MEMORANDUM

October 17, 2007

TO: MEMBERS, PORT COMMISSION
Hon. Ann Lazarus, President
Hon. Kimberly Brandon, Vice President
Hon. Rodney Fong
Hon. Michael Hardeman
Hon. Stephanie Shakofsky

FROM: Monique Moyer
Executive Director

SUBJECT: Informational Presentation Regarding the National Flood Insurance Program

DIRECTOR'S RECOMMENDATION: Informational Item – No Action Required

Summary

On May 8, 2007, Port staff gave an informational presentation to the Port Commission describing the federal National Flood Insurance Program (NFIP) and the Federal Emergency Management Agency's (FEMA) current effort to develop a Flood Insurance Rate Map (FIRM) of San Francisco.

On September 21, 2007, FEMA published a preliminary FIRM for San Francisco depicting Special Flood Hazard Areas along some of San Francisco's coastline, including most of the Port's finger piers. Initial analysis by the Port's Chief Harbor Engineer indicates that most of the Port's finger piers have a freeboard (or clearance) of one foot or more above the Total Water Elevations projected by FEMA during these 100 year events.

FEMA has authorized a 60 day comment period wherein residents, businesses, City development partners and the City may provide technical comments on the preliminary FIRM. This 60 day comment period will commence on October 22, 2007 with a hearing at the San Francisco Board of Supervisors Land Use Committee. Once FEMA issues a Letter of Final Determination, the City will have 6 months within which the City, acting through the Mayor and the Board of Supervisors, must decide whether to join or not to join the NFIP and adopt a floodplain management ordinance. A final FIRM for San Francisco is expected in September 2008.

THIS PRINT COVERS CALENDAR ITEM NO. 9A

Background

The National Flood Insurance Program is a federally managed program created in 1968 to reduce the risk posed by floods throughout the United States. Under the NFIP, the Federal government provides financial backing for affordable flood insurance in exchange for the adoption of floodplain management regulations by communities participating in the program. The NFIP is managed by the Federal Emergency Management Agency.

1. Flood Insurance Rate Maps (FIRMs), developed by FEMA, that identify Special Flood Hazard Areas (SFHAs) typically near riverine or coastal areas that have a 1% chance of flooding in a given year (base flood or 100-year flood) and other related data;

2. Federally backed, affordable flood insurance for property owners in communities that join the NFIP by applying to FEMA and adopting a floodplain management ordinance; and

3. The following incentives to encourage local communities to join the NFIP:

    - Federally-regulated lenders (including Fannie Mae and Freddie Mac) may not make, purchase, increase or extend any loan on an insurable structure in a Special Flood Hazard Areas unless the owner has flood insurance;

    - Residents and businesses may not purchase federally backed flood insurance if the community does not join the NFIP;

    - Federal agencies may not provide financial assistance for acquisition and construction purposes in Special Flood Hazard Areas if a community does not join the NFIP; and

    - FEMA cannot provide flood-related disaster assistance in Special Flood Hazard Areas to communities and individuals in communities that do not join the NFIP.

Most communities that are mapped with Special Flood Hazard Areas join the NFIP.

Preliminary Flood Insurance Rate Map (FIRM) for San Francisco – Port Jurisdiction

As part of a nationwide effort to digitize its FIRMs, FEMA has been working to digitize FIRMs for the coastal areas along San Francisco Bay. Based on a review of historic data and coastal topography, FEMA has been working with a team of coastal engineers to develop a probabilistic analysis of how the Bay and the Bay shoreline are likely to perform in a 100-year flood event. This exercise involves projecting Total Water Level during 100 year storm events for coastal areas. including storm surge and wave elevations. Based on a technical meeting attended by Port and City staff on Tuesday, October 16, 2007, the analysis conducted to date – which follows strict FEMA guidelines – is a work in progress. Given the breadth of the study area, engineers made (necessarily) gross assumptions to develop the preliminary FIRM issued by FEMA to the City on September 21, 2007.

As an example, FEMA consultants did not account for the protection provided by existing breakwater structures, such as the Fisherman's Wharf breakwater constructed by the U.S. Army Corps of Engineers in 1987. When the City and the Army Corps of Engineers provide

documentation that these structures meet required engineering specifications, the protection afforded by these structures will influence FEMA's final FIRM.

Exhibit 1 shows the portion of the preliminary FIRM issued by FEMA that includes Port jurisdiction. All of the Port's finger piers have been mapped in a V-Zone. FEMA defines a V-Zone as:

> "Areas along coasts subject to inundation by the 1-percent-annual-chance flood event with additional hazards associated with storm-induced waves. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply."

FEMA has determined the Total Water Level (TWL) elevations for the entire length of the Port's waterfront along the San Francisco Bay. Table 1 summarizes these elevations. The TWL represents the maximum water height anticipated for all conditions including high tide storm surge and wave heights. Table 1 also shows the elevations of the Port's piers and the differential height between the TWL predicted by FEMA and the actual height of the pier.

In most cases the piers are above the TWL and thus not subject to flooding (elevation differences shown in the right hand column that are **bolded**). With one exception, the areas that are shown to be below TWL (bracketed by parentheses) are in the northern waterfront and are protected to some degree by breakwaters.

Table 1: Comparison of Port Facility Elevations to FEMA Projections for Total Water Level (TWL) During a 100 Year Storm Event

Facility or Pier No.	Elevation (ft.)	Preliminary TWL (ft.)	Elevation Diff. (ft.)
Hyde St. Pier	12.0	14.76	(2.73)
47	10.8	13.48	(2.70)
45	13.4	13.48	(0.11)
45 outer	13.1	13.48	(0.35)
45 inner	11.8	13.48	(1.70)
43.5	10.8	15.62	(4.79)
43	11.0	10.27	**0.76**
41	11.3	9.32	**2.01**
39	11.9	9.32	**2.54**
35	12.8	10.66	**2.18**
33	12.5	10.66	**1.86**
31	12.8	8.86	**3.96**
29	12.2	8.86	**3.34**
27	12.2	8.86	**3.30**
23	12.3	9.91	**2.43**
19	12.5	9.61	**2.87**

Table 1: Comparison of Port Facility Elevations to FEMA Projections for Total Water Level (TWL) During a 100 Year Storm Event			
Facility or Pier No.	**Elevation (ft.)**	**Preliminary TWL (ft.)**	**Elevation Diff. (ft.)**
17	12.5	9.61	**2.87**
15	12.7	9.61	**3.06**
9	12.3	9.78	**2.50**
7	11.6	9.78	**1.82**
5	10.4	9.78	**0.60**
3	12.1	9.78	**2.32**
1.5	10.4	9.78	**0.64**
1	12.0	9.78	**2.17**
0.5	11.7	9.78	**1.90**
FPz	11.6	9.78	**1.80**
AgBl/Sinbad	11.1	9.78	**1.30**
14	15.1	9.78	**5.30**
Rincon Park	13.8	9.91	**3.90**
22.5	12.1	9.91	**2.14**
26	12.9	9.91	**2.95**
28	12.5	10.47	**2.01**
30/32	13.0	10.47	**2.51**
38	12.9	10.53	**2.33**
40	13.0	10.53	**2.49**
46	13.2	11.84	**1.31**
48	12.1	10.99	**1.09**
50	12.0	10.73	**1.30**
54	12.6	10.73	**1.89**
Low T.C. S/o P54	11.6	10.73	**0.90**
Low A.C. @ P64	11.4	10.73	**0.66**
70	11.7	10.53	**1.13**
80	12.5	10.79	**1.67**
92	11.6	10.33	**1.23**
94 (N end)	11.5	12.07	(0.53)
94 (S end)	13.9	12.07	**1.85**
96	13.1	12.07	**1.03**

Table 1 Note: All elevations refer to NAVD 88 Datum.

Note: FEMA is currently undertaking more detailed analysis of the Bay and the San Francisco bay shoreline. This more detailed analysis is expected to be completed by the end of 2008 or early 2009 (depending on budget and other factors). The projected TWL elevations listed in Table 1 above may change as FEMA completes its more refined analysis.

Based on data provided by FEMA, the Port Engineer's analysis shows that the decks of the piers are above the flood hazard during the 100-year flood. However, FEMA's guidelines and specifications for mapping do not recognize piers over water as being out of the flood hazard, unless the piers are built on fill. Therefore, the preliminary FIRM shows the piers in Zone V.

Impact of V Zone Designation on Waterfront Land Use Plan

If the V Zone designation for the Port's finger piers stands, and the City chooses to join the NFIP and adopt a floodplain management ordinance, this V Zone designation could represent a problem for the Port's implementation of its Waterfront Land Use Plan.

Specifically, FEMA regulations require local agencies that participate in the NFIP to include a provision in their floodplain management ordinance prohibiting construction of anything other than **functionally-dependent** uses seaward of mean high tide in V zones. This means that while the Port could build a cruise terminal seaward of the City's seawall, it might be prohibited from building a mixed-use project containing office or retail uses seaward of the City's seawall.

Port staff has requested that FEMA's consultants calculate wave heights under specific piers planned for future development, including Piers 27-31, Piers 15-17 and Piers 30-32. While discussions with FEMA on this point are still evolving, it appears that if calculations show wave heights under 3 feet (relative to storm surge) under these piers, FEMA may be willing to consider an A Zone designation for the footprint of these finger piers, either now or in the future. The restriction on building non-functionally dependent uses does not apply in A Zones.

Port staff and the City's consultant URS Corporation are closely examining the case of Pier 1 in Boston, where FEMA issued a Letter of Map Revision to the City of Boston changing a V Zone designation to an A Zone[1] designation for the footprint of the finger pier to see how this example might inform Port development.

In addition, FEMA regulations permit local agencies to issue exemptions or variances for projects that meet specified hardship and minimal risk criteria, or that preserve historic structures. Most of the Port's finger piers (from Pier 45 to Pier 48) are contributing resources to the Embarcadero Historic District on the National Register of Historic Places.

Port staff has made it clear to FEMA and Department of Homeland Security (DHS) representatives the importance of utilizing a risk-based analysis for purposes of mapping and developing the Port's finger piers and the need to preserve mixed use development as the vehicle for preserving the Port's finger piers. We believe that FEMA and DHS representatives understand the importance of the finger piers to the local community.

[1] Coastal A Zones (typically) mean areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage.

Port staff is less certain regarding the impact of these regulations on new construction, such as the mixed use cruise terminal project proposed for Piers 30-32, as this structure is not a contributing resource to the Embarcadero Historic District. Therefore, if the V Zone for this finger pier cannot be remapped (via Letter of Map Revision), mixed uses at this facility may be precluded by existing regulations.

Preliminary FIRM Comment Period

Commencing Monday, October 22, 2007, members of the public (including property owners), the City's development partners and the City will have 60 days to provide comments on the preliminary FIRM. These comments must be technical in nature (such as documenting the characteristics of a coastal structure or feature) and be based on empirical data. FEMA adheres to strict guidelines during its mapping process and will not alter Special Flood Hazard Areas based on a mere difference of opinion.

The Port will coordinate to submit comments prepared by the Chief Harbor Engineer. These comments will likely include information related to breakwaters along the waterfront, the fill nature of Pier 45 (which is likely to mitigate the V Zone designation for that pier), and the elevations of the piers compared to TWL.

Comments from City departments and City development partners will be collected by City Administrator Ed Lee for distribution to FEMA.

Impact on Port Tenants

The immediate impact of the FEMA effort, and the City's response to it, is not significant. The risk posed by 100 year storm events to Port tenants has not changed – but is in the process of being better defined by FEMA.

Port staff is coordinating with the City Attorney to prepare a second notice to Port tenants describing the FEMA mapping effort and the public comment period the City is entering. In the longer term, if the City joins the NFIP, the City's floodplain management ordinance will impact new construction and substantial improvements to existing structures. According to the California Model Floodplain Management Ordinance for Coastal Communities[2]:

> "**Substantial improvement** means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred "substantial damage", regardless of the actual repair work performed. The term does not, however, include either:
>
> 1. Any project for improvement of a structure to correct existing violations or state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions; or

[2] Copies of the California Model Floodplain Management Ordinance for Coastal Communities can be downloaded at: http://www.fpm.water.ca.gov/ordinance/ordinance.cfm

2. Any alteration of a "historic structure," provided that the alteration will not preclude the structure's continued designation as a historic structure."

As the City moves closer to consideration and/or adoption of a floodplain management ordinance, Port staff will conduct workshops for Port tenants about the NFIP and rules governing facility improvements in coastal floodplains.

Schedule

FEMA is following the schedule below:

Issue Preliminary FIRM	September 21, 2007
60 Day Technical Comment Period	October 22 – December 20, 2007
(If Necessary), Issue Revised Preliminary FIRM	Early 2008
Letter of Final Determination	March 2008
Issue Final FIRM	September 2008

The City will have 6 months from the Letter of Final Determination to decide whether to join the NFIP and adopt a floodplain management ordinance.

Future Analysis

In consultation with the City Administrator, the Port Commission may wish to undertake future analyses to inform possible letters of map revision and/or future shoreline construction projects, including possible improvements to the City's seawall.

One question that frequently arises is whether FEMA's identification of flood hazards includes any assumptions about the rise in sea levels (according to the Bay Conservation and Development Commission, sea level has risen approximately 18-20 centimeters over the past 150 years). The immediate answer is that FEMA is identifying current hazards, not hazards that may exist in the future, and thus any projected rise in sea levels is not reflected in current FIRMs, but may result in revisions to FIRMs in the future.

Port staff will develop options for potential study for the Port Commission to answer some of the following questions:

1. Can the Port's existing finger piers withstand 100 storm events without improvements (from a structural perspective)? Are the piers' substructure elements and/or the seawall capable of withstanding the anticipated wave loads to the elevations predicted by FEMA? If so, would FEMA, under current mapping regulations, be able to remap all or a portion of the finger piers as A or X Zones[3], rather than V Zones?

[3] X Zones mean areas outside the 1-percent annual chance floodplain, areas of 1% annual chance sheet flow flooding where average depths are less than 1 foot, areas of 1% annual chance stream flooding where the contributing drainage area is less than 1 square mile, or areas protected from the 1% annual chance flood by levees. No Base Flood Elevations or depths are shown within this zone. Insurance purchase is not required in these zones.

2. Based on current estimates of the potential rise in sea levels, could additional (already developed) areas of San Francisco's coastline become Special Flood Hazard Areas? What would these areas look like?

3. What shoreline protection features could mitigate these potential hazards and how would these features interact with the Port's finger piers?

Next Steps

Port staff will:

- Coordinate with the U.S. Army Corps of Engineers to obtain and submit technical comments regarding breakwaters, constructed by the Corps, to FEMA via the City Administrator;

- Submit pier elevations, breakwater locations and details, shoreline improvements and the land-fill breakwater characteristics of Pier 45 to FEMA via the City Administrator;

- Determine wave and storm loads acting on the pier structures, for the water elevations predicted by FEMA, to establish relevance of this loading condition with respect to other loads imparted on pier structures and submit to FEMA via the City Administrator;

- Coordinate with FEMA to obtain the wave elevations under piers currently planned for development and establish the significance thereof;

- Develop a recommended scope of work for future study; and

- Negotiate with the City Administrator and FEMA an exemption in any San Francisco Floodplain Management Ordinance for the Port's existing finger piers based on the Embarcadero Historic District, based on existing regulations and analysis of risk.

Prepared by: Brad Benson
Special Projects Manager