



DEPARTMENT OF THE ARMY
CHIEF OF ENGINEERS
2600 ARMY PENTAGON
WASHINGTON, D.C. 20310-2600

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DAEN (1105-2-10a)

SUBJECT: Encinitas – Solana Beach Shoreline Coastal Storm Damage Reduction, San Diego County, California

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on coastal storm damage reduction along the Pacific Ocean shoreline in Encinitas and Solana Beach, California. It is accompanied by the report of the district and division engineers. This report is in partial response to the authority in a May 13, 1993 Resolution of the House Public Works and Transportation Committee to conduct a study of the shoreline in and adjacent to the city of Encinitas and an April 22, 1999 Resolution of the House Committee on Transportation and Infrastructure to conduct a study of the shoreline along Solana Beach, California. The Energy and Water Development Appropriations Act of 2000, Public Law 106-60, appropriated the funds for a reconnaissance study to investigate shoreline protection alternatives for Encinitas and Solana Beach shorelines, California, which resulted in the referenced district and division reports. Preconstruction engineering and design activities for the Encinitas and Solana Beach project will continue under the authorities cited above.

2. The reporting officers recommend authorization for a plan to reduce coastal storm damages by constructing a beach fill/berm along the Encinitas and Solana Beach shorelines. The recommended plan for coastal storm damage reduction in Encinitas includes the construction of a 50-foot-wide beach nourishment project along a 7,800-foot-long stretch of shoreline using 340,000 cubic yards of compatible sediment, with renourishment on the average of every five years, with approximately 220,000 cubic yards of compatible sediment, over a 50-year period of federal participation, for a total of nine additional nourishments. The recommended plan for coastal storm damage reduction in Solana Beach includes construction of a 150-foot-wide beach nourishment project along a 7,200-foot-long stretch of shoreline using 700,000 cubic yards of compatible sediment, with renourishment on average every 10 years, with approximately 290,000 cubic yards of compatible sediment, over a 50-year period of federal participation, for a total of four additional nourishments. The design berm will be constructed to an elevation of +15 feet Mean Lower Low Water with foreshore slope of 10 horizontal: 1 vertical. Material for the beach fill will be dredged from a borrow site identified off the coast of San Diego County. Physical monitoring of the performance of the project will be required annually throughout the 50-year period of federal participation. This plan would provide coastal storm damage reduction throughout the project reach and would maintain the existing recreational beach. The project in Encinitas is expected to have minimal impacts to environmental resources. The project in Solana Beach may cause significant indirect impacts to environmental resources although it is not expected to have any direct impacts. Monitoring of the hard bottom reef communities will be

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required for two years after the initial construction event to determine actual indirect impacts to habitat. Consequently, a comprehensive monitoring and mitigation plan has been incorporated in the project in the event that impacts to habitat result. If impacts are identified, functionally equivalent mitigation will be required. The recommended plan is the Locally Preferred Plan (LPP) for coastal storm damage reduction. The LPP berm width for each community is 50 feet less than the National Economic Development (NED) Plan.

3. The cities of Encinitas and Solana Beach are the non-federal cost-sharing sponsors for all features. Based on October 2015 price levels, the estimated total nourishment cost of the plan in Encinitas is \$101,688,000, which includes the project first cost of initial construction of \$11,133,000 and a total of nine periodic re-nourishments at a total cost of \$90,555,000. Periodic re-nourishments are planned at 5-year intervals. The estimated total nourishment cost of the plan in Solana Beach is \$65,766,000, which includes the project first cost of initial construction of \$19,891,000 and a total of 4 periodic re-nourishments at a total cost of \$45,875,000. Periodic re-nourishments are planned at 10-year intervals. Therefore, total nourishment cost for both plans is \$167,454,000. The combined project first cost for initial construction is \$31,024,000, and combined re-nourishment cost is \$136,430,000. In accordance with the cost share provisions in Section 103 of the Water Resources Development Act (WRDA) of 1986, as amended (33 U.S.C. 2213), the federal and non-federal shares are as follows:

a. The federal share of the project first cost for initial construction of both plans would be \$20,166,000 and the non-federal share would be \$10,858,000, which equates to 65 percent federal and 35 percent non-federal. The first cost of lands, easements, rights-of-way, relocations, and dredged or excavated material disposal areas (LERRD) is estimated at \$60,000, all of which is eligible for LERRD credit.

b. The federal share of the total re-nourishment cost would be \$68,215,000 and the non-federal share would be \$68,215,000, which equates to 50 percent federal and 50 percent non-federal. The cost of LERRD for re-nourishment is estimated at \$346,000, all of which is eligible for LERRD credit.

c. The total nourishment cost includes \$23,060,000 for mitigation and monitoring over the period of analysis for the project.

d. The cities of Encinitas and Solana Beach would be responsible for the operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) of the respective projects after construction. The project is not currently estimated to result in an incremental increase in OMRR&R over the sponsors' existing beach maintenance activities and costs.

4. Based on a 3.125-percent discount rate and a 50-year period of analysis, the total equivalent average annual costs of the project is estimated to be \$2,168,000 in Encinitas and \$1,614,000 in Solana Beach or \$3,782,000 overall, including monitoring. All project costs are allocated to the authorized purpose of coastal storm damage reduction. The selected plan would reduce average annual coastal storm damages by about 41 percent and would leave average annual residual

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damages estimated at \$3,688,000. The equivalent average annual benefits, which include recreational benefits, are estimated to be \$2,394,000 in Encinitas and \$3,017,000 in Solana Beach or \$5,411,000 overall, with net average annual benefits of \$226,000 in Encinitas and \$1,403,000 in Solana Beach or \$1,629,000 overall. The benefit-cost ratio is 1.1 to 1 in Encinitas and 1.9 to 1 in Solana Beach or 1.4 to 1 overall.

5. Goals and objectives included in the Campaign Plan of the U.S. Army Corps of Engineers have been integrated into the Encinitas and Solana Beach Shoreline study process. The project includes an annual project monitoring program to reevaluate and adjust the periodic renourishment actions. The study was conducted using a watershed perspective to examine sediment supply changes within the watershed. A statistical, risk-based model was used to formulate and evaluate the project. The Encinitas - Solana Beach shoreline is characterized by developed coastal bluffs fronted by narrow sand and cobblestone beach materials which are subject to crashing waves, particularly in the winter season. These waves result in erosion and formation of carved notches at the base of the bluff that can lead to episodic collapses of the bluff. Collapses result in damages and land losses to the public and residential property on the upper bluff as well as life safety risks to the residents of the bluff and recreationists on the beach. The pending threat of bluff failure has forced many homeowners to build private seawalls at the base of the bluff to protect their properties. The project is intended to improve public safety, reduce coastal storm damages to property and infrastructure, and reduce coastal erosion and shoreline narrowing. The study report fully describes risks associated with residual coastal storm damages and risks that will not be reduced. These residual risks have been communicated to the cities of Encinitas and Solana Beach.

6. In accordance with the Corps Engineering Circular (EC) 1165-2-212 on sea level change, the study performed a sensitivity analysis to investigate the coastal and economic effects that different rates of accelerated sea level rise could have on project alternatives. The Recommended Plan was formulated using a historical or low rate of sea level rise which results in an increase of 0.34 feet over the 50-year period of analysis. The sensitivity analysis considered additional accelerated changes, which included what the EC defines as intermediate and high values of 0.77 feet and 2.12 feet, respectively. Since the intermediate rise was not significantly different from the low value, the sensitivity focused on the high value of change. The sensitivity analysis indicated that at higher levels of sea level rise, the project width and re-nourishment intervals would increase for Solana Beach while the project would be unaltered in Encinitas. Higher sea-level rise is expected to result in decreased storm damage reduction benefits for the recommended plan, but it is still justified. Adaptive management during periodic nourishments will include monitoring and adding additional volume of sand to compensate for significant accelerated sea level rise beyond the current observed rate should it become necessary.

7. In accordance with the Corps EC 1165-2-214 on review of decision documents, all technical, engineering and scientific work underwent an open, dynamic and vigorous review process to ensure technical quality. This included an Agency Technical Review (ATR), an Independent External Peer Review (IEPR) (Type I), and a Corps Headquarters policy and legal review. All concerns of the ATR have been addressed and incorporated in the final report. The IEPR was

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completed by Battelle Memorial Institute. A total of 17 comments were documented. The IEPR comments addressed the presentation and methodology used to evaluate recreation, design assumptions regarding beach fill quantities and performance, estimates for several equipment and preconstruction costs, and plan formulation for several project alternatives. These comments resulted in additional discussions in the main report and appendices that address how recreation was evaluated, clarified findings on historic shoreline monitoring and changes to sand volumes in the project area, and additional explanation of how several alternatives were eliminated from further consideration. A safety assurance review (Type II IEPR) will be conducted during the design phase of the project. All comments from the above referenced reviews have been addressed and incorporated in the final documents. Overall, the reviews resulted in improvement to the technical quality of the report.

8. Washington-level review indicates that the project recommended by the reporting officers is technically sound, environmentally and socially acceptable, and economically justified. The plan complies with all essential elements of the U.S. Water Resources Council's Economic and Environmental Principles and Guidelines for Water and Land related resources implementation studies and complies with other administrative and legislative policies and guidelines. Also the views of interested parties, including federal, state and local agencies have been considered. State and Agency comments received during review of the final report and EIS included concerns raised by the California Department of Fish and Wildlife (CDFW), the California Department of Parks and Recreation (CDPR), and the National Marine Fisheries Service. The CDFW clarified in a June 24, 2015 email that there were concerns remaining in regard to five of their prior comments on the draft report and DEIS, including the mitigation impacts and monitoring plan, avoiding and minimizing habitat impacts in the Swami's State Marine Conservation Area (SMCA), conducting baseline biological surveys for Swami's SMCA and reference sites, impacts and mitigation in the Swami's SMCA, and impacts and monitoring plans for adjacent lagoons. The Corps responded that the draft report was revised to describe mitigation based on a functional assessment of actual project impacts. Although some borrow and beach fill activities are located within the SMCA, these are allowed, are consistent with past operations, and are expected to produce no significant impacts. Baseline biological surveys are planned as a basis for impact assessments and the mitigation, monitoring and adaptive management plans will be refined during further design. The report identifies potential for increased sedimentation at the mouths of three adjacent lagoons and discusses post construction monitoring of the three lagoon entrances, as well as Los Peñasquitos Lagoon. Any additional entrance sedimentation identified by the monitoring will be dredged. The CDPR expressed general support for the plan and raised questions in their June 19, 2015 letter regarding the potential for unintended impacts to Los Peñasquitos Lagoon and the adequacy of funding for any required dredging to maintain its tidal circulation and health. The Corps responded that the project includes provisions for monitoring and dredging of any additional sediment at the lagoon entrance, although the analysis did not identify potential for impacts within the Los Peñasquitos Lagoon. The National Marine Fisheries Service commented in a June 24, 2015 letter regarding the project effects on Essential Fish Habitat (EFH) and the consideration given to species within their jurisdiction under the Endangered Species Act. The Corps responded that the four federally-listed marine turtles are not expected to be found on any of the beach placement sites

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and any transiting sea turtles are not expected to be impacted, so a no effect determination for these species is appropriate. The response also notes that project area reefs are not the type utilized by black abalone and the white abalone generally occurs in deeper water. Pre-construction surveys will include measures to monitor for sea turtles and abalone, although no impacts are expected. The response also summarizes the EFH coordination undertaken prior to and following coordination of the draft report. The Corps' final responses to the conservation recommendations were included in Appendix L of the Final EIS/EIR. EFH consultation would be reinitiated if the Corps substantially revises its plans or if new information becomes available.

9. I concur in the findings, conclusions, and recommendations of the reporting officers. Accordingly, I recommend that the plan to reduce coastal storm damages for the Encinitas-Solana Beach, California shoreline be authorized in accordance with the reporting officers' recommended plan at an estimated total nourishment cost of \$167,454,000, which includes the project first cost of initial construction of \$31,024,000 and a total of 9 periodic nourishments at the city of Encinitas and 4 periodic nourishments at the city of Solana Beach at a total cost of \$136,430,000, with such modifications as in the discretion of the Chief of Engineers may be advisable. My recommendation is subject to cost sharing, financing, and other applicable requirements of federal and state laws and policies, including Section 103 of WRDA 1986, as amended (33 U.S.C. 2213). The non-federal sponsors would provide the non-federal cost share and all LERRD. Further the non-federal sponsors would be responsible for all OMRR&R. This recommendation is subject to the non-federal sponsors agreeing to comply with all applicable federal laws and policies, including, but not limited to, the following:

a. Provide 35 percent of initial project costs assigned to hurricane and storm damage reduction, plus 100 percent of initial project costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits; and 50 percent of periodic nourishment costs assigned to hurricane and storm damage reduction, plus 100 percent of periodic nourishment costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits and as further specified below:

(1) Enter into an agreement that provides, prior to construction, 35 percent of design costs;

(2) Provide all lands, easements, and rights-of-way, and perform or ensure the performance of any relocation determined by the federal government to be necessary for the initial construction, periodic nourishment, and operation and maintenance of the project, all in compliance with applicable provisions of the Uniform Relocation and Assistance and Real Property Acquisition Policies Act of 1970, as amended (42 U.S.C. 4601-4655) and the regulations contained in 49 CFR Part 24;

(3) Provide, during construction, any additional amounts as are necessary to make their total contribution equal to 35 percent of initial project costs assigned to hurricane and storm damage reduction, plus 100 percent of initial project costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits; and 50 percent of

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periodic nourishment costs assigned to hurricane and storm damage reduction, plus 100 percent of periodic nourishment costs assigned to protecting undeveloped private lands and other private shores which do not provide public benefits;

b. For so long as the project remains authorized, operate, maintain, repair, rehabilitate, and replace the project, or functional portion of the project, at no cost to the federal government, in a manner compatible with the project's authorized purposes and in accordance with applicable federal and state laws and regulations and any specific directions prescribed by the federal government;

c. Hold and save the United States free from all damages arising from the initial construction, periodic nourishment, operation, maintenance, repair, replacement, and rehabilitation of the project and any project related betterments, except for damages due to the fault or negligence of the United States or its contractors;

d. Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law 96-510, as amended, 42 U.S.C. 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way that the federal government determines to be required for the initial construction, periodic nourishment, operation, and maintenance of the project. However, for lands that the federal government determines to be subject to the navigation servitude, only the federal government shall perform such investigations unless the federal government provides the non-federal sponsor with prior specific written direction, in which case the non-federal sponsor shall perform such investigations in accordance with such written direction;

e. Assume, as between the federal government and the non-federal sponsors, complete financial responsibility for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the federal government determines to be necessary for the initial construction, periodic nourishment, operation, or maintenance of the project;

f. Agree, as between the federal government and the non-federal sponsors, that the non-federal sponsors shall be considered the operator of the project for the purpose of CERCLA liability, and to the maximum extent practicable, operate, maintain, and repair the project in a manner that will not cause liability to arise under CERCLA;

g. Inform affected interest, at least annually, of the extent of protection afforded by the project; participate in and comply with applicable federal floodplain management and flood insurance programs; comply with Section 402 of the WRDA of 1986, as amended (33 U.S.C. 701b-12); and publicize floodplain information in the area concerned and provide this information to zoning and other regulatory agencies for their use in adopting regulations, or

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taking other actions, to prevent unwise future development and to ensure compatibility with protection levels provided by the project;

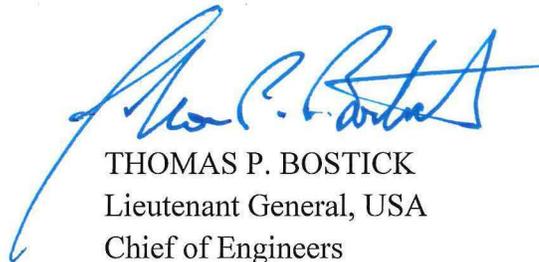
h. Prescribe and enforce regulations to prevent obstruction of or encroachment on the project that would reduce the level of protection it affords or that would hinder future periodic nourishment and/or the operation and maintenance of the project;

i. For so long as the project remains authorized, ensure continued conditions of public ownership and use of the shore upon which the amount of federal participation is based;

j. Provide and maintain necessary access roads, parking areas, and other public use facilities, open and available to all on equal terms; and

k. At least twice annually and after storm events, perform surveillance of the beach to determine losses of nourishment material from the project design section and provide the results of such surveillance to the federal government.

10. The recommendation contained herein reflects the information available at this time and current departmental policies governing formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program or the perspective of higher review levels within the executive branch. Consequently, the recommendation may be modified before it is transmitted to Congress as a proposal for authorization and implementation funding. However, prior to transmittal to Congress, the non-federal sponsors, the state, interested federal agencies, and other parties will be advised of any significant modifications and will be afforded an opportunity to comment further.



THOMAS P. BOSTICK
Lieutenant General, USA
Chief of Engineers