MEMORANDUM

October 4, 2024

TO: MEMBERS, PORT COMMISSION
Hon. Kimberly Brandon, President
Hon. Gail Gilman, Vice President
Hon. Willie Adams
Hon. Stephen Engblom
Hon. Steven Lee

FROM: Elaine Forbes
Executive Director

SUBJECT: Request approval to accept and expend a $159,900 grant from the Federal Emergency Management Agency to fund an Engineering with Nature Working Group.

DIRECTOR'S RECOMMENDATION: Approve the Attached Resolution 24-43

EXECUTIVE SUMMARY

The Port submitted a subapplication to the Federal Emergency Management Agency (FEMA) on December 1st, 2021 for the Building Resilient Infrastructure and Communities (BRIC) competitive grant program for $159,900 to establish an Engineering with Nature Working Group. FEMA formally awarded the grant on August 9, 2024.

This report describes the proposed scope of work under the grant and recommends approval of the attached resolution authorizing Port staff to accept and expend the grant, subject to approval by the Controller and the Board of Supervisors.

STRATEGIC OBJECTIVE

The Port's Waterfront Resilience Program and the work completed with this FEMA BRIC grant funding supports the goals of the Port's Strategic Plan as follows:

Engagement:
By leading an inclusive stakeholder process to develop a shared vision, principles, and goals for the Waterfront Resilience Program and Flood Study. Data from this study will be publicly available to benefit all future projects proposed within SF Bay.

Resiliency:
By leading the City's efforts to address threats from earthquakes and flood risk through research and infrastructure improvements to the Embarcadero Seawall and adjoining buildings and other infrastructure, and to the 7½ miles of Port shoreline property. Findings from this working group will maximize engineering with nature opportunities to be incorporated into future projects along the Port and within the Bay.

Sustainability:
The incorporation of engineering with nature principles provides opportunities to enhance the ecosystem with habitat improvements and sustainable design and construction best management practices. This working group will explore natural infrastructure alternatives (e.g. wetlands, horizontal levees, and "living shorelines") for future shoreline stabilization and improvement projects. Findings from this working group will help implement City Biodiversity Goals and best sustainable practices in all Bay improvement projects.

Evolution:
Incorporating engineering with nature and providing benefits to bay ecosystems is in line with providing publicly desired amenities requested for a new seawall and the Waterfront Resilience Program.

BACKGROUND

The Port submitted a subapplication to the Federal Emergency Management Agency (FEMA) on December 1st, 2021 for the Building Resilient Infrastructure and Communities (BRIC) competitive grant program for $159,900. The proposal is to fund an Engineering with Nature Working Group to build the Waterfront Resilience Program's (WRP) scoping capacity of nature-based solutions for future hazard mitigation projects. This group will be comprised of experts who will workshop and provide recommendations for ways the WRP can incorporate nature-based solutions in our coastal flood defenses waterfront-wide.

The group will work with the Port for approximately nine months after funding is awarded, reviewing existing WRP materials and bayside waterfront conditions, reviewing global adaptation strategies and best practices, participating in multiple design charrettes, and finalizing a report to communicate their recommendations. Additionally, funding from this grant will fund the WRP's effort to identify a methodology for quantifying quantifiable benefits of environmentally beneficial measures incorporated in hazard mitigation projects. This type of methodology will not only better inform the cost-benefit analysis for future grant applications but could also impact national policy on hazard mitigation project funding.

On August 9, 2024, the Port of San Francisco was officially awarded FEMA BRIC funding to conduct this work.

SCOPE OF WORK

This work will rely on a group of experts in nature-based planning, with experts identified for scoping activities, and a contract for consultants to conduct economic and quantitative analysis of the scoped solutions for follow-on FEMA sub-applications for construction.

Task A1: Review of Existing Port and Regional Planning Work:
The work would begin with the Port presenting working group members with work completed to date under the Port's Waterfront Resilience Program, including summaries and access to all reports, planning documents, public engagement, permitting documents, and relevant work of local, state, and federal regulatory agencies.

Task A2: Review of Waterfront Geography, Bathymetry, Hydrological and Ecological Conditions:
This task includes a review of geological, hydrology, and hydrological surveys, hazardous materials inventories, and environmental studies to better understand existing conditions. This includes native species and localized opportunities for ecological improvement with respect to those species.

Task A3: Review and Selection of Specific Reaches for Scope Development:
The Working Group will review sections of the San Francisco waterfront for scoping, considering site-specific hardscape, soil and hydrological conditions, existing and potential public use of the space, intensity, and fungibility of maritime use that may conflict with waterside improvements, results of the Port's robust public engagement and potential environmental impacts of ultimate construction in that section of the waterfront.

Task A4: Review of Global Adaptation Strategies and Best Practices:
Expert Working Group members will draw from their own expertise as well as that of others in their region to ensure the latest innovations are being considered for inclusion in the development of candidate nature-based solutions. The goal of the work under Task A4 is to be as inclusive as possible with the best expertise, ensuring that potential innovations can be realized as part of project scoping.

Task A5: Multiple Iterations of Design Charettes:
With the benefit of work conducted under Tasks A1-4, Working Group members will conduct 2-3 design charettes, bringing a deep understanding of existing conditions and challenges, and with the latest work in nature-based engineering available to iterate around. This task will end with the selection of one or more solutions to be scoped for areas selected for scoping.

Task A6: Project Scoping for Selected Sites:
Working Group members will work together with Port project staff to generate a preliminary design and identify the section(s) of the Port's waterfront that would be most competitive in a subsequent sub-application for funding construction or design and construction projects.

Task A7: Final Report:
The Working Group will complete a final report with recommendations for integrating nature-based solutions into ensuing waterfront adaptation projects eligible for FEMA BRIC funding. These recommendations will be made by the members' individual expertise as well as the research, review of existing Port materials and geography, and charette workshops conducted collectively. The Port will leverage the recommendations by incorporating all viable engineering with nature opportunities into the ongoing planning process to develop waterfront adaptations.

The Working Group will consist of members with expertise in potential nature-based solutions to respond to rising tides due to climate change and to plan for flood risk reduction.

While the working group will be looking for innovations, consideration of natural and nature-based measures will include:

- Nearshore reefs
- Submerged aquatic vegetation
- Mudflat augmentation
- Beaches
- Tidal marshes
- Polder management
- Ecotone levees
- Migration space preparation
- Creek-to-baylands reconnection
- Green stormwater infrastructure

The second tranche of work will be conducted by consultants with expertise in economic and quantitative analysis.

Activities conducted, by task, for economic and quantitative analysis of environmental benefits activities are as follows:

Task B1: Research Existing Models and Methods:
Initial work will consist of a review of indexes, data, and other metrics used by public agencies to account for the economic value of environmental and habitat improvements and ecosystem benefits. This will include a review of other State and Federal agencies in the United States such as NOAA, the EPA, and USACE, as well as state natural resource agencies and other efforts to date to quantify environmental benefits.

Task B2: Research Existing Markets for Ecosystem Investments:
Review of public investments and marketplaces created around individual ecosystem investments to determine willingness-to-pay across different public markets. This work will establish a range of potential price points that can serve as a proxy for the public value of ecosystem improvements in future nature-based solutions benefits modeling. For example, the California Air Resources Board's Carl Moyer program has established price points, below which it will fund grant subapplications for emissions reduction (e.g. preferred

funding status for projects that reduce weighted tons of emissions for less than $10,000/ton).

Task B3: Review and integration of methods and models:
Review and integration of methods and models derived under previous tasks for both general and broad applicability and for use in calculating benefits for the specific project(s) scoped in detail for this capacity-building work.

Task B4: Peer Review 1 – Methodologies:
Members of the Port and the Port's consultant team will review the methods and models selected for application by the Working Group. Methods reviewed will be for both broad applicability and for selection for the specific project(s) scoped in detail for this capacity-building work.

Task B5: Application and Sensitivity Testing:
Methods and models selected for general application and specific projects will be applied to produce an initial benefit-cost analysis, with sensitivity analysis to determine the effect of respective variables on the outcome.

Task B6: Peer Review 2 – Results:
Peer review of results of methods and models application among members of the consulting team and with members of the Port, reviewing results of benefit-cost analyses for both the scoped projects and generalized costs for use as pre-calculated benefits.

Task B7: Final Report:
The Working Group will complete a final report with recommended methodologies for quantifying environmental impacts and benefits yielded from nature-based solutions, both for capital improvement projects in general and for Port specific waterfront adaptations sought through follow on subapplications to FEMA for funds to construct scoped projects. With an effective methodology to integrate the full public value of nature-based solutions into benefit-cost analysis, the Port will be able to make informed economic decisions about future waterfront adaptation strategies. As an ancillary benefit, the development of such methodologies could extend far beyond the San Francisco shoreline, as jurisdictions worldwide are looking to incorporate nature-based solutions in their climate resilience infrastructure.

New methods for quantification of benefits will allow for preliminary estimates of cost-effectiveness that expand and complement FEMA's standard values for ecosystem services. While this is a project scoping exercise and not construction, the goal of this work (apart from adding to the knowledge base for use by others) is to scope several projects, where those scopes will be the basis for follow on subapplications to FEMA for construction of that infrastructure.

PROJECT FUNDING

The Engineering with Nature Working Group will be funded by the following sources:

SOURCE	AMOUNT
FEMA BRIC Grant	$159,900
Port Local Match	$80,000
Total	**$239,900**

RECOMMENDATION

Port staff recommend that the Port Commission approve the attached resolution authorizing staff to accept and expend $159,900 from the FEMA BRIC grant program, administered through the California Office of Emergency Services (CalOES), subject to Board of Supervisors approval; approve the Grant Agreement; and upon the Board of Supervisors' approval, authorize the Executive Director to execute and implement the Grant Agreement with FEMA/CalOES.

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Waterfront Resilience Program