San Francisco Bay Conservation and Development Commission
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TO: Bay Fill Policies Working Group Committee Members

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SUBJECT: Fill for Habitat Bay Plan Amendment policy challenges for discussion at the Bay Fill Policies Working Group Meeting on December 20, 2018

Background

On July 20, 2017, the Commission voted to initiate a Bay Plan Amendment addressing how BCDC approves Bay fill for habitat improvement projects. In the Staff Report provided to the Commission, staff explained the need for an amendment addressing this topic, and stated that "The proposed Bay Plan Amendment would consist of (1) amending the natural resource and dredging findings and policies to address the potential need for fill in habitat-based projects, (2) updating shoreline protection policies to address living shorelines and nature-based infrastructure, and (3) potentially, updating Public Access policy language".

BCDC staff have outlined key topics that are associated with each of the proposed policy areas. For each topic, we have outlined the applicable Bay Plan policies, case studies (where available), the policy issue, questions to consider, and complementary efforts (where applicable). These topics and associated questions were derived from 1) notes and meeting materials from the Commission's Public Workshops on Sea Level Rise; 2) past Bay Fill Policies Working Group meeting minutes and materials; and 3) interviews with key BCDC regulatory staff.

Questions for the Working Group to Consider

1. Are there any additional policy issues relevant to the fill for habitat Bay Plan amendment that should be included in the list below?
2. Should any of the policy issues listed below be reframed or characterized differently?
3. What other research questions should be addressed?

Discussion Materials

Please review the policy issues and questions outlined below for discussion at the November 15 Bay Fill Policies Working Group Meeting:

1. **Amending the natural resource and dredging findings and policies to address the potential need for fill in habitat-based projects:**

   a. **Impacts of Bay Fill**

   Applicable Bay Plan Policies:

   Summary: Major Conclusions and Policies:

   (1) **Justifiable Filling.** Some Bay filling may be justified for purposes providing substantial public benefits if these same benefits could not be achieved equally well without filling. Substantial public benefits are provided by:

   (a) Developing adequate port terminals, on a regional basis, to keep San Francisco Bay in the forefront of the world's great harbors during a period of rapid change in shipping technology.

   (b) Developing adequate land for industries that require access to shipping channels for transportation of raw materials or manufactured products.

   (c) Developing new recreational opportunities-shoreline parks, marinas, fishing piers, beaches, hiking and bicycling paths, and scenic drives.

   (d) Developing expanded airport terminals and runways if regional studies demonstrate that there are no feasible sites for major airport development away from the Bay.

   (e) Developing new freeway routes (with construction on pilings, not solid fill) if thorough study determines that no feasible alternatives are available.

   (f) Developing new public access to the Bay and enhancing shoreline appearance over and above that provided by other Bay Plan policies-through filling limited to Bay-related commercial recreation and public assembly.

   (2) **Effects of Bay Filling**. Bay filling should be limited to the purposes listed above, however, because any filling is harmful to the Bay, and thus to present and future generations of Bay Area residents. All Bay filling has one or more of the following harmful effects:

   (a) **Filling Destroys the Habitat of Fish and Wildlife.** Future filling can disrupt the ecological balance in the Bay, which has already been damaged by past fills, and can endanger the very existence of some species of birds and fish. The Bay, including open water, mudflats, and marshlands, is a complex biological system, in which microorganisms, plants, fish, waterfowl, and shorebirds live in a delicate balance created by nature, and in which seemingly minor changes, such as a new fill or dredging project, may have far-reaching and sometimes highly destructive effects.

(b) **Filling almost always increases the danger of water pollution by reducing the ability of the Bay to assimilate the increasing quantities of liquid wastes being poured into it.** Filling reduces both the surface area of the Bay and the volume of water in the Bay; this reduces the ability of the Bay to maintain adequate levels of oxygen in its waters, and also reduces the strength of the tides necessary to flush wastes from the Bay.

(c) **Filling reduces the air-conditioning effects of the Bay and increases the danger of air pollution in the Bay Area.** Reducing the open water surface over which cool air can move in from the ocean will reduce the amount of this air reaching the Santa Clara Valley and the Carquinez Strait in the summer-and will increase the frequency and intensity of temperature-inversions, which trap air pollutants and thus cause an increase in smog in the Bay Area.

(d) Indiscriminate filling will diminish the scenic beauty of the Bay.

Policy Issue. In parts of the Bay Plan Summary (Part I), bay fill is construed solely as having an adverse impact, and the potential benefits of fill for restoration projects are not acknowledged. While this has not been an issue in permitting, it may be worthwhile to update this language to reflect shifting perspectives on fill for sea level rise adaptation.

Questions to Consider

- Do these policies restrict BCDC's ability to approve fill for restoration projects?
- How could these policies be updated to reflect best available science on the potential importance of bay fill to facilitate adaptation to sea level rise?

Complementary Effort. Regional Water Quality Control Board Water Quality Certification review process (ongoing)

b. **Minor Amount of Fill**

Applicable Bay Plan Policies:

(1) **Fish, Other Aquatic Organisms and Wildlife Policy 5.** The Commission may permit **a minor amount of fill** or dredging in wildlife refuges, shown on the Plan Maps, necessary to enhance fish, other aquatic organisms and wildlife habitat or to provide public facilities for wildlife observation, interpretation and education.

(2) **Tidal Marsh and Tidal Flat Policy 8 / Subtidal Areas Policy 6.** Based on scientific ecological analysis and consultation with the relevant federal and state resource agencies, a **minor amount of fill** may be authorized to enhance or restore fish, other aquatic organisms or wildlife habitat if the Commission finds that no other method of enhancement or restoration except filling is feasible.

Case Study. The Sonoma Creek Enhancement project received a permit to place 24,200 cubic yards (cy) of material in the Bay, but many larger fill for habitat projects have been permitted in diked wetlands, including Hamilton Wetlands (7.1 million + cy) and Sonoma Baylands (~2 million cy).

Policy Issue. Several policies require that restoration projects in the Bay use no more than a "minor amount of fill," yet the Bay Plan does not provide guidance on how to define "minor." Most restoration projects have been sited in diked baylands or salt ponds that are subsequently restored to the Bay, so this policy limitation did not apply to them. However, Bay restoration projects in coming years will likely require more than a "minor amount" of fill to keep pace with sea level rise. The Commission's law and policies already require that fill be the minimum amount necessary and that its public benefits outweigh its detriments, among other tests. So it is not clear why restoration projects should additionally need to be limited to "minor" amounts of fill.

Questions to Consider

- In light of sea level rise, will restoration projects need more than a "minor amount" of fill?
- How much more than a "minor amount of fill" would restoration projects need in the future?
- Which types of habitat might need more or less (e.g. transition zones vs subtidal habitats, etc.), and why?
- Could this language be replaced with the same language used in the law, "minimum amount necessary"? Or are there more factors that should be considered?

Complementary Effort. Regional Water Quality Control Board Water Quality Certification review process (ongoing)

c. **Middle Harbor Enhancement Restriction on Beneficial Reuse of Dredged Material**

Applicable Bay Plan Policies:

(1) **Dredging Policy 11.b.** To ensure protection of Bay habitats, the Commission should not authorize dredged material disposal projects in the Bay and certain waterways for habitat creation, enhancement or restoration, except for projects using a minor amount of dredged material, until:

(a) Objective and scientific studies have been carried out to evaluate the advisability of disposal of dredged material in the Bay and certain waterways for habitat creation, enhancement and restoration. Those additional studies should address the following:

(i) The Baywide need for in-Bay habitat creation, enhancement and restoration, in the context of maintaining appropriate amounts of all habitat types within the Bay, especially for support and recovery of endangered species;

(ii) The need to use dredged materials to improve Bay habitat, the appropriate characteristics of locations in the Bay for such projects, and the potential short-term and cumulative impacts of such projects;

(b) The Commission has adopted additional Baywide policies governing disposal of dredged material in the Bay and certain waterways for the creation, enhancement and restoration of Bay habitat, which narratively establish the necessary biological, hydrological, physical and locational characteristics of candidate sites; and

(c) The Oakland Middle Harbor enhancement project, if undertaken, is completed successfully.

Case Study. Sonoma Creek

Policy Issue. BCDC's current policies provide that only a "minor amount" of dredged material can be used in restoration projects until the Middle Harbor Enhancement project at the Port of Oakland is completed successfully. This restriction will likely limit many Bay restoration projects as dredged material is a major source of construction material for use in these projects and is particularly well suited for them. The Middle Harbor Enhancement project is unique to one area of the bay and one habitat and may not be predictive as to the potential for success of projects in different geographic regions and habitat types. Given the delays to the project it likely will be years before its success can be determined, while restoration projects need to be completed as soon as possible in light of rising sea level.

Questions to Consider

- Is there a fundamental reason why the Middle Harbor Enhancement project needs to be completed and shown to be successful before using greater amounts of dredged material in other habitat projects?
- Can we remove or replace the "Middle Harbor Enhancement" condition?

Complementary Effort. Beneficial Reuse Bay Plan Amendment (tentatively scheduled to be initiated after the completion of this Bay Plan amendment in late 2019)

d. **Habitat-Specific Bay Plan Policies in Light of Sea Level Rise**

Applicable Bay Plan Findings and Policies:

(1) **Tidal Marshes and Tidal Flats Policy 3.** Projects should be sited and designed to avoid, or if avoidance is infeasible, minimize adverse impacts on any transition zone present between tidal and upland habitats. Where a transition zone does not exist and it is feasible and ecologically appropriate, shoreline projects should be designed to provide a transition zone between tidal and upland habitats.

(2) **Subtidal Areas Finding j.** Fill material, such as rock, oyster shells and sediments dredged from the Bay, can enhance or beneficially contribute to the restoration of subtidal habitat by: (1) creating varied subtidal areas beneficial to aquatic species, such as Pacific herring; (2) restoring native oyster reefs; (3) enhancing subtidal plant communities, such as eelgrass beds; and (4) recreating the bathymetry of disturbed areas, such as dredged channels.

(3) **Subtidal Areas Policy 3.** Subtidal restoration projects should be designed to: (a) promote an abundance and diversity of fish, other aquatic organisms and wildlife; (b) restore rare subtidal areas; (c) establish linkages between deep and shallow water and tidal and subtidal habitat in an effort to maximize habitat values for fish, other aquatic organisms and wildlife; or (d) expand open water areas in an effort to make the Bay larger.

Case Studies. Sonoma Creek; Middle Harbor; Coastal Conservancy Living Shorelines Project

Policy Issue. Certain features of tidal marsh (transition zones and channels), as well as certain types of subtidal habitats (oyster reefs and eel grass) will be important components of healthy, resilient ecosystems. There are questions around restoration and fill for each of these habitats that could be better and more clearly addressed by Bay Plan Policies. Additionally, some of these habitats are often created at the expense of other existing habitats. For example, projects may propose conversion of tidal marsh to create transition zone, or conversion of muddy or sandy bottom to create an oyster reef. These projects may involve short-term loss of healthy, functional habitat of one type (and the species that reside there) in order to create long-term benefits.

Questions to Consider

- Do we need more specific policies/guidance on oyster reefs and eel grass habitat restoration and/or creation?
- Do we know enough about where eel grass or oyster reefs have been and have done well to make these decisions?
- Do we need more specific policies/guidance on transition zones?
- Where should we allow for transition zones, i.e., where is it appropriate to place fill on existing marsh to create a transition zone to help that marsh keep pace with SLR?
- What if the proposed transition zone does not have adequate room for migration?
- Do we need more policies/guidance on allowing Bay fill to reposition channelized creeks and streams that connect to the Bay?
- Should we specifically note the importance of these activities and encourage them?
- Under what circumstances should we encourage restoration of more natural tidal hydrology?

Complementary Efforts. Mitigation Bay Plan Amendment (tentatively scheduled to be initiated after the completion of this Bay Plan amendment in late 2019)

e. **Adaptation Planning for Regional Habitat Goals**

Applicable Bay Plan Policies:

(1) **Fish, Other Aquatic Organisms, and Wildlife Policy 3.** In reviewing or approving habitat restoration programs the Commission should be guided by the recommendations in the Baylands Ecosystem Habitat Goals report and should, where appropriate, provide for a diversity of habitats to enhance opportunities for a variety of associated native aquatic and terrestrial plant and animal species.

Policy Issue: The SF Bay Region can make the best use of limited resources by strategically planning for restoration and designing projects that integrate and account for natural processes. BCDC policies already highlight the recommendations of the Baylands Ecosystem Habitat Goals report. This language could potentially be supplemented or updated to reflect recent efforts to assess regional goals for habitat restoration, including the Subtidal Habitat Goals Report (2010), the Baylands Ecosystem Habitat Goals Report Update (2015), and research on Operational Landscape Units.

Questions to Consider

- How can we ensure that we are designing and planning in accordance with natural processes and boundaries in our restoration projects?
- Is any additional policy language needed to encourage these efforts?
- Do we only want to restore what was previously existing or do we want to allow creation of new habitat types in areas where they did not previously exist?

Complementary Efforts. Operational Landscape Units; Baylands Ecosystem Habitat Goals; Subtidal Habitat Goals; Long Term Management Strategy for the Placement of Dredged Material in the Bay Region (LTMS); Regional Sediment Management Plan; SFBJV Implementation Plan; SFEP's Estuary Blueprint

f. **Monitoring and Long-Term Management of Fill for Habitat Projects**

Applicable Bay Plan Policies:

(1) **Tidal Marshes and Tidal Flats Policy 6.** Any ecosystem restoration project should include clear and specific long-term and short-term biological and physical goals, and success criteria, and a monitoring program to assess the sustainability of the project. Design and evaluation of the project should include an analysis of: (a) how the system's adaptive capacity can be enhanced so that it is resilient to sea level rise and climate change; (b) the impact of the project on the Bay's sediment budget; (c) localized sediment erosion and accretion; (d) the role of tidal flows; (e) potential invasive species introduction, spread, and their control; (f) rates of colonization by vegetation; (g) the expected use of the site by fish, other aquatic organisms and wildlife; (h) an appropriate buffer, where feasible, between shoreline development and habitats to protect wildlife and provide space for marsh migration as sea level rises; and (i) site characterization. If success criteria are not met, appropriate adaptive measures should be taken.

(2) **Subtidal Areas Policy 4.** Any subtidal restoration project should include clear and specific long-term and short-term biological and physical goals, and success criteria and a monitoring program to assess the sustainability of the project. Design and evaluation of the project should include an analysis of: (a) the scientific need for the project; (b) the effects of relative sea level rise; (c) the impact of the project on the Bay's sediment budget; (d) localized sediment erosion and accretion; (e) the role of tidal flows; (f) potential invasive species introduction, spread and their control; (g) rates of colonization by vegetation, where applicable; (h) the expected use of the site by fish, other aquatic organisms and wildlife; and (i) characterization of and changes to local bathymetric features. If success criteria are not met, corrective measures should be taken.

Policy Issue. Monitoring of habitat restoration projects that involve Bay fill is necessary to understand efficacy of restoration strategies, and whether or not adaptive management measures should be taken to improve the project's outcome. Different approaches to monitoring could be more clearly laid out in the policy language. Because restoration projects involving fill could have uncertain outcomes, especially considering sea level rise, it may be difficult for permit analysts to assess likelihood of success and feasibility of the proposed approach. Assessment of risk and development of a long-term management plan for will be important in the permitting process. Little guidance is currently provided on how to best account for uncertainty in the long-term, and more guidance may facilitate permitting of this kind of project.

Questions to Consider

- What metrics should be monitored and how should permits address monitoring (e.g. with flexibility or more rigidity)?
- Considering the WRMP process, and the plans to address similar questions, how should we incorporate this work into our policies?
- What kind of risk assessment is necessary for fill for habitat restoration projects?
- How do we analyze restoration projects and how they respond to sea level rise?
- How should a "failed" restoration project be handled?
- How do you balance flexibility and enforceability when deciding how much specificity and detail should be required by applicants and should be written into permit?

Complementary Efforts. Wetlands Regional Monitoring Program (WRMP); Adaptive Management Bay Plan Amendment (tentatively scheduled to be initiated in 2021)

g. **Pilot Projects to Experiment with Fill for Habitat**

Relevant Bay Plan Policies:

Climate Change Policy 5. Wherever feasible and appropriate, effective, innovative sea level rise adaptation approaches should be encouraged.

Case Study. Coastal Conservancy Living Shorelines Project, NERR thin-layer vegetation response study

Policy Issue. There have been urgent calls to restore and potentially create habitats across the bay in preparation for sea level rise, but some approaches to fill for restoration projects are untested in the bay. More policies or guidance may be necessary to facilitate permitting of these essential yet uncertain projects.

Questions to Consider

- How do we define "pilot projects"? Should they be innovative? When is it appropriate to consider projects as "pilot" vs full-scale?
- Should we add Bay Plan findings and policies encouraging pilot/uncertain-outcome projects? Should permits for these projects require their removal if they fail?
- In what sections of Bay Plan could these policies be added?
- Could pilot projects be addressed under a regionwide permit?

h. **Fill Placement Methods**

Policy Issue. Many approaches to sediment augmentation of marshes, or placement of fill to prevent erosion, are untested in the bay. However, these approaches may be essential to retain sediment and help marshes keep pace with sea level rise. Considering the lack of precedent, it may be difficult for permit analysts to assess a project's feasibility. Additional Bay Plan findings and policies or guidance may be necessary to facilitate permitting of projects that propose using one of these approaches.

Questions to Consider

- What is known about the efficacy of various methods of fill? Types of fill (e.g. sand, dredged sediment)? Frequency of fill? Timing, aerial extent, thickness?
- How should methods that are untested in the Bay be evaluated?
- Are policies or guidance needed on this topic?

Complementary Efforts. Strategic Placement Framework (USACE, Stantec, SFEI)

2. **Updating shoreline Protection Policies to Address Living Shorelines and Nature-Based Infrastructure**

   a. **Emphasize the Use of Green Shoreline Infrastructure Over "Gray" Infrastructure in Habitat Projects**

   Applicable Bay Plan Policies:

   Shoreline Protection Policy 4. Whenever feasible and appropriate, shoreline protection projects should include provisions for nonstructural methods such as marsh vegetation and integrate shoreline protection and Bay ecosystem enhancement, using adaptive management. Along shorelines that support marsh vegetation, or where marsh establishment has a reasonable chance of success, the Commission should require that the design of authorized protection projects include provisions for establishing marsh and transitional upland vegetation as part of the protective structure, wherever feasible.

   Policy issue. Although this Bay Plan policy calls for the use of natural or nature-based shoreline erosion prevention strategies over hardened shoreline strategies, most Bay Plan Shoreline Protection policies have a stronger focus on hardened structures, especially riprap. Policy language could be strengthened and expanded to encourage greener strategies and balance out the riprap language.

   Questions to Consider

   - To what extent should we consider shoreline protection policies as a part of this amendment as opposed to the fill for flood protection amendment?
   - When is green infrastructure appropriate over gray infrastructure?
   - How can these policies be more encouraging of green infrastructure?
   - When is a project considered a habitat vs shoreline protection project? Does this distinction have to be made? Do different policies apply if the project is meant for both uses?
   - How to determine whether the primary purpose of a project is habitat restoration or shoreline protection?

   Complementary Efforts. Fill for Flood Protection Bay Plan Amendment (tentatively scheduled to be initiated in 2021)

3. **Potentially Updating Public Access Policy Language**

   Applicable Bay Plan Policies:

   Public Access Policy 2. In addition to the public access to the Bay provided by waterfront parks, beaches, marinas, and fishing piers, maximum feasible access to and along the waterfront and on any permitted fills should be provided in and through every new development in the Bay or on the shoreline, whether it be for housing, industry, port, airport, public facility, wildlife area, or other use, except in cases where public access would be clearly inconsistent with the project because of public safety considerations or significant use conflicts, including unavoidable, significant adverse effects on Bay natural resources. In these cases, in lieu access at another location preferably near the project should be provided.

Public Access Policy 3. Public access to some natural areas should be provided to permit study and enjoyment of these areas. However, some wildlife are sensitive to human intrusion. For this reason, projects in such areas should be carefully evaluated in consultation with appropriate agencies to determine the appropriate location and type of access to be provided.

Also see Public Access Policy 4, 7, 9, 13, and 14.

Policy Issue. During the final Public Workshop on Sea Level Rise, a concern was raised regarding conflicts between BCDC's mandate to provide maximum feasible public access consistent with each project and the wildlife protection objectives of many restoration projects. This conflict is intensified by limited space with sea level rise, limited resources available to construct and maintain public access areas, and other considerations. Although BCDC's policies already address the potential conflicts between public access and wildlife protection, staff added the Public Access policy section as a potential component of the fill for habitat Bay Plan amendment. When BCDC staff and the Bay Fill Policies Working Group revisited this topic recently, all agreed that the effects of sea level rise on public access is an important topic, which is broader than the public access and wildlife habitat protection issue. Thus, it was decided that Public Access policies would be best addressed as part of a separate amendment process, potentially the fill for shoreline protection Bay Plan amendment, tentatively scheduled to be initiated in 2021.