





Update on Monarch Bay Shoreline Development Project

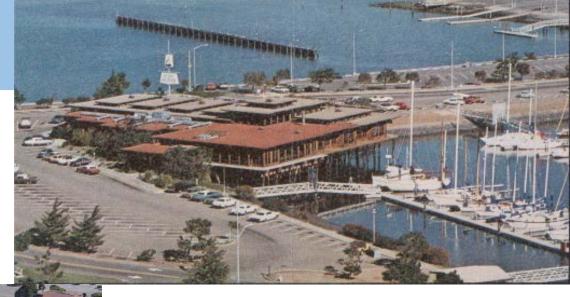


City Council Meeting April 3, 2017





Blue Dolphin





1975

Current

Monarch Bay – San Leandro Shoreline Development Illustrative Site Plan 9/26/16



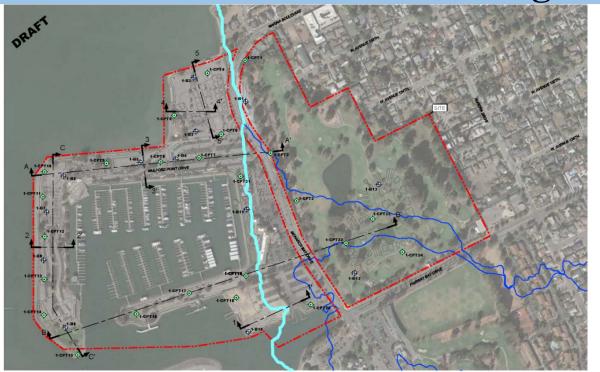
Monarch Bay Shoreline Development BCDC Sea Level Rise Guidelines

All projections reported in this document assume a base year of 2000, and are summarized in Table 3-2. These projections are to be used for projects south of Cape Mendocino.

Table 3-2 SLR projections, in inches, form 2000. Source: CO-CAT (2013); CCC (2015); and NRC (2012).

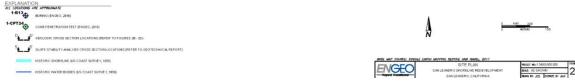
Year	Central projection	Central upper range	Central lower range	Lower bound	Upper bound
2030	5.67	7.64	3.70	1.69	11.69
2050	11.02	14.65	7.40	4.84	23.94
2100	36.18	46.22	26.14	16.69	65.51
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Monarch Bay Shoreline Development Geotechnical Investigation

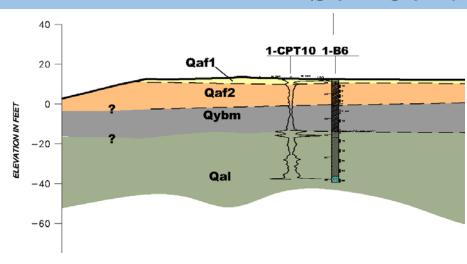


~35 exploration locations

Historic shoreline impact on Young Bay Mud



Monarch Bay Shoreline Development Soil Conditions



EXPLANATION

ALL LOCATIONS ARE APPROXIMATE

Qaf1 EXISTING FILL, CLAYEY SAND TO SANDY LEAN CLAY WITH GRAVEL

Qaf2 EXISTING FILL, DREDGED BAY MUD (FAT CLAY)

Qybm YOUNG BAY MUD, SOFT TO MEDIUM STIFF, HIGH PLASTICITY CLAY (HOLOCENE)

Qal ALLUVIUM, STIFF TO VERY STIFF, LEAN CLAY WITH OCCASIONAL SILTY SAND LENSES

— — GEOLOGIC CONTACT

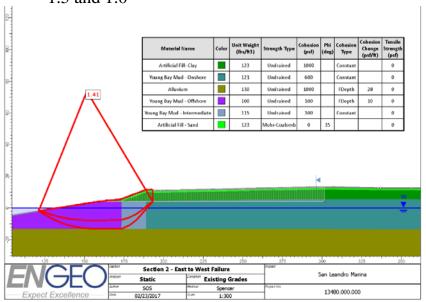
EXISTING GROUND SURFACE

Geotechnical Concerns

- Existing Fill
- Expansive Soils
- Liquefaction Settlement
- Shallow Groundwater
- Consolidation Settlement of Young Bay Mud
- Slope Stability

Monarch Bay Shoreline Development Slope Stability

- ➤ Ratio of shear strength resistance / mobilized shear stress (from gravity, surcharge, earthquake shaking, etc)
- ➤ Static and seismic loading
- ➤ Target Factors of Safety
 - 1.5 and 1.0



RESULTS:

- Proposed Development required to satisfy BCDC Sea Level Rise Guidelines for 2100 Upper Bound (66")
 - Static: < 1.5
 - Seismic: < 1.0
- Conclusion: Geotechnical mitigation needed for development, based on existing and proposed grades.
- > Outer and inner basin stability, ~8,600 linear feet

Monarch Bay Shoreline Development Geotechnical Mitigation Measures

- 1. Surcharge Program
 - Increase shear strength of soil
- 2. Steel Sheet Pile Wall
 - Piles can serve as sea wall and provide increased shear resistance
- 3. Cantilevered Wall on Concrete Pier Foundation
 - Similar to steel sheet pile wall
- 4. Drilled Displacement Piles
 - Soil column displaced and backfilled with grout
- 5. Deep Soil Mixing
 - Soils mixed with grout to increase shear strength

Monarch Bay Shoreline Development Geotechnical Mitigation Measures - Costs

- 1. Surcharge Program
 - Infeasible
- 2. Steel Sheet Pile Wall
 - $$2,000 / \text{linear foot} \sim = 17.2 MM
- 3. Cantilevered Wall on Concrete Pier Foundation
 - \$1,500 / linear foot ~ = \$12.9 MM
- 4. Drilled Displacement Piles (buildings only)
 - \$935 / linear foot ~ = \$8.1 MM
- 5. Deep Soil Mixing
 - $$700 / \text{linear foot} \sim = 6.0 MM
 - Will allow for more cost-effective sea wall option (Keystone wall, CMU wall, or similar)
 - 250,000 cubic yards of import still required \sim = \$6MM
 - Total Deep Soil Mixing = + \$12MM

BCDC 100' Shoreline Band



Table 3-2 SLR projections, in inches, form 2000. Source: CO-CAT (2013); CCC (2015); and NRC (2012).

Year	Central projection	Central upper range	Central lower range	Lower bound	Upper bound
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Monarch Bay Shoreline Development







Monarch Bay Shoreline Development Illustrative Site Plan



Monarch Shoreline Development Conceptual Park Master Plan



Monarch Bay Shoreline Development Diagram Plan



Monarch Bay Shoreline Development Park Program











ACTIVE/ PASSIVE EVENT



Monarch Bay Shoreline Development Park Program









SMALL BOATING

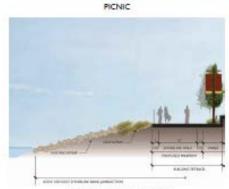
VIEWING

Monarch Bay Shoreline Development Park Program











DIMENSIONAL EDGE - BAY

3 DIMENSIONAL EDGE - INTERIOR BASIN