



Office of the City Manager

June 19, 2018

To: Honorable Mayor and Members of the City Council

From:  Dee Williams-Ridley, City Manager

SUBJECT: Shoreline Stabilization Project and the  
Berkeley Waterfront Sea-Level Rise Study

The purpose of this memo is to provide detailed descriptions and the basis for the preliminary cost estimate for a) the shoreline stabilization project and b) the Waterfront Sea-Level Rise Study component of the proposed Waterfront Master Plan.

#### BACKGROUND

The Parks, Recreation & Waterfront Department recently provided a one-time funding request to Council in the amount of \$4.2 million in General Funds for FY19-FY21 as a part of the [May 8, 2018 budget update](#).<sup>1</sup> This request would address immediate safety problems and provide resources to complete a Waterfront Master Plan. As reported to Council in the [May 15, 2018 budget update](#),<sup>2</sup> \$2.8 million is needed in FY19. Two of these funding needs relate directly to sea-level rise: the Shoreline Stabilization Project (phase one – design, \$250,000) and the Waterfront Master Plan (\$325,000 for staff and \$500,000 for engineering consultants), which will contain a sea-level rise study component.

#### DISCUSSION

##### **Shoreline Stabilization Project**

##### **Project Description**

This project consists of shoreline stabilizations at two areas comprising approximately 2,200 linear feet of shoreline: University Avenue from the Strawberry Creek Bridge to Marina Blvd.; and Marina Blvd. from Virginia Street Extension to Spinnaker Way. These two locations have been identified by City engineering staff as areas with significant shoreline erosion that are vulnerable to significant flooding and in need of immediate repair.

---

<sup>1</sup> See [https://www.cityofberkeley.info/Clerk/City\\_Council/2018/05\\_May/Documents/2018-05-08\\_WS\\_Item\\_01\\_FY\\_2019\\_Proposed\\_Budget\\_Update.aspx](https://www.cityofberkeley.info/Clerk/City_Council/2018/05_May/Documents/2018-05-08_WS_Item_01_FY_2019_Proposed_Budget_Update.aspx)

<sup>2</sup> See [https://www.cityofberkeley.info/Clerk/City\\_Council/2018/05\\_May/Documents/2018-05-15\\_Item\\_38\\_Fiscal\\_Year\\_2019\\_Proposed\\_-\\_Supp.aspx](https://www.cityofberkeley.info/Clerk/City_Council/2018/05_May/Documents/2018-05-15_Item_38_Fiscal_Year_2019_Proposed_-_Supp.aspx)

The construction phase involves the installation of additional riprap at two locations at the Berkeley Waterfront, and is currently not funded. The design phase, currently proposed at \$250,000 in City funding, involves the design, permitting, and environmental review of the work. This phase will include technical studies required for the permitting and environmental review of the wave action and erosion dynamics, sea-level rise, geotechnical concerns, CEQA environmental review, construction documents for bidding purposes, and construction engineering estimates.

### **Permitting**

The Bay Conservation and Development Commission (BCDC) is the Bay Area Coastal Zone Management division of the State Coastal Commission. BCDC is the lead permitting agency for this project. Recent state legislation has directed BCDC to use the [State of California Sea-Level Rise Guidance Manual of 2018](#), produced by the Governor's Office of Planning and Research (OPR), as the design guideline to assess risk, identify vulnerabilities, and evaluate adaptation strategies and feasible projects.

This guidance manual was developed by the California Ocean Protection Council (OPC), in coordination with the California Natural Resources Agency, the Governor's Office of Planning and Research, and the California Energy Commission. This policy document relies on the scientific findings from a recently released report from the OPC's Science Advisory Team entitled "[Rising Seas in California: An Update on Sea-Level Rise](#)," which synthesized the current state of sea-level rise science, including advances in modeling and improved understanding of the processes that could drive extreme global sea-level rise as a result of ice loss from the Greenland and Antarctic ice sheets.

The State's Guidance Manual provides: 1) a synthesis of the best available science on sea-level rise projections and rates for California; 2) a stepwise approach for state agencies and local governments to evaluate those projections and related hazard information in decision-making; and 3) preferred coastal adaptation approaches.

At present, the City is currently completing a BCDC permit for a shoreline stabilization project on the east side of Cesar Chavez Park. For this permit, BCDC has issued requirements that the project use the OPR Sea-Level Rise projection of 2.4 feet by 2070 (the Medium Risk Aversion Level of 5% probability of occurrence, or one in twenty chance). This criteria was also used for the nearby Albany Beach Shoreline Stabilization Phase One Project of 2015. The City will use this same sea-level rise criteria for the University Ave. / Marina Blvd. Shoreline Stabilization Projects for the design, permitting, and environmental review phases.

### **Related Projects**

The shoreline at Cesar Chavez Park is monitored annually by a COB-hired, independent engineering firm, SCS Engineers, per the formal Water Board Landfill Closure Order requirements. In 2011, SCS notified the City that several locations along the western and eastern side of Cesar Chavez Park showed signs of significant erosion

and repairs were recommended in order to maintain the integrity of the landfill structure and prevent leachate from entering the Bay. In 2011, the City implemented a shoreline stabilization repair along the west side. In 2017, the City began additional shoreline stabilization repair along the east side and is currently in the design and permitting phase with BCDC. As part of this latest project, staff did a visual assessment of the remaining segments of the Berkeley waterfront shoreline in 2017. A visual inspection found evidence of significant shoreline erosion along the riprap just south of University Ave., as well as Marina Blvd. at the Virginia Street Extension. These problem areas were also observed by the Friends of Five Creeks, which provided the City with recent photographs of flooding during king high tides, (see below). Staff analysis indicates the shoreline has eroded an estimated thirty (30) feet from the original shoreline over the past three decades, more than one foot per year. At the main location of erosion along the University Avenue shoreline, the current high tide line is less than thirty-six feet from the newly constructed Bay Trail Extension, as compared to over sixty-six feet away in 1993.

With [partial funding from Measure T1](#),<sup>3</sup> the City is currently in design for three significant capital roadway improvement projects at the Berkeley Marina: University Ave., Marina Blvd., and Spinnaker Way. These roadways are adjacent to shoreline areas that require immediate shoreline stabilization, specifically at University Ave. and a portion of Marina Blvd. north of the Virginia Street Extension. However, this additional shoreline work is not currently part of the roadway improvement projects. In addition, these roadway projects will require permits from the major aquatic regulatory agencies (Bay Conservation and Development Commission (BCDC), U.S. Army Corps of Engineers (USACE), the Regional Water Board, and the California Department of Fish and Wildlife (DFW)).

### **Project Cost Estimate/Timeline**

There are two shoreline stabilization projects in the immediate area that are similar to this proposed project, namely – the Albany Beach Stabilization Project (Phase One) of 2015, and the Cesar Chavez Park Shoreline Stabilization Project of 2018 (currently in the design and permitting phase). Both the Albany Beach and the Cesar Chavez Park project had a recent estimate of approximately \$1,000 per linear foot. Using this cost as the basis for the programmatic level construction estimate of this project, the total cost is estimated at \$2,800,000. City Staff estimate the design and permitting costs of the project to be approximately \$500,000. The entire University Avenue portion and part of the Marina Blvd. shoreline portion are within East Shore State Park. The City will work on sharing the project costs with the East Bay Regional Park District. Therefore \$250,000 of City funds is requested for Phase One – Design, Permitting, and Environmental Review. If funded, the project will be completed in late FY19 or early FY20.

---

<sup>3</sup> See [https://www.cityofberkeley.info/uploadedFiles/Parks\\_Rec\\_Waterfront/Level\\_3\\_-\\_General/T1%20Detailed%20Project%20Spreadsheet.pdf](https://www.cityofberkeley.info/uploadedFiles/Parks_Rec_Waterfront/Level_3_-_General/T1%20Detailed%20Project%20Spreadsheet.pdf)

Shoreline erosion south of University Ave., at the Marina, during a storm at a king high tide, circa 2017 (photo: Friends of Five Creeks).



Shoreline erosion at Marina Blvd. path at Virginia St Extension, during a storm at a king high tide, circa 2017 (photo: Friends of Five Creeks).



## **Berkeley Waterfront Sea-Level Rise Study- Part of Waterfront Master Plan**

### **Project Description**

As a part of the Waterfront Master Plan, the Sea-Level Rise Study will identify specific additional locations at the Berkeley Waterfront that are vulnerable to Sea-Level Rise (SLR) and will describe how to protect and preserve Waterfront amenities, assets, and quality of life for Berkeley's Marina users, residents, and businesses.

This project will conduct an assessment of sea-level rise using field surveys and coastal engineering analyses to identify locations at the Berkeley Marina that may be impacted by sea-level rise in 2070 and 2100. Adaptation strategies will be provided to address flooding and sea-level rise concerns in these vulnerable locations. The sea-level rise component of the study will serve as a site-specific climate change case study to inform future development of best practice guidelines and other adaptation tools, including science-based visualization techniques. As a requirement of BCDC, the study will rely on the California Governor's Office of Planning and Research (OPR) Sea-Level Rise Guidance Manual of 2018 for specific sea-level rise elevations.

### **Project Permitting**

BCDC is the lead permitting agency for this study.

### **Related Projects**

This Study expands on the City's Climate Action Plan Core Strategies Goal of "In preparation for rising sea-levels and more severe storms, take steps to reduce property and ecosystem damage associated with flooding and coastal erosion." This Study will provide a summary of coastal vulnerability to sea-level rise at the Berkeley Marina in order to meet BCDC's requirement to incorporate best estimates of future sea-level rise in 2070 and 2100 for near-, medium-, and long-term projects.

Near- and medium-term projects will focus on maintenance-related activities such as the replacement of existing finger dock systems at the Marina, stabilization of existing shoreline revetments, and projects currently underway (University Avenue Lane Reconfiguration, Marina Boulevard Pavement Rehabilitation, Spinnaker Way Pavement Rehabilitation and Drainage Improvements, Berkeley Municipal Pier Study, and the Bay Trail Phase 3 Renovation Project). As required by BCDC, the near- and medium-term projects will be designed to be "resilient" to 2070 sea-level rise, and include potential measures to allow the project site be "adapted" to end of century (2100) sea-level rise.

### **Project Estimate/Timeline**

Along with infrastructure evaluation and financial modeling, the Waterfront Master Plan will include a Sea-Level Rise Study. The draft study should be complete in late FY2019 with the Final Study and BCDC Maintenance Permit completed in FY2020. Staff estimates that the total master plan will cost approximately \$975,000, inclusive of the Sea-Level Rise Study.

Page 6

June 19, 2018

Re: Shoreline Stabilization Project and the  
Berkeley Waterfront Sea-Level Rise Study

cc: Jovan Grogan, Deputy City Manager  
Scott Ferris, Director, Parks, Recreation & Waterfront  
Teresa Berkeley-Simmons, Budget Manager  
Farimah Brown, City Attorney  
Ann-Marie Hogan, City Auditor  
Mark Numainville, City Clerk  
Matthai Chakko, Assistant to the City Manager