



AGENDA  
SAN MATEO COUNTY SEA LEVEL RISE VULNERABILITY ASSESSMENT  
TECHNICAL WORKING GROUP (TWG) MEETING #3

Thursday, April 14<sup>th</sup>, 2016  
10:00 AM – 12:00 PM  
San Mateo County Board Chambers  
400 County Center,  
Redwood City, CA 94063

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**Supervisor Pine's Welcome**

- Sea level rise is a big issue we will have to address for many years. San Mateo County is working to address this with the sea level rise vulnerability assessment
- Some efforts Supervisor Pine is involved with are:
  - Measure AA. This is a \$12 parcel tax to fund tidal wetlands restoration
    - On the ballot in June
    - Grant money to applicants who are doing projects around the bay.
  - C/CAG Water Committee
    - Comprised of city council members, city managers, and County supervisors
    - Working to better organize themselves to work collectively on flooding and sea level rise
- Thank you to the cities for their hard work and support for San Mateo County's Sea Level Rise Vulnerability Assessment.

**Michael Mak, AECOM, "San Mateo County Bayshore Inundation and Overtopping Assessment"**

- Why / Purpose of the ART Maps
  - Shoreline and flood hazards are complex.
    - In San Mateo County, there are a wide range of shoreline types and critical infrastructure near the shoreline.
    - Cross jurisdictions.
  - Large population of the County live and work near shoreline.
  - The maps provide San Mateo County's overall Vulnerability Assessment with available tools to assess sea level rise.
- Overview of OCOF/ART Maps
  - OCOF Inundation Maps
    - OCOF maps take a broad look at areas vulnerable to sea level rise and coastal flooding.
    - Identify **WHERE** sea level rise and storm surge exposure zone is located.
    - Used to inform selection of San Mateo County's Sea Level Rise Vulnerability Assessment's 30 case study assets.



- ART Inundation Maps
  - Is a finer-scale assessment than OCOF (refined topography).
    - Added additional data sets like overtopping.
  - Identify **WHEN** assets could be impacted.
    - E.g. 24 or 36 inches of sea level rise.
  - Identify **HOW** assets are at risk.
    - What are the pathways of inundation?
    - Is it from local or broad scale overtopping that would allow bay water to reach assets?
- Background
  - Pacific Coast vs. Bay Flooding
    - On the Bayshore
      - Storm surge is the dominant flood hazard that drives inland inundation.
      - Waves are small in the Bay (< 5 feet).
      - ART approach works well.
        - Tested in Alameda County, San Francisco County, and Contra Costa County.
      - On the Pacific open coast
        - Waves are the dominant flood hazard.
        - Waves can be very large (> 30 feet).
        - OCOF approach works well for the coast.
          - ART approach for wave hazards have not been fully developed.
  - Adapting To Rising Tides (ART)
    - AECOM based methodology from ART framework.
    - ART is multi-agency effort.
      - Included BCDC, MTC, Caltrans, BART, Alameda County.
      - Used to understand, refine, and enhance our understanding of climate related risk.
      - Emphasis on future sea level rise and storm surge impacts.
      - ART project includes:
        - Vulnerability and risk assessment
        - Adaptation strategy development
        - Conceptual engineering of selected adaptation options
    - Methods and tools developed through previous Alameda County projects were updated and used for San Mateo County.
      - MTC and BATA will be also creating maps for the rest of the bay.
        - San Mateo can display how both the ART maps and OCOF maps can be used together.
  - FEMA San Francisco Bay Area Coastal Study
    - Large-scale regional modeling to characterize existing coastal hazards.
      - Tides, storm surge, and waves.



- Comprehensive data set that provides water level data along the entire complex shoreline.
- Key Information On Maps
  - Extreme Tides (Stillwater Elevations)
    - Includes astronomical tide, storm surge, El Nino, and freshwater discharge.
    - Extreme tides are temporary flooding.
    - Characterized as “X-percent-annual-chance” tide elevation.
      - For ex. 100-year extreme tide, or 100% annual chance.
    - Does not include wave effects.
  - San Mateo Sea Level Rise Inundation Maps
    - At the 2<sup>nd</sup> Technical Working Group, AECOM first present 3 scenarios for review
      - MHHW + 12” of Sea Level Rise
      - MHHW + 24” of Sea Level Rise
      - MHHW + 36” of Sea Level Rise
      - Now these scenarios are completed for 12” of SLR to 108” of SLR at 12” increments.
        - 10 total maps.
        - Represent combination of sea level rise and extreme tides.
  - Topographic Data
    - Source data from LiDAR collected by USGS in 2010.
      - Same as OCOF, but ART maps have a finer scale.
    - 1-meter grid spacing data elevation model (DEM).
    - DEM modified with additional survey/field data:
      - SFO, US Coast Guard property, Foster City, Redwood Shores, San Mateo, Burlingame, East Palo Alto.
      - Framework takes community feedback, then AECOM can go back and make updates.
  - Shoreline Delineation
    - Leverage SFEI shoreline
    - Delineate structures that currently prevent floodwater conveyance. The tracing of structures that would prevent bay water from being conveyed inland.
    - Examples:
      - Levees
      - Engineered structures
      - High ground
      - Roadways
      - Etc.
    - Delineate natural shorelines and wetlands.
  - Overtopping Potential
    - Overtopping: **Water** level (MHHW or SWEL) exceeds **elevation** of asset:



- “Depth of overtopping”.
  - **Freeboard: Elevation** of asset exceeds **water** level (MHHW or SWEL).
    - Freeboard = the height of the asset above the adjacent water surface.
- Permanent Inundation vs Temporary flooding – 3 concepts each ART map can represent.
  - **Temporary Flooding** – When an extreme tide rolls in on top of MHHW or daily high tide.
    - Low-lying areas on shoreline are flooded.
    - Assets might be damage and some might need repairs, but eventually flood water recedes
    - Low-lying areas are in green on the map
  - Permanent Inundation – Permanent sea level rise on top of high tide, so high tides now stretch farther inland. Low-lying areas are now fully inundated every day.
  - SLR + Extreme Tide – Combination of SLR on top of extreme tide. Some areas remain permanently flooded and some low-lying area are temporarily flooded, but the reach is farther than before.
- Equivalent Futures
  - This ART approach looks at total water levels
    - Different combinations of tide and SLR produce same water levels
      - “One map many futures.”
- San Francisco Tidal Datums Study
  - MHHW and Extreme Tide levels at a finer resolution available Bay-wide.
  - Provides Bay Water Levels at over 900 points along the Bay shoreline.
  - Tidal Datums
    - MHHW, MHW, MTL, MSL, MLW, MLLW
  - Extreme Tide Elevations
    - 1-year, 2-year, 5-year, 10-year, 25-year, 50-year, 100-year, and 500-year.
  - Available online
    - [www.r9coastal.org](http://www.r9coastal.org)
    - [www.adaptingtorisingtides.org](http://www.adaptingtorisingtides.org)
- How to Use the Maps
  - Applications
    - SLR / Extreme Tide Matrix
      - Identify combination of equivalent SLR and extreme tide scenarios.
      - See how shoreline level of protection changes over time.
      - Use in tandem with inundation maps.
    - Inundation and Overtopping Maps
      - *WHEN* assets could be impacted (permanent or temporary flooding).



- E.g. 48” of SLR or 6” of SLR plus 100-year storm event.
- *HOW* assets are at risk.
  - Quickly locate vulnerable sections of shoreline.
  - Locate critical flood pathway.

### **Hilary Papendick, San Mateo County, “Sea Level Rise Vulnerability Assessment Update”**

- Recent study in *Nature Climate Change, 2016*
  - Incorporates population growth and sea level rise. In San Mateo County, 3 feet of sea level rise puts 100,000 + people at risk by 2100.
- Vulnerability Assessment Overview
  - Draft Asset Vulnerability Profiles for asset managers to review in May.
    - Have completed 29/30 asset interviews.
  - A part of the study will include 2 renderings of adaptation strategies.
  - Arcadis will create a draft report end of summer and the report will be final in the fall.
  - In June, next stakeholder meeting to provide an update on vulnerability assessment.

### **Attendee Updates**

- Azalea Mitch, City of Menlo Park
  - Menlo Park is updating General Plan.
    - Researching what other agencies are doing.
      - Menlo Park is figuring out what requirements they should be implementing in terms of development and first floor elevation to sea level rise.
        - Curious how other cities are thinking about sea level rise and creating consistency across County.
- Ahmad Haya, City of Redwood City
  - Current project – Blu Harbor.
- Jeff Moneda, City of Foster City
  - Working with consultant Schaaf & Wheeler to raise levee.
    - Working on the Environmental Impact Report.
    - Completed geotechnical investigation.
    - Have 2 community meeting scheduled.
      - April 21st
      - May 12<sup>th</sup>
    - Foster City has created a Frequently Asked Questions video about the levee project.
      - There will also be recordings of community meetings.
- John Bourgeois, South Bay Salt Pond Restoration Project
  - Focusing on 3000 acres in Ravenswood (near Dumbarton bridge)
  - Goals
    - Habitats



- How wetlands help serve as part of a more resilient shoreline.
  - Integrated habitat features.
- Don Edwards has 70 miles of “levees.”
  - Map viewer would be helpful to show what areas might pose the greatest risk.
- Sabrina Brennan
  - Harbor District site visit on April 25<sup>th</sup> at Oyster Point Marina from 5:30-7:30.
    - Purpose is to see the various facilities and look at chronic flooding issues.
    - Subsidence is a greater factor.
      - Sea level rise is also a key issue.
      - Open to the public
- Afshin Oskoui, City of Belmont
  - Updating General Plan.
    - Plan to incorporate information from Vulnerability Assessment into study.
- Brian Schumacker, City of South San Francisco
  - Concentrating on ground level for data sets.
    - Updating gauging station on Colma Creek.
  - Partnering with FEMA.
  - Output of data
    - Need universal type all stakeholders could use.
      - Google Earth / KMZ.
- Jill Ekas, City of Half Moon Bay
  - Presenting their sea level rise vulnerability assessment to the General Plan Advisory Committee.
  - Updating Local Coastal Land Use Plan.
    - City is entirely in coastal zone.
    - Coastal Hazards chapter.
      - First take at sea level rise policies.
    - Using component of Coastal Commission sea level rise guidance.
      - Main focus is on bluff conditions and drainage.
      - Trying to pull out what is useful in guidance.
  - A portion of the plan will be highlighting moving the California Coastal Trail.
  - Shoreline is changing rapidly.
    - Bluff top erosion.
    - Need to adapt in real time.
  - Half Moon Bay Sea Level Rise Vulnerability Assessment.
    - Will be posted soon.
    - Assessment only used existing data and resource.
    - This will serve as a playbook for what to do next.
- Amy Hutzel, California State Coastal Conservancy
  - Working with San Mateo County Parks to update Coyote Point promenade.



- Just completed western promenade, now working on eastern promenade.
- Dick Fahey, California Department of Transportation
  - GIS files, online/PDF maps would serve as a benefit.
- Michael Barber, San Mateo County
  - Highlight the need for more sharing of data sets across jurisdictions.
- Sabrina Brennan
  - Question on whether there could be a color-coded or prioritized list of assets that are currently having flooding problems.
    - Least critical to most critical to prioritize efforts.
- Aydan Kutay, Woodside Planning Commission
  - Woodside's General Plan (2012) has a sustainability component that includes greenhouse gas reduction and other climate change mitigation measures.