the Northern Gulf of California, (iiii) the land transfer of delivered water in NW Mexico/SW USA including the importation/border crossing.
After establishing the possible (and then the final) TRANSALTON project configuration(s) the appropriate agencies will be contacted and the needed final approvals will be obtained.

• *Project Development Schedule -- Schedule for project development from current stages through implementation.*

TRANSOCEANIC response: The TRANSALTON project part is expected to be developed in 5 years from the date of the project and financing approval if the project enters a sustained deployment; the larger TRANSOCEANIC Lower Colorado River project completion is expected to require 10-15 years from the date of the project and financing approval. The projects can be achieved in incremental phases with a gradual increase in the number of TRANSOCEANIC submersible boats.

The first phase of the project(s) will require a sustained engineering effort for the design of the TRANSOCEANIC hardware and the routing and complete configuration of the TRANSALTON project in conjunction with any other related water import project(s). During this phase, all the required aspects of the project(s) (economic, environmental, legal, international relations, etc.) will be solved too.

• Operation Schedule -- Provide an estimate of the length of time necessary for the proposed project to raise the water levels at the lake to recover potentially emissive playa.

TRANSOCEANIC response: It is expected that the first rise in water level will take place close to the completion of the TRANSALTON project in about five years from its financing approval. The rate of the raise can be adjusted by the ways (as used water or direct) that the water is transferred to the lake, but it also has an economic impact if the lake-received water does not exclusively consist of used water.
Also, the existence and configuration of the future perimeter lake(s) or agricultural land conversions will influence the speed of recovery of the selected potentially emissive playa(s).
The TRANSALTON project together with the larger TRANSOCEANIC Lower Colorado River project is a very strong instrument having the potential of raising the water level of the Salton Sea at any desired value, but the economic aspects (cost of water, and impact on its use) should also be taken into account.

4. *Cost projection*
• Provide a cost projection for the proposed project. The projection should be documented to the extent that the reviewers can review the cost projection process and determine the validity of the projections

TRANSOCEANIC response:
The TRANSALTON project uses the new TRANSOCEANIC technology of importing long-distance water and does not consist of the pipeline transportation of (salty) water contemplated in the RFI email; therefore the cost projections are presented in Annex 2, in a structure that is different from the Cost Template suggested with the specified RFI email.
The main assemblies of the TRANSALTON project are (i) the submersible boats and (ii) the terminal loading and unloading stations.
The main cost of the submersible boats is incurred for their ballastable hulls manufactured of reinforced concrete (@$55.4 million/each).
The propulsion is also important (@$9.7 million/boat) as well as the different items (@$27.7 million/boat) consisting in collapsible bags, Instrumentation and Command&Control (ICC), ballast control system(s), navigation and communication equipment, and all other required items.
Due to the novelty of the TRANSALTON/TRANSOCEANIC projects, a cost safety coefficient of 80% was added for the CAPEX, resulting in a total cost of $167 million for each submersible boat.

Each terminal station was considered to cost the same as one submersible boat. The loading station seems to be simpler than the unloading station where the required onshore work seems to be substantial. However, it is important to underline that these stations serve the whole larger TRANSOCEANIC Lower Colorado River project, the TRANSALTON project being just a share user.
The cost of the energy was also considered in the cost of delivered water, the cost of energy being similar to the TRANSOCEANIC hardware 30-year amortization. The propulsion and energy costs were considered for high-efficiency LNG diesel propulsion, but other propulsion modes (nuclear, hydrogen, ammonia) can be considered.

The CAPEX for the TRANSALTON project is $869 million, while the CAPEX for the larger TRANSOCEANIC Lower Colorado River project is $8.687 billion. The projected cost of water transportation for 1300 miles @$0.0738 per cubic meter (tonne) and the massive volume of water deliveries (9 billion cubic meters / 7.3 million acre-feet, per year (AFY)) is clear proof of the TRANSOCEANIC project importance and usefulness.

The considered commodity prices (for cement, rebar, LNG) were those of years 2012-2020 before the period of very volatile prices.
The spreadsheet with the cost computation can be obtained as an interactive file from dorian@transoceanic.us.
It is important to note that the present document is not an offer or a quotation; it is for information only.

5. *Plan for funding of proposed project*

• Describe how the planning, design and construction implementation of the project will be funded.

TRANSOCEANIC response: There are three funding sources for the TRANSALTON/ larger TRANSOCEANIC Lower Colorado River project:

1. The federal government through its agencies. An important funding source should be the federal infrastructure funds that at the date of this document are in the process of being approved.
2. California state funds should be an important part of the funding of the project. California and the federal fund should be the ones used for the initial planning and design for the project, this part of the project is estimated at 15% of the whole project(s) cost.
3. Third-party funds: Water Departments (San Diego, Metropolitan Water Department, Palm Springs, Indio), other states (Arizona, Nevada) and water departments and projects (Phoenix, Central Arizona Water Conservation District, Tucson) and other third parties interested in water.
4. It is also possible that some of the funding will be financed by banks and other credit institutions/instruments during the project's development.

The construction, funding, operation, and maintenance of the TRANSALTON/ larger TRANSOCEANIC Lower Colorado River project(s) should be centralized and consolidated under one entity dedicated to these projects, in a similar way to the construction and operation of Arizona's CAP.

Mexico might prefer to get water delivered in exchange for supplying the river water and the use of its sea and land for water conveyance. This fact might increase the required CAPEX but might slightly diminish the price of delivered water.

Let's be efficient! Do not forget that Arizona's CAP cost five times more US$ (in today's money), for five times less delivered water than the proposed larger TRANSOCEANIC Lower Colorado River project(s).

• Identify the responsible parties for the operation and maintenance for the project and estimate annual cost.

TRANSOCEANIC response: The construction, funding, operation, and maintenance of the TRANSALTON/ larger TRANSOCEANIC Lower Colorado River project(s) should be centralized and consolidated under one entity dedicated to these projects, in a similar way to the construction and operation of Arizona's CAP.
The price of water we computed already includes for the TRANSALTON project a "Cost of Operation+Maintenance /Repair +Replacement, and profit and other costs" of 25% ($13.3 million/year) added to the net cost of water transportation. Also, a water mark-up of 10% ($6.3 million /year) was added to cover the Operation+Maintenance costs of the TRANSALTON project with priority.
No pre-established profit was added to the water import operation considering it a federal/state program; however, no loss is expected to be encountered and substantially all investment should be recuperated.
The values above are increased tenfold as appropriate for the larger TRANSOCEANIC Lower Colorado River project.

NOTES

Note 1. The TRANSOCEANIC concept is described on the websites: https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2021101684&tab=PCTBIBLIO and https://transoceanic.us/

{Note 2. Salton Sea Hydrological Modeling and Results https://www.iid.com/home/showdocument?id=17299#:~:text=The%20open%20water%20surface%20evaporation,System%20%5BCIMIS%5D%202012).

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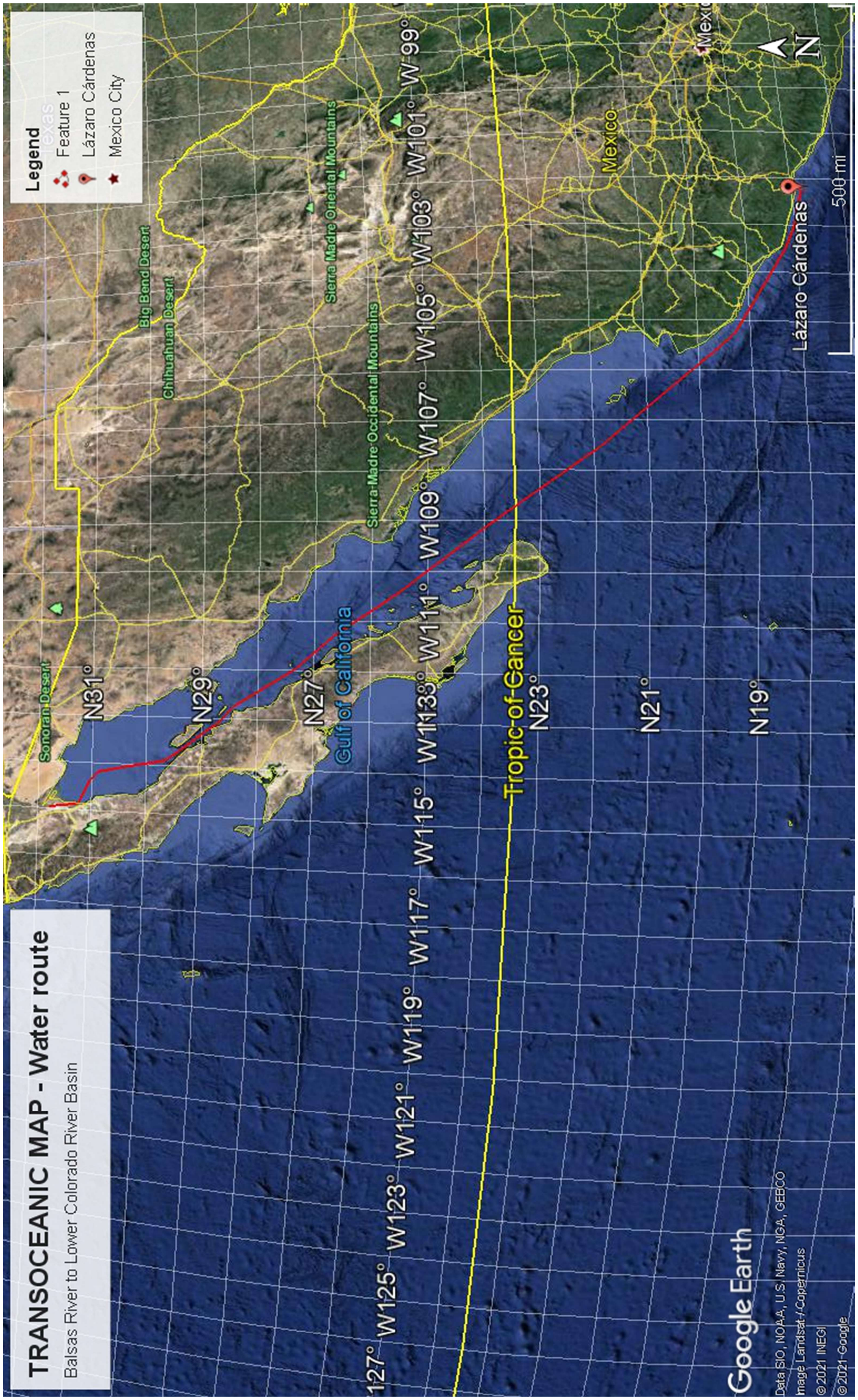
Annex 1

Map of marine water transportation for the TRANSALTON / TRANSOCEANIC Lower Colorado River Basin projects


TRANSOCEANIC MAP - Water route
Balsas River to Lower Colorado River Basin
Legend
Feature 1
Lázaro Cárdenas
Mexico City
Texas
Big Bend Desert
Chihuahuan Desert
Sonoran Desert
Sierra Madre Oriental Mountains
Sierra Madre Occidental Mountains
Gulf of California
Mexico
Tropic of Cancer
Lázaro Cárdenas
500 mi
N31°
N29°
N27°
N23°
N21°
N19°
W99°
W101°
W103°
W105°
W107°
W109°
W111°
W113°
W115°
W117°
W119°
W121°
W123°
W125°
127°
Google Earth
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus
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Annex 2

Characteristics of the TRANSALTON / TRANSOCEANIC Lower Colorado River Basin Projects

PROJECT TRANSALTON - TRANSOCEANIC (transoceanic.us)
(Interactive file - inputs in green cells)

Supply station	**Balsas River, Mexico**	**Balsas River, Mexico**
Delivery station	**Lower Colorado River**	**Salton Sea Project**
Distance, one way, km	**2100**	

CONSTANTS AND TRANSFORMATIONS	
cubic meters for one acre ft	1233.48
meters for one ft	0.3048
Sea water density is (kg/cubic meter)	1028
Pi value	3.14159
Kilometers in one mile	1.60934

SUBMERSIBLE TRANSPORTER	GEOMETRY
Radius, meters	60
Radius, ft	197
L/(2R) RATIO	7
Equivalent submersible length, m	840
Submersible Section, square meters	11310
Submersible surface (cylinder, considered closed by hemispheres)	361911
volume (cylindrical length), cubic meters	9,500,168
volume, acre-ft	7701.92

BALLASTING	
Relative density of concrete	2.4
ballasting required (on cylindrical part), kg/square meters	840
thickness of concrete wall, m	0.612
Volume of concrete required, cubic meters	221578
Volume of concrete required, cubic yards	289813
Weight of concrete structure, metric tonnes	531788
Chamber thickness, meters	0.84
Total hull thickeness, meters	1.45

STRESSES

Max tangent force, Newton/linear meter		1,483,272
Max tangent force, metric tonne force/linear meter		151.200

HYDRODYNAMICS

cx (drag coefficient)		0.08
speed v, m/s		2.9
speed km/h		10.44
Drag force, Newton		3,911,120
Drag force, metric tonne force		398.69
Power required for cruising (w)		11,342,247
Power for cruising, Mw		11.342

POWER AND ENGINE

Hydrodynamic efficiency		0.7
Required Engine power, Mw		16.203
Engine reserve, %		20%
Total Engine Installed Power		19.444

FIXED COSTS

SUBMERSIBLE COST

Unit Concrete price, $/cubic meter		70.00
Unit cost of armature, $/cubic meter		60.00
Unit cost of work, $/cubic meter		120.00
Total unit price of concrete, $/cubic meter		250.00
Cost of concrete for submersible, $	$	55,394,567
PROPULSOR COSTS		
Cost of propulsion $/Mw		500,000
Total cost of propulsion	$	9,721,926
INSTRUMENTATION, COMMAND AND CONTROL (ICC) +OTHER ITEMS		
Cost of ICC, BAGS OTHER STRUCTURES (AT 50% OF CONCRETE COST)	$	27,697,283
Complexity Factor		1.80
Total cost of one submersible	**$**	**167,064,797**

VARIABLE COSTS (FUEL)

FUEL COST PER HOUR		
Fuel Consumption, kg/kWh		0.165
Fuel cost (LNG), $/kg		0.2207
Cost of fuel per hour (at required power) $/hour		590

TRIP COMPUTATION

Supply station	**Balsas River, Mexico**	
Delivery station	**Lower Colorado River**	
Distance, one way, km		**2100**
Distance, one way, miles		1305
Stationing, days at each station		1.25
Cruise time, round trip, hours		402.30
Cruise time, round trip, days		16.76
Total travel time, hours		462
Total travel time, days		19.26
Fuel cost per trip (stationary at half consumption per hour), $	$	255,077
Submersible life (years)		30
Amortization of submersible (30 year life) $/hour		661.14
Cost of submersible per trip	$	305,644
Net cost per trip (submersible+fuel)	$	560,721
Net transport cost $/acre-ft		72.80
Cost of O+M/R+R, profit and other costs (% of net cost)		25%
Brut cost per trip, $		700901
Brut transport cost $/acre-ft		**91.00**
Brut transport cost $/cu meter		**0.0738**

TRANSPORTATION SYSTEM CONFIGURATION AND COST		**Lower Colorado River**		**Salton Sea Project**
Transported water, million cubic meter / year		**9,000**		**900.00**
Transported water, acre-ft per year		**7,296,429.61**		**729,643**
Transporter capability per boat, trips/year		18.949		
Transporter capability per boat, mil cubic m/year		180.02		
Transporter capability per boat, acre-ft/year		145,942		
Required number of transporters		**50**		**5**
Cost of transporters (boats)	**$**	**8,353,239,833**	**$**	**835,323,983**

Cost of two teminal stations (each equal to one submersible transporter cost)	$	**334,129,593**	$	**33,412,959**
Total cost of transportation system	$	**8,687,369,426**	$	**868,736,943**

PARAMETERS

Transportation pressure drop equivalent, meters		176		
Transportation pressure drop equivalent, ft		578		
Water flow at stations for continuous filling/emptying, cubic m/sec		285.39		
Transportation system capability (acre-ft/yr)		7,297,103		
Cost of O+M/R+R, profit and other costs, $	$	132,799,986	$	13,279,999
Unit cost of water at purchase ($/cubic meter)		0.07		
Total cost of water, $/year		630,000,000.00	$	63,000,000
Markup (water)		10%		
Water sale maerup, $/year (includes G&A)		63,000,000.00	$	6,300,000
Total delivered price of water, $/year		**1,356,999,930**	$	**135,699,993**
Unit price of water, delivered, $ / cubic meter		**0.1508**		
Unit price of water, delivered, $ / acre-ft		**185.98**		
For information only: Present Value Investment per Present Value Yield - 5-year construction period, 30-year project life, real discount rate of 2.5%, no salvage value, ($/acre-ft)		**63.99**		
Investment cost per yearly yield $/(acre-ft/year)		1191		