Coastal Environment's Projects Vs. Qatar's Environmental Law and Project's Opportunities

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Summary

Qatar is a peninsula, about 180 km long and 85 km wide, covering an area of approximately 11,500 km^2, which is surrounded on three sides by the waters of the Arabian Gulf and is directly connected by land, in the south, to Saudi Arabia. The State of Qatar has seen fast paced development and industrialization, with social and economic changes taking place at an unprecedented rate. This rapid development and the growing resident population inevitably place pressures on the natural environment. However, these pressures can be monitored and managed to ensure that sustainable development and the vision set out in the country's development strategy 2030 can be achieved, coupling socio-economic benefits with the conservation of biodiversity and natural heritage.

The research study and findings in this document encompass a critical analysis of the existing Qatari Environmental Law in relation to relevant projects conducted by Coastal Environment, Inc USA (CE)(www.coastalenvironments.com) with related opportunities that can be explored in the State of Qatar. The emphasis has been laid on the Environmental Law with a view to access their efficacy in dealing with environmental related projects. This has been done by analyzing the nature and origin of these law and the extent to which they function towards the protection of the environment. The related opportunities in this context can be explored with the Government sectors such as Ministry of Environment, Ministry of Transport and Communication etc., Qatar Tourism sector such as Hotels, Oil & Gas sector such as Qatar Petroleum, Island projects, Qatar Navy, shipping and logistics companies, Consultants and contractors with projects related to the Marine environment and various stakeholders..

The feasibility study analysis in this document helps in understanding and identifying relevant issues (Environmental Coastal issues) relating to Qatar in areas of different kind of projects already achieved by CE in setting those projects which bring elements of knowledge on the possibilities of identifying critical issues and environmental strategies in negotiating concerns of how possible we can achieve a good marine environmental ecosystem. These vulnerable ecosystems have come under increasing pressure in recent times as a result of the dramatic expansion of coastal development, and threats to these ecosystems are likely to accelerate in the coming years as Qatar's economy and population continue to grow. Although environmental regulation had historically lagged behind the rapid pace of development, in recent years Qatar's leadership has aggressively expanded environmental management as a result of the growing awareness of the importance of coastal ecosystems. While these improvements are encouraging, management remains challenged by its current project-driven focus.

The coastline of Qatar is a rich mosaic of productive and diverse coastal and marine ecosystems including mangrove forest, intertidal mudflats (Sabkha), seagrass beds and coral reefs which opens many opportunities to various related projects in the document. The Qatar markets is challenging as we have various competitors in the marine field but with the vast experience and expertise of our associate, Coastal Environments, Inc USA in this area of services, lots of similarly projects can be executed with better results locally and within the region.

S/N	Title of Coastal Environments Projects	Environmental Law Articles Statement of Article	Remark	Related Opportunities
1	**Commercial Basin- San Diego Bay, California** Coastal Environments assisted Scripps Institute of Oceanography in San Diego with water quality monitoring during remediation dredging, sediment cleanup verification, and compliance with monthly regulatory reporting for San Diego Bay as per requirements issued by the Regional Water Quality Control Board. Field tasks included water and sediment sampling.	**Article No. 76:** The standards of the drainage water quality, criteria of the exhaust waters treated from the land industrial facilities used for the irrigation, criteria of the disposal of the industrial waste to the general waste, criteria of the treated drainage water and criteria of the composure water disposal will be determined in accordance with the standards, criteria, percentage and limits shown in the table attached to the **Annex 3 (Standards and Criteria of Environment Protection)** of these bylaws. The concerned department, in collaboration with the council, will undertake adopting the term and conditions necessary to arrange the best use of drainage water treated and having the quality prescribed in the **Annex 3** referred above, giving guideline to consume them and not to waste them and to utilize them for agriculture and irrigation.	According to the Article 76 there is a • standard for the discharge of industrial effluents into sewers • standard for discharging liquid waste to the public sewage network for treatment • standard for the treatment effluents sanitary wastewater **In Annex 3/Second (Standards and Criteria of Wastewater Quality).** The companies who discharge industrial effluents, liquid waste and sanitary wastewater should fulfill those standards during water quality monitoring and sediment clean-up process for compliance with regulatory bodies. In these cases, treatments, water quality monitoring and regulatory reporting of industrial effluents, liquid waste and sanitary wastewater is very important during remediation dredging activities to avoid destroying the coral reef and seagrass systems	Water Quality Monitoring and Water Sediment Quality Monitoring for Mwani (all Doha Ports), Pearl Qatar, Lusail, United Development Company (UDC) Island Projects (Gewan Island Project), Qatar Petroleum (QP), Qatalum, Qatar Navy etc. Dewatering projects during constructions with Ashghal and major players in construction activities such as Al Jaber, Consolidated Contractors Company (CCC), Boom Construction etc. Doha Wastewater Treatment Plants projects for Ashghal, Qatari Diar Vinci Construction (QDVC), Marubeni Corporation etc. Coral Relocations projects for Qatar Port Authority (Mwani),

				Ministry of Transport and Communication (MoTC) Qatar, UDC (Pearl Qatar), Lusail Real Estate Development Company, GHD, Qatar Tourism Authority, Dredging companies such as MEDCO etc.
2	**Desalination Facility- San Diego, California** As part of an economic feasibility study for the siting of a 30 MGD (million gallons per day) desalination facility, Coastal environments was responsible for environmental review by regulatory agencies and the municipal government, analysis of brine discharge options, and identifying the critical issues and strategies in negotiating environmental concerns with the power utility	**Article No. 87:** The parameters and specifications of the hazardous material disposed of in the water environment have been limited to the terms and conditions shown in the **Annex 4 (Criteria and specifications of the hazardous materials when disposed of in the water environments)** attached to these bylaws. Also, the liquid and illiquid materials damaging to the water environment and subject it to danger and prohibits for the ships and transporters to put or discharge in the regional sea or economic area of the state, from the organic and inorganic materials are described in the **Annex 4/2 (Liquid, illiquid, polluting and unsolvable materials prohibited to be disposed of in water environments)** attached to these bylaws.	Brine discharge, which is the fluid waste from a desalination plant, it returns back to the sea. The impacts of the brine discharge are due to the high level of salinity and total alkalinity and alteration to the temperature. These impacts could be considerable in terms of the influence on the marine organisms such as the development of species, survival of larva and breeding and reproductive traits. These are non-compliance with Qatari laws of the environmental protection **Annex 4 (Criteria and specifications of the hazardous materials when disposed of in the water environments)** Feasibility study analysis helps in the initial design in sitting a project which brings elements of knowledge on the possibilities of identifying critical issues and environmental strategies in negotiating concern of how possible the brine discharge options are to the desalination plants, its effect and mitigation measures.	Environmental Impacts of desalination plants projects with Mwani, Ashghal, Qatar Electricity and Water Company (QEWC), Kahramaa, Pearl etc. Environmental and Marine Impact of Discharge Hazardous materials projects with Mwani Ports, MoTC, Ministry of Municipality and Environment (MME), QP, Manufacturing companies, etc. Marine Impact of Seawater Desalination with Mwani (All Doha Ports), Nakilat, Lusail, UDC Island Projects, Pearl.

			This kind of projects are referred in **Annex 1 No. 31 (Projects of desalination, filling and purification of drinking waters and distribution networks)**	Environmental Marine pollution, spillages etc. with Nakilat, Milaha, Mwani Qatar Ports, Nature Reserves projects, Ashghal etc.
3	**Shipyards Sediment Sampling and Analysis at San Diego Bay- San Diego, California** Coastal Environments has been involved in an extensive sampling program with San Diego Bay Shipyards and Boatyards in order to determine water and sediment chemistry, primarily for the analysis of pollutant levels. As a primary solvent, water is a carrier of many dissolved chemicals. The analysis of water and sediment samples provides data related to environmental conditions. Coastal Environments team has been collecting these samples in various yards to assess the level of chemical contaminants and evaluate changes over time.	**Article No. 88:** The ships and offshore platforms are prohibited from discharging the drainage to internal waters or regional seas or exclusive economic area of the state. It should be disposed of as per the following criteria and procedures. 1. The ship or the marine platform should be equipped with a unit to treat the drainage water 2. Not to discharge the treated drainage water in the distance less than four seal miles from the coast 3. If the ship or the marine platform discharges the wastes before treating them, it should not be in a distance less than 12 seal miles from the coastline. In all cases no ships or marine platform discharges the wastes kept in the tank at once but in medium quantities and the ship is sailed in a speed less than 12 seal miles from the coastline The discharge operation, whatsoever, should not cause to appear visible floating solids in the regional water not to cause for change in the color of these waters.	Considering the provision of the article (88) of the executive by laws of the environmental protection, ships and offshore platforms should follow the criteria and procedures in discharging pollutants. Also, Shipyards where ships are built or repaired which also emit pollutants that can dissolve in water should follow the same criteria	Environmental Marine pollution, spillages etc. with Nakilat, Milaha, Mwani Qatar Ports, Nature Reserves projects, Ashghal, Marine construction companies, etc. Remediation study and sediment analysis for N-KOM, Nakilat, Mwani Ports, MoTC, Qatar Emiri Naval Forces, Shell, QatarGas, etc. Wastewater drainage discharge from ships and offshore platform with the oil sector players (such as North Oil, QatarGas, RasGas, QP, Shell, Total, etc.) Nakilat, Milaha, Mwani Ports, Mediterranean Shipping Co. (MSC), Logistics companies

		If the drainage water is mixed with water wastes must be treated, this treatment should be done before discharging them. These provisions are not applied in case of discharge for the safety of the ship or those who are on the board or to save the souls in the sea or due to any damage occurred to the ship or its equipment, provided that all the precautions should have taken to prevent this discharge or to minimize them to the maximum limit before and after such damage.		
4	**Beach Stability at Doheny State Beach- Dana Point, California** The California Department of Parks and Recreation retained Coastal Environments (CE) to assist in a project involving construction of a new lifeguard headquarters facility at Doheny State Beach. Doheny State Beach is located in southern Orange County just south of Dana Point Harbor in the City of Dana Point. It consists of 86 acres with frontage along 1.2 miles of the Pacific Ocean. The proposed facility would be at the back of the beach (about 260 ft away from the shoreline). CE's role was to evaluate the risks of damage to the proposed new facility from coastal forces resulting from storm waves and-or flooding from nearby San Juan Creek, which intersects Doheny State Beach and flows into the Pacific Ocean.	**Article No. 92:** No project or enterprise will be allowed to be established on the sea coasts up to minimum 200 meters inside from the coastline, nor to carry out business which may affect the natural way of the coast or alter it by entering in the direction of the sea water or reduce the line except with the approval of the concerned department in collaboration with the council and considering the provisions of the Law No. (4) of 1983, regarding the exploitation and protection of the living water wealth in Qatar and law No. (10) of 1987, regarding the private and public properties of the state. **Article No. 93:** The following procedure and conditions to be followed in licensing any projects or	Considering the provision of the article (92) of the executive by laws of the environmental protection, do not establish any project within 200 meters inside from the coastline. Also, should follow the procedures in article (93) such as • Documentation procedures • Environmental Impact Assessment (EIA) • Provide the necessary means to treat the wastes • Justifications of economic and social perspective and confirm of non-availability of alternative place for project • The decision of the council about the environmental license The projects which are listed under article (92) and (93) comply with	Beach stability and nourishment projects for MME, Qatar Tourism Authority, Ashghal etc. Sea water Monitoring and storm waves modeling analysis (Waves and currents of the beaches) for Mwani Ports, UDC (Pearl Island), Lusail projects, MoTC, QP (Dukhan, Mesaieed etc.), Qetafien Projects, Hotels etc. Reclamation and Beach Profiling with Qatar Tourism Authority, MME, MoTC, Ashghal, Hotels etc.

	Tasks included conducting beach profiles, wave modeling analysis to estimate the design wave for various return periods, computation of wave run-up and overtopping, and computation of San Juan Creek mouth water levels for various flood return periods	enterprises or to practice any business in the foregoing paragraph: 1. Submit the application to the concerned department on the form given in the **Annex 2/2- (Application form for Environmental License)** attached to these bylaws, attached with documents, information and required studies. 2. Conduct an environmental impact evaluation study in accordance with the section two of the chapter one of these bylaws, explaining the extent of the impact made by the project or the business on the environmental balance of the coastal area, Coastline and its natural ways, particularly the following a. Slaughtering b. Sedimentation c. Coastal Waves d. Pollution resulted from the project or business e. Works, precautions and plans suggested to avoid or treat the impacts, if any 3. Provide the necessary means to treat the materials or wastes or liquids that may be discharged and any cause for the pollution of the coasts or adjacent waters. 4. Justifications for the establishment of the project in the economic and social perspective and confirm the non-availability of alternative places to establish the project therein. 5. The secretary general undertakes the study of the environment license	environmental protection law article (92) and (93) at least one procedure which are listed above.	Marine and Environmental Impact Assessment (EIA) for MoTC, Mwani Ports, Ashghal, Nakilat, Milaha, QP etc. Beaches erosion and monitoring with MME, Qatar tourism authority (QTA), Hotels, etc.
5	**San Onofre Beach Monitoring Program- San Clemente, California 41-2** In this study, Coastal Environments implemented a beach monitoring program at the San Onofre Nuclear Generating Station, located in San Clemente, CA, for Southern California Edison. This project included measurements and analysis of beach profiles and interpretation of existing wave data in an effort to evaluate beach stability near the nuclear power plant and determine the amount of sand transport in the area. The profiles documented in the study proved crucial for assessing the impact of removing a laydown construction pad from the nearby beach.			Beach profiling projects with Hotels, QTA, MME, etc. Beach monitoring programs with MME, Qatar hotels, Pearl, Lusail, QTA, etc. Coastal development programs and plan projects with Qatar Naval Force, Qatar Army (such as Al Udeid base), Hotels, MME, Mwani (all Qatar ports), etc.
6	**Overtopping Study, UNOCAL-Santa Maria, California 53-2** Coastal Environments was retained to evaluate beach characteristics and		Coastal harbors play a vital role as economic hubs in terms of trade, communications and tourism. The adequate development of port activities depends on the ability of the	

	generate design beach profiles in relation to stability assessment of the Guadalupe Dunes sheet pile wall. The Guadalupe Dunes Oil Field lies east of and extends down onto the alluvial plain of the Santa Maria River. A contaminant plume had been contained by installation of an HDPE wall. UNOCAL constructed a 360-foot-long steel cantilever sheet pile wall to protect the existing HDPE wall from becoming breached by discharges from the Santa Maria River. The primary purpose of this study was to satisfy the Coastal Development Permit requirements pertaining to the stability of the wall during proposed excavation activities. The goal was to prevent the release of hydrocarbons into the environment in the event of overtopping, flooding, or failure.	application for the project or the application for approval on the business to be established after the application and the attached documents are referred to it. The decision of the council about the environmental license or the approval is issued in accordance with the procedures described in the section two of the chapter one from, these bylaws. Fulfill other terms prescribed by the concerned department in accordance with the nature of the project or the business to be licensed for and as per the requirements of the above referred Law Nos. (4) of 1983 and (10) of 1987.	protecting structures for providing shelter and facilities to the users. In particular, coastal harbors must be able to offer operating conditions during most of the year and withstand extreme wave conditions, minimizing economic risks as well as risks for humans, their properties, and the environment. Consequently, overtopping is one of the most important phenomena concerning both the functional efficiency and the structural safety of coastal and port structures, such as breakwaters, which frequently patterns the severity of strong chemical such as hydrocarbon to examine critical locations along the structure, to define proper control measures and to minimize flooding of the infrastructure as much as possible, to attain the expected standard of performance.	
7	**Laguna Madre Coastal Development Project- Tamaulipas, Mexico 47-1** The Laguna Madre, the largest coastal lagoon in Mexico, is located on the Gulf of Mexico and spans between Texas and Mexico. It's portion in Mexico is approximately 120 miles long and 3–8 miles wide. One of the major problems in the area is a lack of tidal inflow to the lagoon. As a result, the southern area has become dry over the past 50 years.		During coastal development, diverse habitats, air and water are essential to a better quality of life. In order to achieve this quality of life, we must integrate economic, ecosystem and societal needs in all elements of development and planning. Projects that integrate conservation, education, sustainable harvest, and economic stability in this area also should be supported. This	Lagoon restoration and tourist development projects with MME, Ashghal, Katara Cultural Village projects, Hotels, UNESCO, QTA, etc. Lagoon hydrodynamic, 3D Hydrodynamics and modelling projects with

	Coastal Environments' work in Laguna Madre was part of a dual-purpose project involving lagoon restoration and tourist development. The latter portion of the project included marinas and navigation channels. Tasks included studying lagoon hydrodynamics and proposing various alternatives for lagoon restoration and navigation channels.		comprehensive approach will further the goal of achieving the protection of a unique natural resource and the viability of local human populations that depend upon it, creating challenges to define what should be targeted as management goals. Long-term monitoring data is needed on both physical and biologic components of the system that would also improve the science-based decision processes.	QTA, MME, Ashghal, Qatar Navy, Hotels etc. Coastal development Plans and Projects with QTA, MME, Hotels, Qatar Navy, Supreme committee 2022, Ashghal, Lusail, UDC (Pearl), etc. Navigational aid and channel installation and supply projects with Mwani (all Qatar ports), MME, Ashghal, Pearl, Lusail, UDC (Pearl) etc. Sea-level rise and data consequences project with Mwani (all Qatar ports), Hotels with beach, Qatar Navy, Milaha, Nakilat, QP, MoTC, Ashghal, etc.
8	**Programmatic EIS (Environmental Impact Statement) for Disposal of Dredged Material from Navy. Dredging Projects in San Diego Bay, California** Coastal Environments was responsible for the development of the marine biology, oceanography, and beneficial uses sections of a comprehensive, programmatic EIS to study and evaluate	**<u>Article No. 91:</u>** The party who is licensed to establish any of the projects or enterprises including the general stores, commercial, industrial, tourist, and services enterprises on the seashore or nearby places, should abide by the following: 1. Not to discharge or put any untreated materials or wastes or	According to the article (91) there are some criteria that should be followed when disposing wastes in water, by the parties who are licensed to establish any of the projects or enterprises. Also, they are responsible for the violations as well. Related reports about potential impact and treating measures should be prepared as an environmental impact statement, as these are ways to	Marine and Environmental Impact Assessment (EIA) for Qatar Navy, MoTC, Mwani Ports, Ashghal, Nakilat, Milaha, QP etc. Marine ecological survey and study projects with Mwani (all Qatar port), Nakilat,

	alternatives for disposal of potentially contaminated dredged sediments from naval facilities in San Diego Bay, including ocean disposal (LA5), beach nourishment (Silver Strand), fast land creation (Convair Lagoon), habitat enhancement (eelgrass and avian), and upland disposal (landfill). The study included a baseline review of over 200 technical documents and the development and analysis of site-specific contaminant chemistry and bioassay information on potential dredge sites to facilitate assessment of impacts of disposal alternatives.	liquids that may cause pollution in the coasts or adjacent waters 2. Not to discharge any insolvent polluting materials, especially those stipulated in the **Annex 4/2 (Liquid, illiquid, polluting and unsolvable materials prohibited to be disposed of in water environments)** attached to those bylaws, in the water environment and adjacent coasts directly or indirectly 3. Not to discharge solvent polluting materials to the water environment and adjacent coasts until they are treated and complied with the specifications and criteria stipulated in the **Annex 3 (Standards and Criteria of Environment Protection)** **and** **Annex 4/1 (Criteria and Specifications of Some Materials when Disposed of in the Water Environments)** attached to these bylaws. 4. Provide suitable and enough units to treat the materials or wasted or liquids, start their operation as soon as such projects or enterprises are started and maintain their safety and maintenance regularly. The legal representative or the in-charge for the management of the project or enterprise that discharges to the water environment will be responsible for the	describe the impacts on the environment as a result of a proposed actions and also alternatives as well as plans to mitigate the impacts from affecting the environment.	Milaha, Hotels, Ashghal, MoTC, etc. Dredging projects with marine dredging companies (such as MEDCO, Promar, Seaworks), MME, MoTC, UDC (Pearl), Lusail, Island developers (such as Qetafien) etc.

		violations committed by the worker against the provisions of the law and these bylaws and to provide the treating measures complying with the criteria and specifications specified in the **Annex 3 and Annex 4/1** attached to these bylaws. **Article No. 87:** The parameters and specifications of the hazardous material disposed of in the water environment have been limited to the terms and conditions shown in the **Annex 4 (Criteria and specifications of the hazardous materials when disposed of in the water environments)** attached to these bylaws. Also, the liquid and illiquid materials damaging to the water environment and subject it to danger and prohibits for the ships and transporters to put or discharge in the regional sea or economic area of the state, from the organic and inorganic materials are described in the **Annex 4/2** attached to these bylaws.		
9	**Site Remediation, Railroad Repair and Fueling Facility- Mazatlán, Mexico** In this project, Coastal Environment utilize remediation technologies to remediate soil and groundwater in Mazatlán, Mexico. The ex-situ system consisted of five bio-cells of approximately 800 cubic yards each. The in-situ system consisted of	**Article No. 73:** The standards prescribed for the drinking water, sea water and drainage water shown in the Annex (3) attached to these bylaws should be followed and the concerned department should take the necessary procedures to implement those standards	This reviews the suite of technologies available for source remediation and their ability to reach a variety of cleanup goals, from meeting regulatory standards for groundwater to reducing costs. The project proposes elements of a protocol for accomplishing source remediation that should enable project managers to decide whether and how to pursue source remediation at their sites.	Soil and groundwater remediation with dredging companies such as (MEDCO, Promar), Mwani (all Qatar Ports), Supreme Committee 2022, Nakilat, N-KOM, QP facilities, Qatar Fuel (Woqod) Fueling depots and facilities, etc.

	approximately 80 CO2 extraction ventilation wells and 65 air sparging wells. CO2 data collected from the extraction blower exhaust was converted into pounds of TPH (total petroleum hydrocarbons) removed and used to estimate advances. Confirmatory sampling was performed every six months in order to evaluate advances. Coastal Environments interacted with environmental authorities on behalf of the client and negotiated soil and groundwater cleanup levels. This project was among the largest full-scale federally sponsored soil and groundwater remediation projects ever carried out in Mexico.	**Article No. 76:** The standards of the drainage water quality, criteria of the exhaust waters treated from the land industrial facilities used for the irrigation, criteria of the disposal of the industrial waste to the general waste, criteria of the treated drainage water and criteria of the composure water disposal will be determined in accordance with the standards, criteria, percentage and limits shown in the table attached to the **Annex 3 (Standards and Criteria of Environment Protection)** of these bylaws. The concerned department, in collaboration with the council, will undertake adopting the term and conditions necessary to arrange the best use of drainage water treated and having the quality prescribed in the **Annex 3** referred above, giving guideline to consume them and not to waste them and to utilize them for agriculture and irrigation.	When using the wastewater for irrigation, according to the Annex 3-2 there is a maximum limit of ▪ Physical test ▪ Inorganic matter ▪ Trace metals ▪ Organic matters and ▪ Biological test for irrigating plantations and green lands. In Qatar, Ground water is one of the main sources for irrigation. Contamination of soil and groundwater in arid and (semi)-arid coastal regions are caused by accidental spillages of petroleum products, such as crude oil, gasoline, and diesel fuel etc. The companies who are polluting the ground water system should take the necessary procedures to remediate that. This kind of projects are referred in **Annex 1 No. 52 (Projects that may influence on the soil and underground water such as irrigation or drainage projects)**	Environmental baseline and geotechnical surveys and studies with MME, Major Construction companies in road and infrastructures such as Marafeq, Qatari Diar, CCC, Al Jaber group, etc., Qatar Fuel (Woqod), Qatar Industrial cities (Mesaieed Industrial City), Manufacturing companies such as Chemical companies such as Mesaieed Petrochemical Holding Company (MPHC), Qatar Petrochemical Company (QAPCO), etc.
10	**Water Level and Velocity Measurements During Vessel Launching at NASSCO Shipyard Graving Dock- San Diego, California** The purpose of this study was to collect data on horizontal and vertical water movements during the launching of large naval vessels. NASSCO's Shipyard Graving Dock constructs and	**Article No. 81:** The concerned departments should equip the shipping ports and the ports arranged to receive the oil transporters and ships repairing docks mentioned in the articles (47) and (52) of the Law, with the necessary equipment enough to receive the unclean composure water and different kinds of waters from servicing the	The launching process takes various forms in shipyards, especially in proximity of rivers or canals where water level and current velocities can change any time and where shipping traffic is extensive. In every shipyard, optimization of economic efficiency is of paramount importance, even more in the current	Water level, sea rise and velocity measurements for Vessel Launch with Nakilat, Milaha, MSC, Mwani (All Qatar Ports), etc. Marine Emergency Response Plan for Mwani (all Qatar Ports),

	launches large naval vessels and observed that during launches, the vessel's path upon leaving the construction dock was not straight. Coastal Environments collected current velocities (north and east) and water levels at the site. The data collected by Coastal Environments was used to determine the cause of this deviation.	reservoirs of the oil transporters and other ships. These ports should be equipped with necessary vessels to receive the wastes, garbage, oil sediments and oil mixtures. No ships or transporter will bill not be permitted for shipping or unloading unless contacted with the concerned department to receive them and direct them to the places allotted for disposing the wastes and unclean composure waters.	shipping industry market conditions, therefore it follows that efforts should be taken to improve the efficiency in each of the productive processes. Most conventional shipyards are large scale operations, which means that most large shipyards have carefully studied and developed their ship launching procedures. It is necessary to understand the principal requirements of the ship launching process and the basic requirements of shipyard for designing and developing one possible solution for ship launching as launching problems can have negative consequences in economical and contracting terms.	Nakilat, Milaha, MSC, Hotels, UDC (Pearl), Lusail, Qetafien Island, etc. Directional Wave analysis projects with Qatar Ports, Nakilat, Milaha, MSC, Hotels, Island (Pearl, Qetafien, Gewan etc.), Lusail etc.
11	**Loma Alta Creek Ultraviolent Treatment Facility – Oceanside, California** Coastal Environments performed a discharge pipe stability and wave run-up analysis to determine the coastal and oceanographic conditions that might affect a proposed discharge structure of the Loma Alta Creek Ultraviolet Treatment Facility in Oceanside, CA. The analysis addressed possible damage to the discharge pipe from wave run-up during various storm wave and water level conditions, the effects of scour on the pipe during winter storms when the mouth of Loma Alta Creek is open, and the effects of the pipe on lateral public access under	**Article No. 89:** The concerned departments should define the necessary vessels prepared for receiving the wastes and the place of delivery for the garage and provide the facilities to receive the wastes, polluted waters and ship wastes, considering that such facilities should be good for use, well maintained and kept clean regularly. **Article No. 90:** The concerned departments should consider, when the wastes collected in the facilities mentioned in the foregoing paragraph, not to spill these wastes or discharge any smell the reform and dispose them in the places in accordance with the	According to Article 89, it is necessary not to provide facilities to receive and deliver wastes, but also all facilities should be well maintained and standard to all regulatory compliance especially in relation to weather condition, wave condition of the waterbodies and possible overtopping. Sea defense structures are very important as they primarily help to limit overtopping volumes which might cause flooding and inundation due to excess discharge from wave run during various storm wave and water level conditions. Conducting standard coastal flood hazard analysis on the facilities will	Wave run-up and Overtopping on beaches and coastal structures projects by Qatar Navy, Hotels, Lusail Island, Pearl Qatar, MME, Ashghal, Qatar Ports QP, Nakilat, Milaha, MSC, etc. Coastal development and beach nourishment projects with MME, Ashghal, Hotels, Qatar Ports, QTA, etc. Coastal Flood Analysis and Mapping projects with Nakilat, Milaha,

	various conditions, including possible flooding and inundation.	terms stipulated in the Law No. (8) of 1974 regarding the Public Cleanliness and its executive bylaws.	help in managing discharge amounts, spillages and its effect on coastal region. Checking the stability of the discharge pipe will help to avoid any possible damage during discharge.	MSC, Qatar Ports, QP and subsidiaries, Lusail, Qatari Diar, UDC (Pearl), Ashghal, MME etc.
12	**Wave Climate Analysis for Vencor's Holly Pipelines Program- Santa Barbara County, CA 34-2** Coastal Environments conducted a wave analysis study for Vencor's Holly Pipelines, which extend from the platform to an onshore processing plant, which is located east of Ellwood Pier. The purpose of the study was to describe the nearshore wave characteristics (height, period, and direction) and to estimate longshore currents caused by breaking waves that create a load on the pipes. The pipes are frequently unburied due to beach erosion in the surf zone and offshore, which exposes them to wave and current forces. This information was used to carry out stress and material fatigue analyses to assess the pipelines' capacity to withstand wave and current loading. This study is important for prevention of a sudden failure of the pipelines, which could halt the crude oil and gas production operation at Holly Platform.			Wave and current loads for Pipelines Stability projects with Oil and Gas companies (such as QP, North Oil, Mesaieed Industrial City, Ra Laffan, Qatar Shell etc.) Dredging companies such as (MEDCO etc.), Ashghal, Qatar Port, MME, Nakilat, Milaha, Marine engineering companies. Directional wave, current, wind, water temperature and tidal studies projects with Qatar Port, Nakilat, Milaha, MME, Ashghal, Qatar Navy, Lusail, Pearl, Hotels, QP, etc. Tidal and storm surge flooding analysis projects with Qatar Ports, Hotels, Lusail,

				Pearl, Qetafien Island, QP, etc.
13	**Venice Lagoon, Sediment Study for Ecosystem Restoration- Venice, Italy 36-2** Coastal Environments assisted Scripps Institute of Oceanography to studied sediment transport in Venice Lagoon, Italy in an effort to address flooding problems from the lagoon into Venice and to assess conditions for a lagoon restoration project. Approximately 55,000 m3 of sediment is lost every year when it moves into the Adriatic Sea. Substantial efforts have been made to minimize this erosion, including construction of submerged banks from dredge material. This study was designed to investigate the effects of these banks on near and far-field flow and local bathymetry. The results of this study provided information about the physical processes occurring in the lagoon, identified the most significant sources of erosion at the bank sites, addressed the impacts of the banks on near and far-field flow currents, and evaluated geomorphologic changes at the banks and in their vicinities.	**Article No. 92:** No project or enterprise will be allowed to be established on the sea coasts up to minimum 200 meters inside from the coastline, nor to carry out business which may affect the natural way of the coast or alter it by entering in the direction of the sea water or reduce the line except with the approval of the concerned department in collaboration with the council and considering the provisions of the Law No. (4) of 1983, regarding the exploitation and protection of the living water wealth in Qatar and law No. (10) of 1987, regarding the private and public properties of the state. **Article No. 93:** The following procedure and conditions to be followed in licensing any projects or enterprises or to practice any business in the foregoing paragraph: 6. Submit the application to the concerned department on the form given in the **Annex 2/2- (Application form for Environmental License)** attached to these bylaws, attached with documents, information and required studies. 7. Conduct an environmental impact evaluation study in accordance with the section two of the chapter one of these bylaws, explaining the extent of the	During coastal development, diverse habitats, air and water are essential to a better quality of life. In order to achieve this quality of life, we must integrate economic, ecosystem and societal needs in all elements of development and planning. These lagoon and harbor projects also require an understanding of coastal processes, including sediment transport over the continental shelf and nearshore minimizing erosion with dredging materials or bank barriers. Numerical modelling techniques are often used during the feasibility studies to ascertain the correct result.	Lagoon restoration and tourist development projects with MME, Ashghal, Katara Cultural Village projects, Hotels, UNESCO, QTA, etc. Lagoon hydrodynamic, 3D Hydrodynamics and modelling projects with QTA, MME, Ashghal, Qatar Navy, Hotels etc. Coastal development Plans and Projects with QTA, MME, Hotels, Qatar Navy, Supreme committee 2022, Ashghal, Lusail, UDC (Pearl), Katara Cultural Village, etc.
14	**Construction of Southern California Edison's Experimental Artificial Kelp Reef – San Clemente, CA**		Artificial reefs are typically designed to enhance specific biological communities and maintain their structural and functional integrity for many years without deteriorating or	Artificial Kelp Reef Marine construction projects for MME, QTA, Pearl, Lusail,

	Coastal Environments (CE) was responsible for the engineering support and construction verification of Southern California Edison's Experimental Artificial Kelp Reef in San Clemente, CA. The experimental reef was constructed to gain information prior to construction of a 150-acre mitigation reef that would be built to mitigate fish and associated biota losses resulting from operation of the San Onofre Nuclear Generating Station. The reef consisted of 22.4 acres constructed of recycled concrete and quarry rock. Technical specifications for design of the reef were completed by CE prior to its construction. Verification monitoring was conducted, including on-site verification, sides-scan sonar verification, diver surveys, and video monitoring. Photographs were collected during the 35-day construction process. Compliance with all applicable permits was achieved.	impact made by the project or the business on the environmental balance of the coastal area, Coastline and its natural ways, particularly the following f. Slaughtering g. Sedimentation h. Coastal Waves i. Pollution resulted from the project or business j. Works, precautions and plans suggested to avoid or treat the impacts, if any 8. Provide the necessary means to treat the materials or wastes or liquids that may be discharged and any cause for the pollution of the coasts or adjacent waters. 9. Justifications for the establishment of the project in the economic and social perspective and confirm the non-availability of alternative places to establish the project therein. 10. The secretary general undertakes the study of the environment license application for the project or the application for approval on the business to be established after the application and the attached documents are referred to it. The decision of the council about the environmental license or the approval is issued in accordance with the procedures described in the section two of the chapter one from, these bylaws. Fulfill other terms prescribed by the concerned department in accordance with	being permanently covered by sediments. In this context, having reliable and detailed ocean bottom characterization data is necessary to properly site and design artificial reefs not only to assure the successful placement of the reef but also as a critical input to the reef design itself. This kind of projects are referred in **Annex 1 No. 45 (Projects established adjacent to the areas which have high environmental values such as valleys, coastal lands, islands, coral areas, unique areas for plants and animals including the natural quarantine and environmental and ecological sensitive areas).**	Qetafien Island, Katara Cultural Village, Coral Relocations projects for Qatar Port Authority (Mwani), Ministry of Transport and Communication (MoTC) Qatar, UDC (Pearl Qatar), Lusail Real Estate Development Company, GHD, Qatar Tourism Authority, Dredging companies such as MEDCO etc. Seagrass and Coral Reef studies, survey and restoration projects with QTA, MME, Nakilat, Milaha, Qatar Ports, Lusail Island, Qetafien, Gewan Island, etc. Ecological survey and mitigation measures for Marine Flora and Fauna projects with MME, Qatar Ports, Katara Cultural Village, Pearl, Lusail, QD, Qetafien Island, etc. Verification monitoring and diver surveys with

		the nature of the project or the business to be licensed for and as per the requirements of the above referred Law Nos. (4) of 1983 and (10) of 1987.		dredging companies, Qatar Ports, Milaha, Nakilat, Lusail, Qetafien island, major players in the real estate companies with projects on the island, Qatar Navy etc.
15	**Environmental Impact Report Consulting for the Southern California Edison Kelp Reef – San Clemente, California 64-1** Coastal Environments (CE) provided consulting services for Resource Insights for the Program Environmental Impact Report (PEIR) required for the construction and management of an artificial reef near San Clemente, CA. CE provided studies for this PEIS that helped determine the effects of existing kelp reefs on coastal processes such as waves, currents, beach widths, and kelp wrack. Additionally, CE performed a review of alternative sites for the kelp reef, taking factors such as the presence of historical kelp reefs, substrate type, location in relation to existing kelp reefs, depth, navigation, rivers, sewer discharges, cultural resources, parks and reserves, and proximity to the San Onofre Nuclear Generating Station into account. The PEIS was completed in 1998 and the completion of the entire 150 acres of reef was completed in 2008		This study includes site selection, baseline environmental, project impact on the environment, environmental impact assessment, mitigation measurement, and environmental management plan of the kelp reef. These examines all aspects and activities of the study area in terms of the impact on the environmental components, provide the best alternatives to preserve the environment, and avoid potential negative effects during the establishment and operation of the project in order to outline the issues that need to be considered when establishing an EIR for reef, ports, harbors, marinas and other related facilities. However, as each development intervention is unique, key issues may differ from project to another. Accordingly, specific key issues may be identified through a planning focus meeting and through consultation with the existing community.	Marine and Environmental Impact Assessment (EIA) for Qatar Navy, MoTC, Mwani Ports, Katara Cultural village, Ashghal, Nakilat, Milaha, QP etc. Marine ecological survey and study projects with Mwani (all Qatar port), Nakilat, Milaha, Katara Cultural village, Hotels, Ashghal, MoTC, etc. Seawater Monitoring (waves, currents, beach widths and kelp wrack) studies and survey projects with Qatar Port, Nakilat, Milaha, MME, Ashghal, Qatar Navy, Lusail, Pearl, Hotels, QP, Katara, all island projects etc.

				Environmental Impacts of Artificial Kelp Reef projects with Mwani, Ashghal, Qatar Electricity and Water Company (QEWC), Kahramaa, Pearl etc. Environmental and Marine Impact of coastal processes projects with Mwani Ports, MoTC, Ministry of Municipality and Environment (MME), QP, Manufacturing companies, etc. Harbors and marina development analysis projects with QTA, Hotels, Ashghal, MME, Qatar Navy, Island projects (Pearl, Lusail etc.), QP etc.
16	**EIR for Oceanside Harbor Precise Plan Amendment- Oceanside, CA64-2** Coastal Environments (CE) provided technical support to BRG Consulting, Inc., in the preparation of an Environmental Impact Report (EIR) related to the Oceanside Harbor Precise Plan Amendment. The amendment was developed in response to three project		These lagoon and harbor projects also require an understanding of coastal processes, including sediment transport over the continental shelf and nearshore minimizing erosion with dredging materials or bank barriers. Numerical modelling techniques are often used during the feasibility studies too ascertain the correct result.	Beach stability, coastal processes and nourishment projects for MME, Qatar Tourism Authority, Ashghal, Hotels, Lusail, Pearl, Qetafien Island, UDC, etc.

	components envisioned for the Harbor Beach area of the Oceanside Small Craft Harbor: 1) A boat launch ramp and interpretive expansion; 2) A marine research and interpretive center; and 3) Improvement of the Harbor Beach recreational support facilities. CE investigated the possible impacts of the proposed expansion through a review of beach width history, beach stability, and coastal processes that determine these factors. The study also addressed the impact of the proposed development in relation to nearshore processes and beach use. Mitigation measures for construction-related impacts were presented, and the impacts of the beach processes on the proposed development were evaluated, including flooding and undermining.		This kind of projects are referred in **Annex 1 No. 52 (Projects for establishing airports, ports and harbors and deepening channels)**	
17	**Channel Dredging, Beach Sand Transport, and Sedimentation Report- San Diego, California 65-1** Coastal Environments provided technical support to Frederic R. Harris, Inc., to assess the potential beneficial and adverse impacts resulting from placement of beach fills from the dredging of the San Diego Bay entrance channel on specific local beaches. Beneficial impacts included enhanced recreational areas, improved surf breaks, shoreline protection, erosion control, and improved cross beach and along-shore access. Possible adverse	**Article No. 91:** The party who is licensed to establish any of the projects or enterprises including the general stores, commercial, industrial, tourist, and services enterprises on the seashore or nearby places, should abide by the following: 5. Not to discharge or put any untreated materials or wastes or liquids that may cause pollution in the coasts or adjacent waters 6. Not to discharge any insolvent polluting materials, especially those stipulated in the **Annex 4/2 (Liquid, illiquid, polluting and**	According to the article (91) there are some criteria that should be followed when disposing wastes in water, by the parties who are licensed to establish any of the projects or enterprises. Also, they are responsible for the violations as well. Related reports about potential impact and treating measures should be prepared as an environmental impact assessment, as these are ways to describe the impacts on the environment as a result of a proposed actions and also alternatives as well as	Marine and Environmental Impact Assessment (EIA) for Qatar Navy, MoTC, Mwani Ports, Ashghal, Nakilat, Milaha, QP etc. Marine ecological survey and study projects with Mwani (all Qatar port), Nakilat, Milaha, Hotels, Ashghal, MoTC, etc. Dredging projects with marine dredging

	impacts included impeded cross-beach access due to scarps, modified surfing conditions, impacts on structures and utilities, and sand migration influencing lagoons, creeks and offshore habitat. Nine coastal wetland areas were included in the study. The findings were based on an understanding of environmental conditions, littoral processes, coastal wetland processes, and on the results of qualitative analysis and numerical modeling.	**unsolvable materials prohibited to be disposed of in water environments)** attached to those bylaws, in the water environment and adjacent coasts directly or indirectly 7. Not to discharge solvent polluting materials to the water environment and adjacent coasts until they are treated and complied with the specifications and criteria stipulated in the **Annex 3 (Standards and Criteria of Environment Protection)** and **Annex 4/1 (Criteria and Specifications of Some Materials when Disposed of in the Water Environments)** attached to these bylaws. 8. Provide suitable and enough units to treat the materials or wasted or liquids, start their operation as soon as such projects or enterprises are started and maintain their safety and maintenance regularly. The legal representative or the in-charge for the management of the project or enterprise that discharges to the water environment will be responsible for the violations committed by the worker against the provisions of the law and these bylaws and to provide the treating measures complying with the criteria and specifications specified in the **Annex 3 and Annex 4/1** attached to these bylaws.	plans to mitigate the impacts from affecting the environment. Sediment Sampling and Testing Plan (SSTP), as part of the sediment quality assessment, is prepared to propose appropriate field investigation, sampling and chemical and biological laboratory tests to characterize the sediment/mud concerned, including the ranges of parameters to be analyzed; the number, type and methods of sampling; sample preservation; chemical and biological laboratory test methods. This SSTP serves its purpose for meeting the EIA requirement for the Project only and also ascertain if the spoil from dredging are suitable for other usage such as beach nourishment or ocean disposal.	companies (such as MEDCO, Promar, Seaworks), MME, MoTC, UDC (Pearl), Lusail, Island developers (such as Qetafien) etc. Beach nourishment projects with MME, Ashghal, Hotels, Qatar Ports, QTA, Katara Cultural Village, etc. Coastal development Plans and Projects with QTA, MME, Hotels, Qatar Navy, Supreme committee 2022, Ashghal, Lusail, UDC (Pearl), Katara Cultural Village, etc. Sediment sampling and testing plan projects for dredging projects with QP, Hotels, Milaha, Nakilat, Katara Cultural Village, MME, Ashghal, Island (Pearl, Qetafien), Lusail, MoTC, Mesaieed Industrial City, Qatar Ports, etc.
18	**Nimitz Marine Facility, EA-IS Joint NEPA-CEQA Document- San Diego, CA 65-2** Coastal Environments provided technical support for Scripps Institute of Oceanography (SIO) in preparing necessary environmental review documents and in sediment usage feasibility for the dredging of 30,000-60,000 cubic yards of sediment at the Nimitz Marine Facility. The dredging was necessary to permit berthing of the new SIO research vessel, AGOR 24. Coastal Environments assisted SIO in drafting the EA-IS joint NEPA-CEQA document for the proposed dredging. Coastal Environments also assisted SIO in developing and implementing a sediment testing plan to determine if the dredge spoil was suitable for beach nourishment or open ocean disposal. The results of the designed testing program indicated that the material was			

	suitable for use in either application (beach nourishment or ocean disposal).	**Article No. 87:** The parameters and specifications of the hazardous material disposed of in the water environment have been limited to the terms and conditions shown in the **Annex 4 (Criteria and specifications of the hazardous materials when disposed of in the water environments)** attached to these bylaws. Also, the liquid and illiquid materials damaging to the water environment and subject it to danger and prohibits for the ships and transporters to put or discharge in the regional sea or economic area of the state, from the organic and inorganic materials are described in the **Annex 4/2** attached to these bylaws.		