

Appendix A

San Rafael's Levees and Shorelines

Section A: Downtown San Rafael

Section B: Inner Canal

Section C: East San Rafael Shoreline

Section D: San Pedro Peninsula

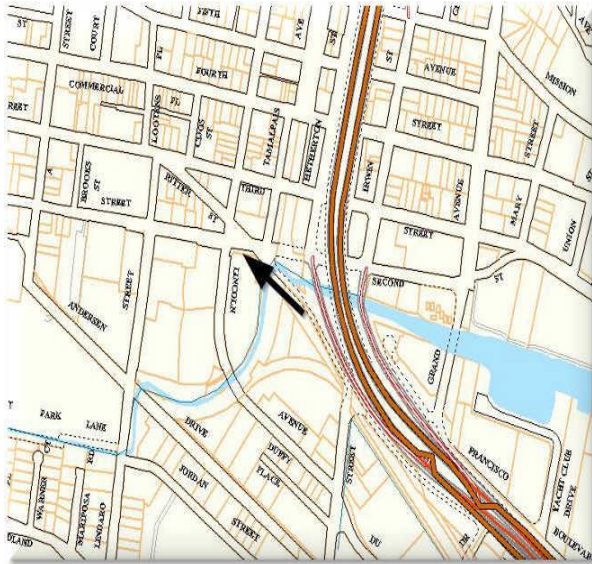
Section E: Gallinas Creek Basin

Appendix A
San Rafael's Levees and Shorelines
Section A: Downtown

Locator Map for Downtown San Rafael

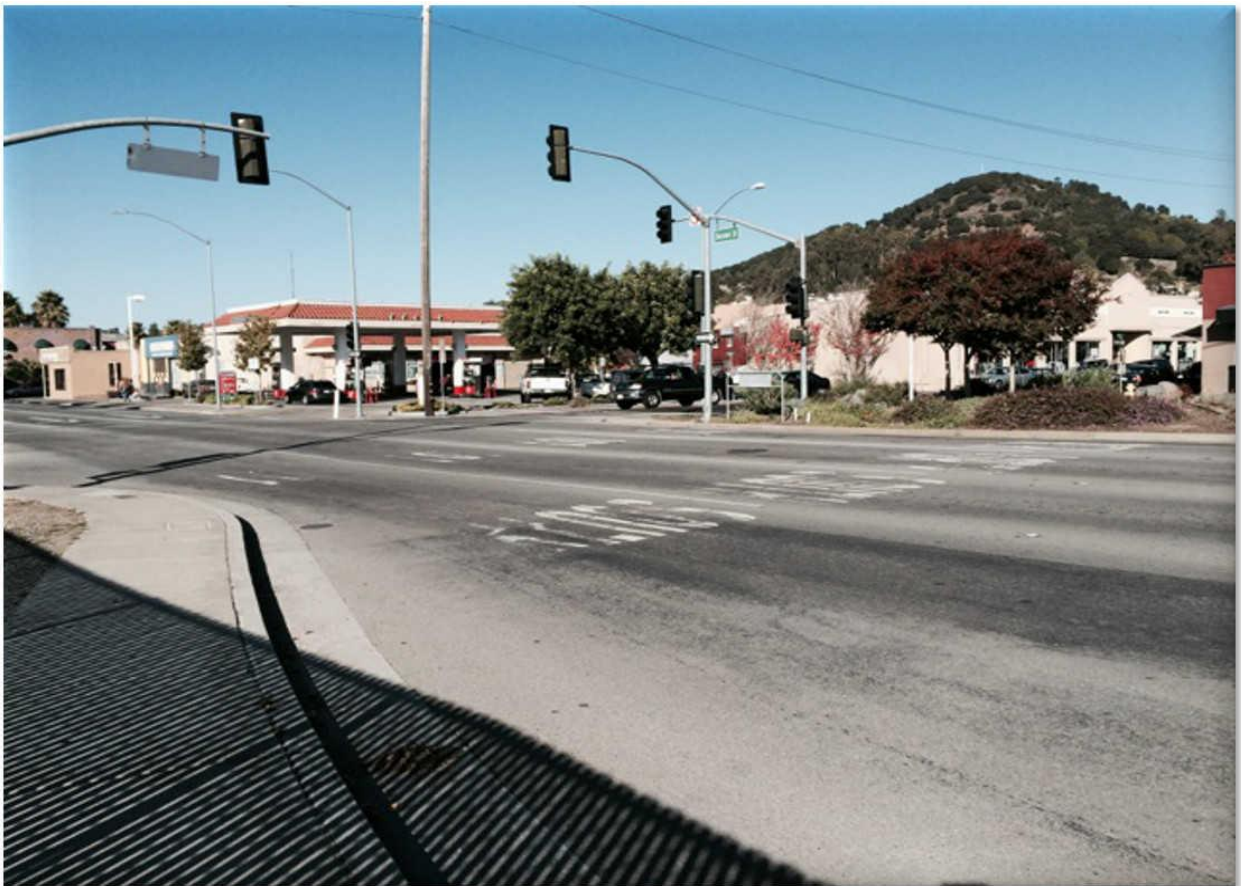


Appendix A
San Rafael's Levees and Shorelines
Section A: Downtown



A.1
Second St. and Lincoln Ave.
Owner: City of San Rafael

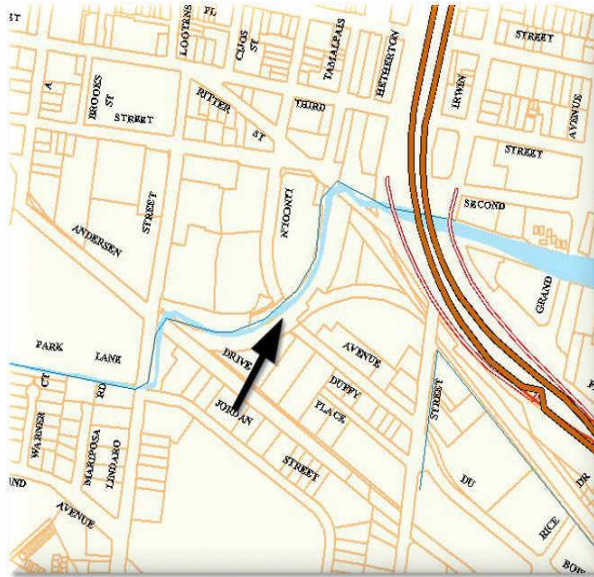
Conditions and Characteristics:
lowest elevations in Downtown;
areas at sea level and subject to
regular flooding during high tides
and heavy rain



Appendix A

San Rafael's Levees and Shorelines

Section A: Downtown



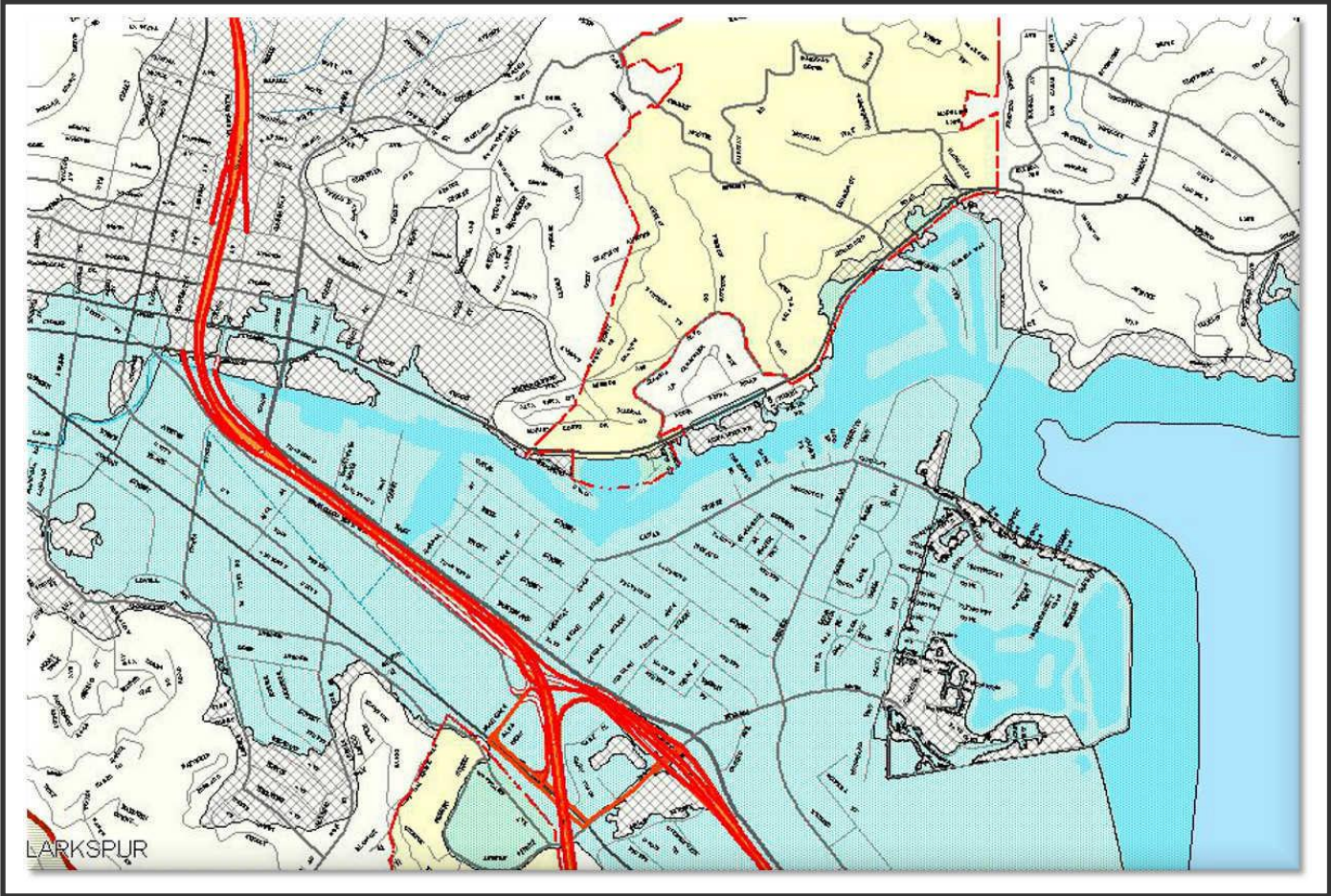
A.2
Mahon Creek
Owner: City of San Rafael

Conditions and Characteristics:
Open creek channel bordering
Downtown; remains of San Rafael
Creek west of US101; subject to
tidal action

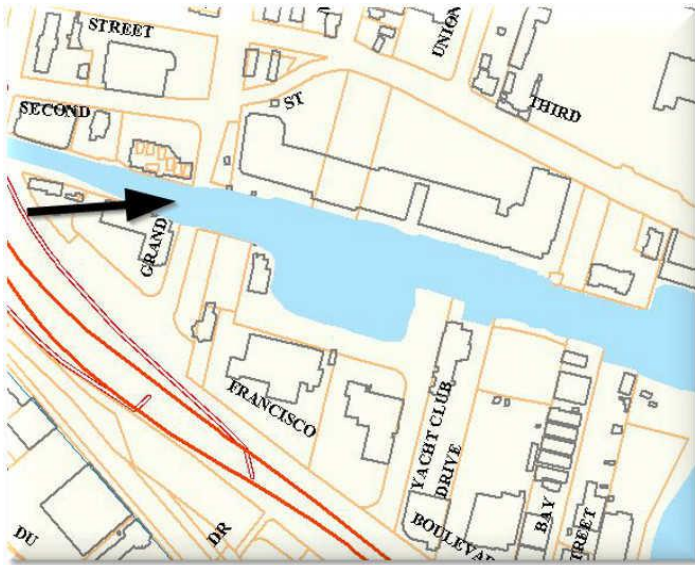


Appendix A
San Rafael's Levees and Shorelines
Section B: Inner Canal

Locator Map for the Inner Canal Area



Appendix A
San Rafael's Levees and Shorelines
Section B: Inner Canal

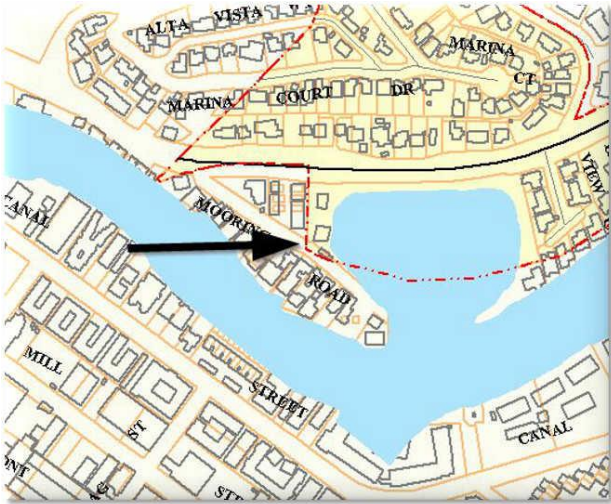


B.1
San Rafael Canal
Owner: City of San Rafael

Conditions and Characteristics:
open creek; navigable; most properties bordering channel are developed; some properties built over waterway; some sea walls/bulkheads developed on private properties bordering on canal.



Appendix A
San Rafael's Levees and Shorelines
Section B: Inner Canal



B.2
Mooring Road and Residential Lots
Owners: City of San Rafael + private
(residential lots and adjacent marina)

Conditions and Characteristics:
residential buildings constructed at low
elevations (some at sea level); no sea wall
or protection along water's edge



Appendix A
San Rafael's Levees and Shorelines
Section B: Inner Canal



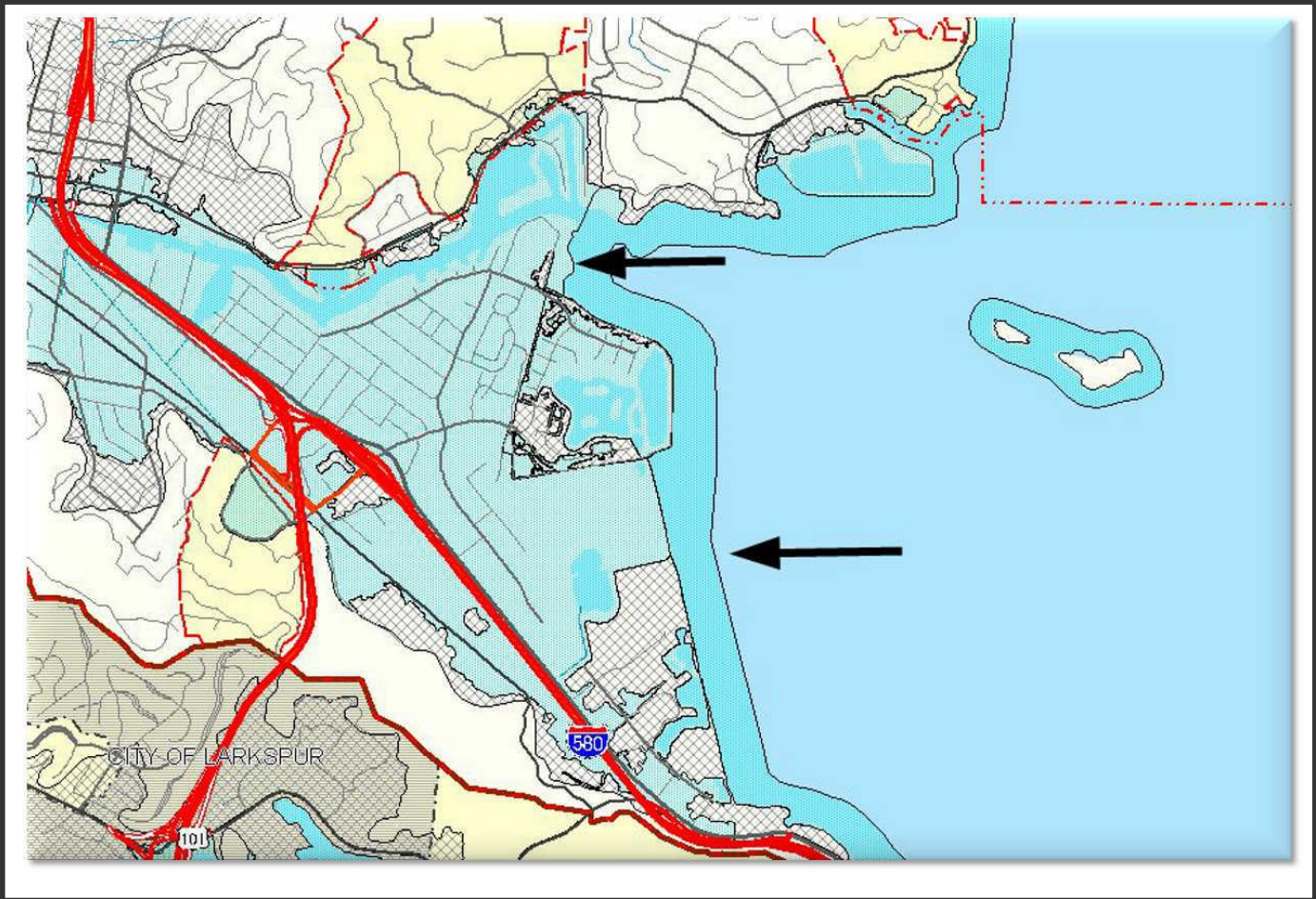
B.3
Summit Ave. and Marina Vista Subdivision
Owner: City of San Rafael + private residential lots

Conditions and Characteristics:
Residential buildings constructed at low elevations (some at sea level); no sea wall or protection along water's edge; some private sea walls and small berms

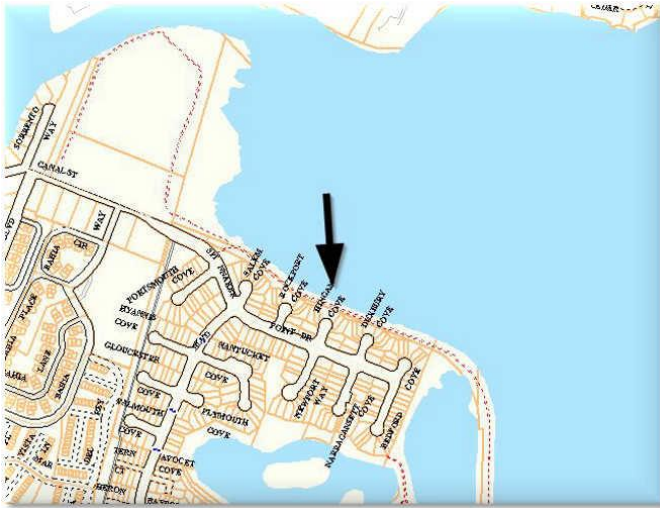


Appendix A
San Rafael's Levees and Shorelines
Section C: East San Rafael Shoreline

Locator Map for East San Rafael shoreline



Appendix A
San Rafael's Levees and Shorelines
Section C: East San Rafael Shoreline



C.1

Spinnaker Point + Shoreline Park levee

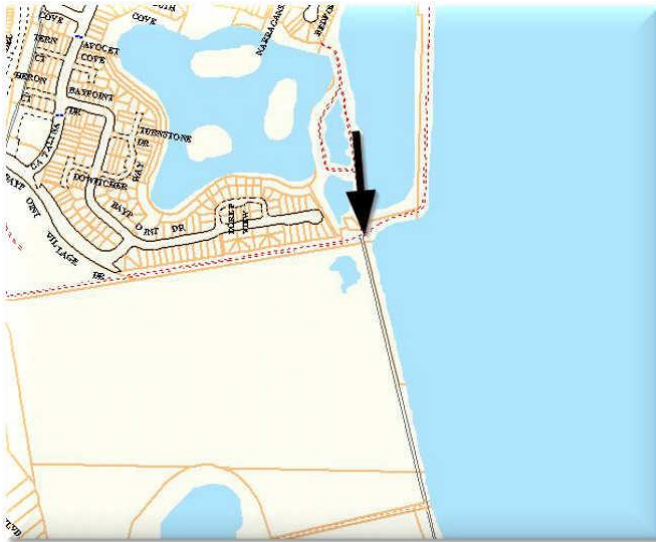
Owner: City of San Rafael + private
(Spinnaker Point HOA common areas)

Conditions and Characteristics:

Public shoreline path; shoreline levee protecting residential development (portions in FEMA Zone A); levee elevation and engineering likely not adequate to accommodate projected rise in sea level



Appendix A
San Rafael's Levees and Shorelines
Section C: East San Rafael Shoreline



C.2

Canalways levee

Owner: Private (levee and diked marsh) and City of San Rafael (drainage pond.)

Conditions and Characteristics:

levee constructed at low elevations + mostly un-engineered fill; levee provides seasonal inundation of greater diked marshland comprising most of Canalways properties (diked marshland); current levee not adequate to accommodate projected sea level rise



Appendix A
San Rafael's Levees and Shorelines
Section C: East San Rafael Shoreline



C.3

Piombo Place levee

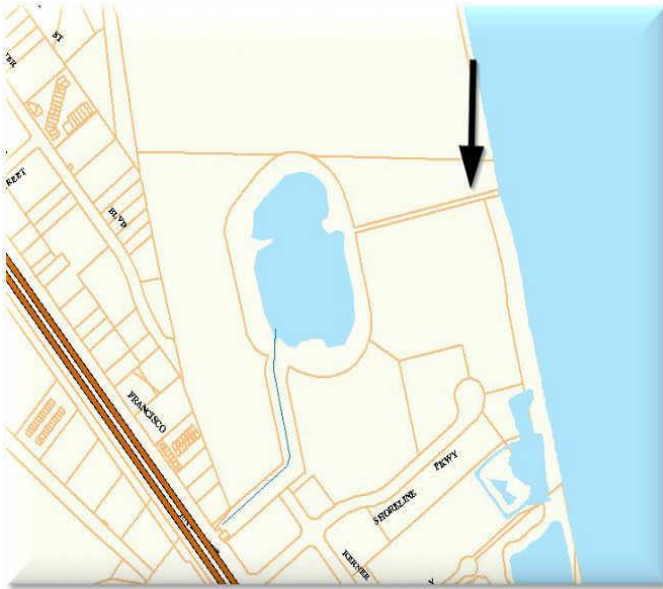
Owner: City of San Rafael

Conditions and Characteristics:

public shoreline path; levee constructed at currently acceptable elevations; levee elevation and engineering likely not adequate to accommodate projected rise in sea level



Appendix A
San Rafael's Levees and Shorelines
Section C: East San Rafael Shoreline



C.4

Shoreline Center levee

Owner: City of San Rafael

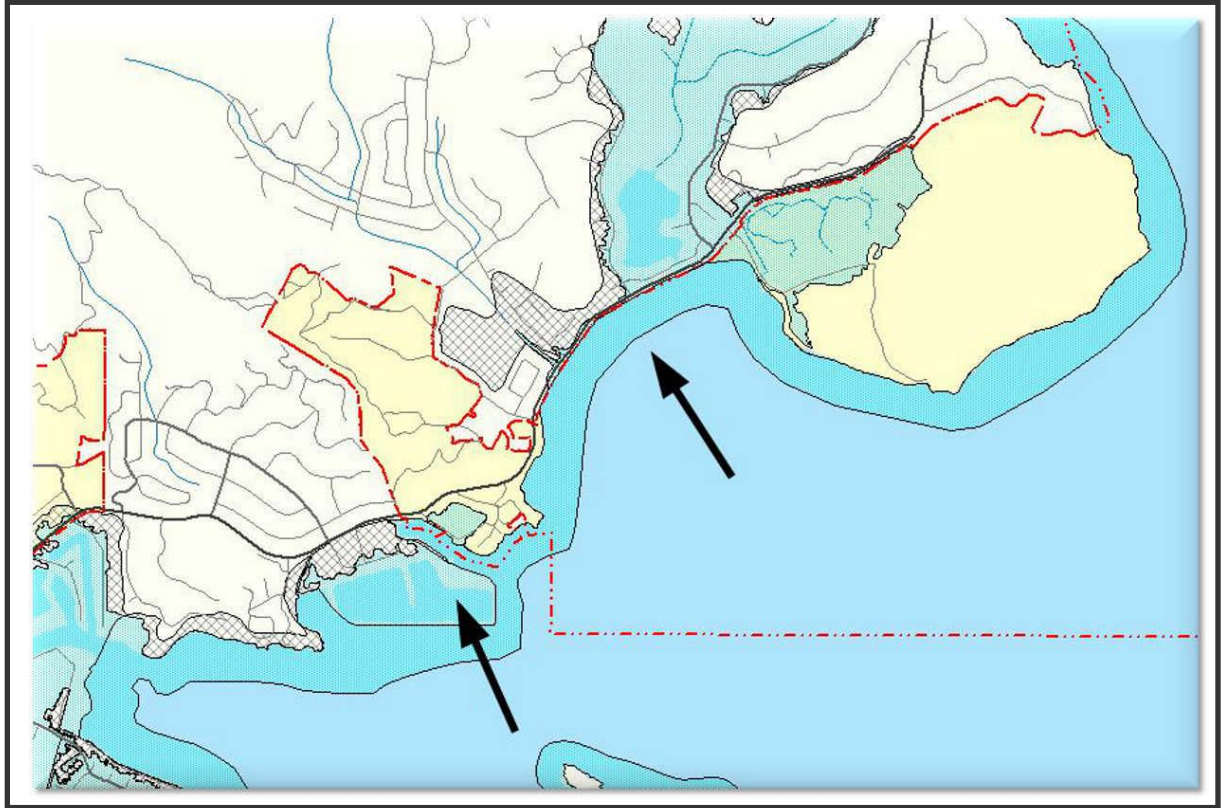
Conditions and Characteristics:

public shoreline path; levee constructed at currently acceptable elevation; upland property inland of levee (Shoreline Center) is a closed landfill with finished surface elevations of over 20ft MSL; conditions likely adequate to accommodate projected sea level rise along this one stretch of bay front



Appendix A
San Rafael's Levees and Shorelines
Section D: San Pedro Peninsula

Locator Map for San Pedro Peninsula



Appendix A
San Rafael's Levees and Shorelines
Section D: San Pedro Peninsula



D.1
Loch Lomond Marina
Owner: Private

Conditions and Characteristics:
site developed at low elevations; no formal levee protection except breakwater and inner-marina seawall; development approved for site which includes significant improvements to breakwater plus site filling to elevations exceeding current FEMA standards; developed elevations likely not adequate to accommodate projected sea level rise



Appendix A
San Rafael's Levees and Shorelines
Section D: San Pedro Peninsula



D.2

Glenwood and Peacock Gap sea wall

Owner: City of San Rafael

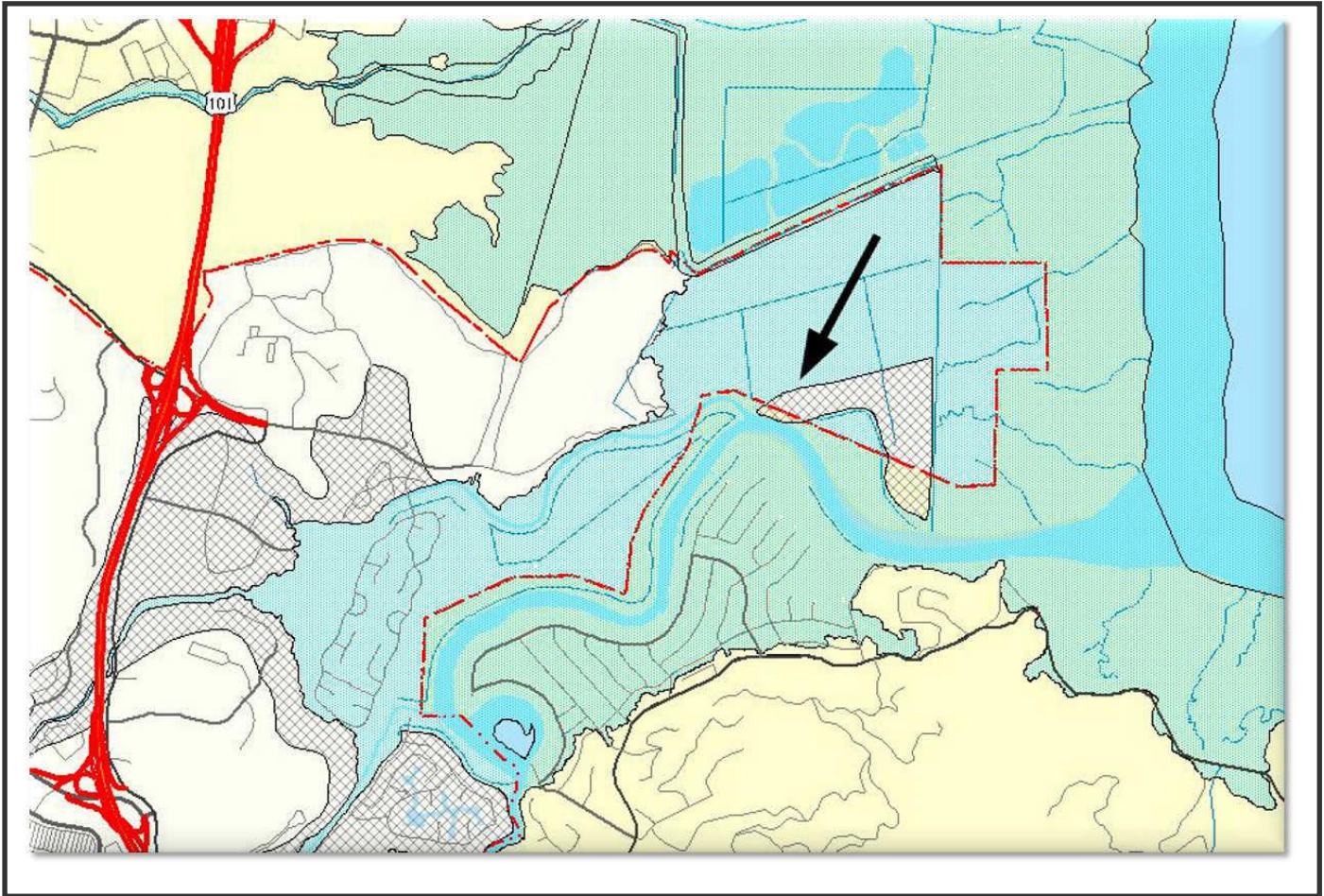
Conditions and Characteristics:

Riprap sea wall is a substantial improvement but has not been adequate to during extreme wet weather and high tide conditions; current elevation likely not adequate to accommodate projected sea level rise

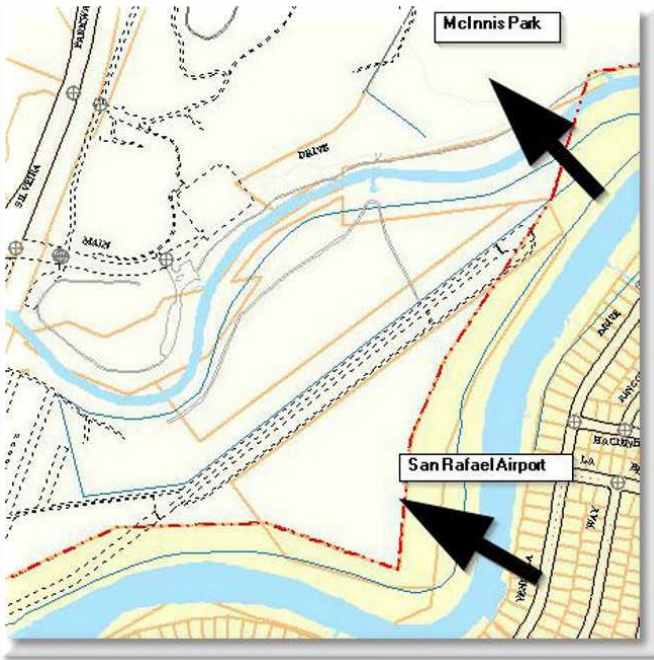


Appendix A
San Rafael's Levees and Shorelines
Section E: Gallinas Creek Basin

Locator Map for Gallinas Creek Basin



Appendix A
San Rafael's Levees and Shorelines
Section E: Gallinas Creek Basin



E.1
McInnis Park and San Rafael Airport levees

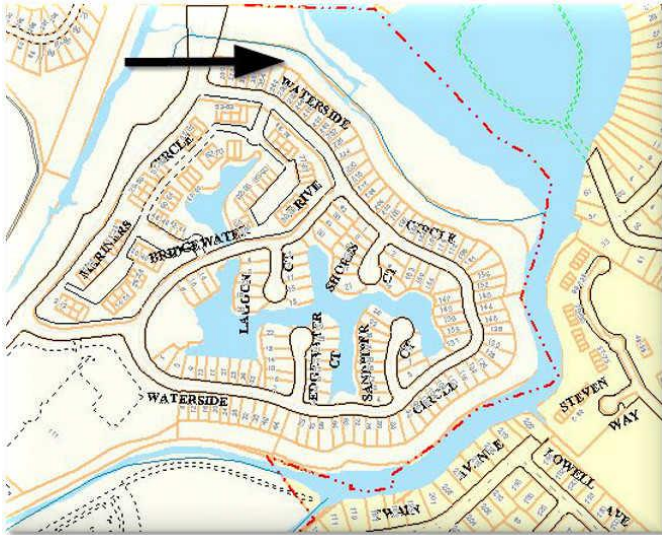
Owner: County of Marin + private (San Rafael Airport)

Conditions and Characteristics:

Levee system along the Gallinas Creek (portions of north and south forks); inland area is combination of diked marsh (former agricultural use) and natural upland



Appendix A
San Rafael's Levees and Shorelines
Section E: Gallinas Creek Basin

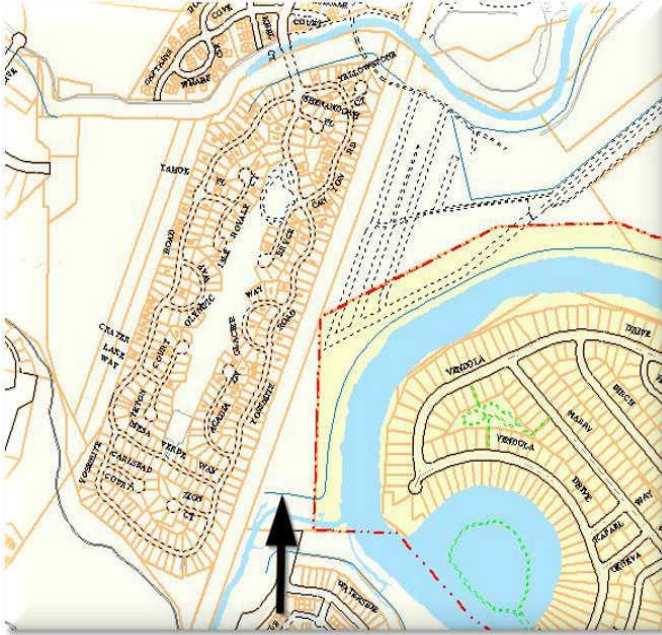


E.2
Marin Lagoon
Owner: Private (Marin Lagoon HOA)

Conditions and Characteristics:
Private pedestrian path; development on landfill (former marsh); fill transitions to marsh (no levee); current conditions likely not adequate to accommodate projected rise in sea level



Appendix A
San Rafael's Levees and Shorelines
Section E: Gallinas Creek Basin



E.3

Contempo Marin levee (small berm)

Owner: Private (Comtempo Marin)

Conditions and Characteristics:

Development on landfill (former marsh); limited levee improvements along Gallinas Creek; small levee likely not adequate to accommodate projected sea level rise

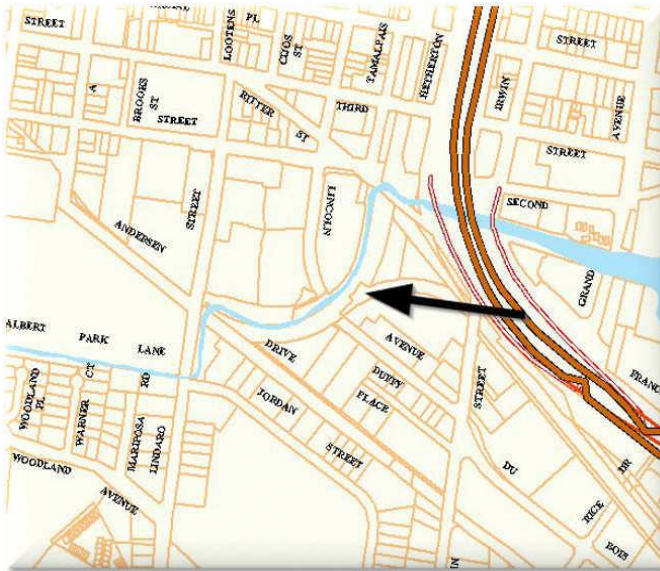


Appendix B

San Rafael Possible Opportunity Areas for Adaptation

- B.1: Mahon Creek @ San Rafael Corporate Center
- B.2: Seastrand Open Space
- B.3: San Pedro Cove Public Open Space
- B.4: Dutra Quarry diked bay lands/seasonal wetland
- B.5: Pickleweed Community Center and Park canal front lands
- B.6: Spinnaker Point Diked Marsh
- B.7: Canalways
- B.8: East San Rafael Tidelands
- B.9: San Rafael Canal (Creek)

Appendix B San Rafael Possible Opportunity Areas for Adaptation



B.1 Mahon Creek @ San Rafael Corporate Center

Owner: Public (City of San Rafael)
Zoning: P/OS-WO
Land Use Status: Permanent/ Secured
Open Space

Opportunity: Possible widening of
channel and/or returning adjacent upland
portion to tidal marsh

Constraints/Issues: biological resources



Appendix B

San Rafael Possible Opportunity Areas for Adaptation



B.2

Seastrand

Owner: Public (City of San Rafael)

Zoning: P/OS-WO-C

Land Use Status: Permanent/ Secured Open Space.

Opportunity: possible retreat and expanded tidal marsh on low-lying fill areas

Constraints/Issues: biological resources



Appendix B

San Rafael Possible Opportunity Areas for Adaptation



B.3

San Pedro Cove Public Open Space

Owner: Private (San Pedro Cove HOA)

Zoning: PD-WO

Land Use Status: Publicly-accessible open space with paths and beach access

Opportunity: possible retreat, return to tidal marsh

Constraints/Issues: biological resources, loss of publicly-accessible area; private ownership



Appendix B

San Rafael Possible Opportunity Areas for Adaptation



B.4

Dutra Quarry (County)

Owner: Private (Dutra San Rafael Properties)

Zoning: Residential Multiple Planned Commercial (RMPC) District

Land Use: private, undeveloped land; some marsh

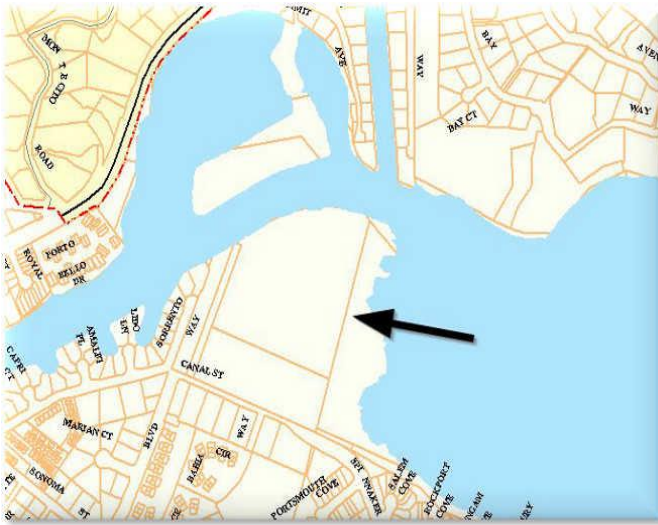
Opportunity: possible retreat and return to tidal marsh

Constraints/Issues: biological resources, drainage/hydrology, private ownership



Appendix B

San Rafael Possible Opportunity Areas for Adaptation



B.5

Pickleweed Community Center & Park - canal front lands

Owner: (Public) City of San Rafael

Zoning: P/OS-WO-C

Land Use: vacant land (land fill with some isolated wetlands)

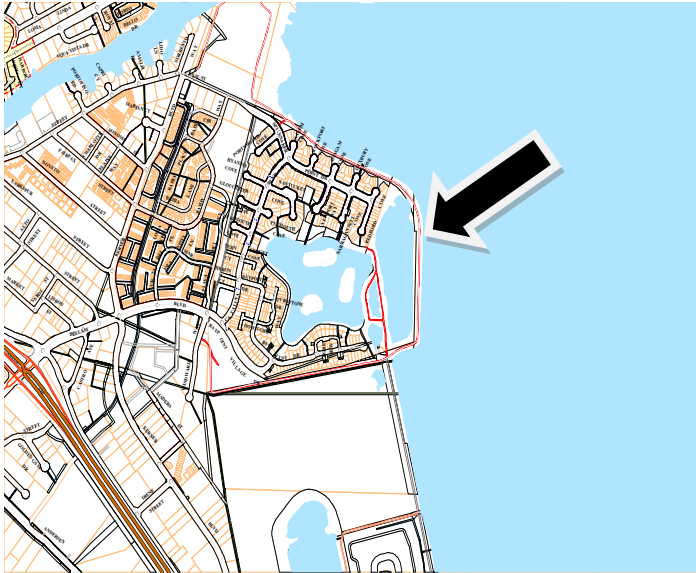
Opportunity: possible retreat and return to tidal marsh

Constraints/Issues: biological resources



Appendix B

San Rafael Possible Opportunity Areas for Adaptation



B.6

Spinnaker Point Diked Marsh

Owner: Private (Rockport Land Corp.)

Zoning: P/OS-WO

Land Use: vacant diked marshland separated from Bay by levee

Opportunity: possible retreat and return to tidal marsh

Constraints/Issues: biological resources, private ownership



Appendix B

San Rafael Possible Opportunity Areas for Adaptation



B.7

Canalways

Owner: Private (Canalways/Joseph Lemon)

Zoning: PD-WO

Land Use Status: Undeveloped
Private Land; diked marshland

Opportunity: possible retreat and
conversion to tidal marsh

Constraints/Issues: biological issues,
hydrology/drainage, private
ownership



Appendix B

San Rafael Possible Opportunity Areas for Adaptation



B.8

East San Rafael Tidelands

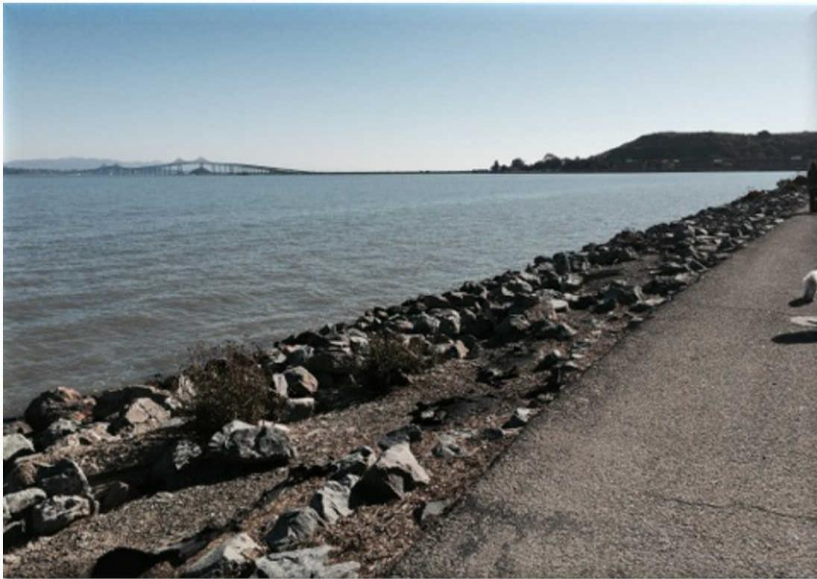
Owner: Private + City of San Rafael

Zoning: W (Water) District

Land Use: undeveloped tidelands

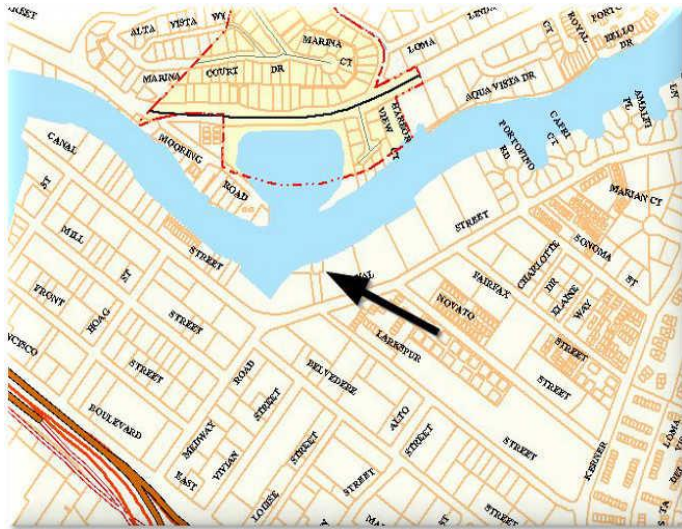
Opportunity: possible horizontal levee; use of dredge spoils from San Rafael Canal

Constraints/Issues: biological resources, hydrology, cost for improvements, utilities (sewer outfall), private ownership



Appendix B

San Rafael Possible Opportunity Areas for Adaptation



B.9

San Rafael Canal

Owners: City of San Rafael + Private
Zoning: W District
Land Use: tidelands

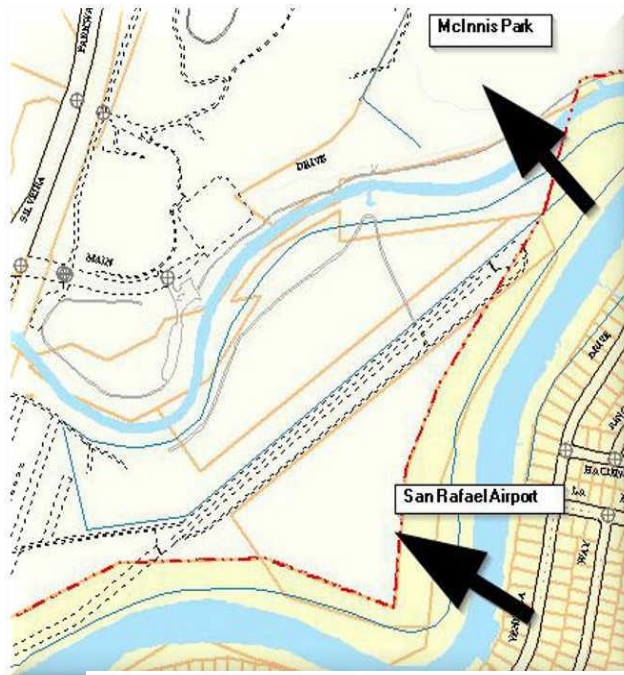
Opportunity: Continuation of
dredging, possible sea walls

Constraints/Issues: hydrology, toxicity
(spoils contamination), cost, utilities,
extensive private ownership



Appendix B

San Rafael Possible Opportunity Areas for Adaptation



B.10

San Rafael Airport/McInnis Park Diked Bay lands

Owner: Private (San Rafael Airport LLC)
+ County of Marin

Zoning: PD-1764-WO District (Airport);
Land Use Status: Private, undeveloped
land; public open space

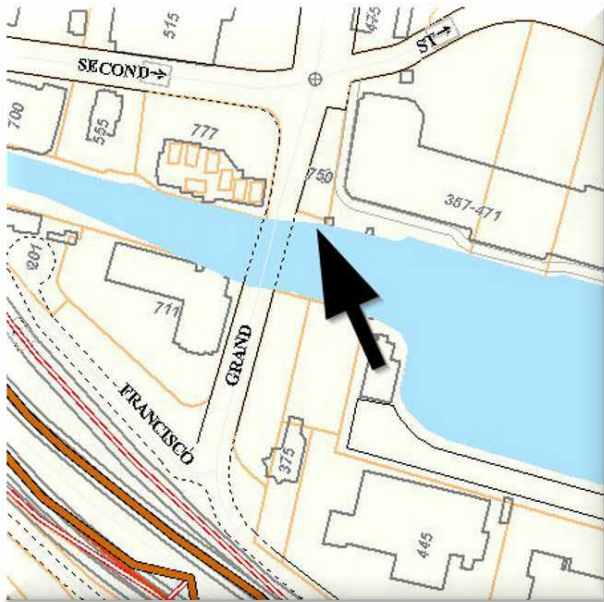
Opportunity: possible retreat and restore
to tidal marsh

Constraints/Issues: biological resources,
hydrology, private ownership



Appendix C

Examples of Private Improvements



C.1

Example of Sea Wall

750 Grand Ave.
Owner: Harold Geister
Land Use Status: M-C



Appendix C
Examples of Private Improvements

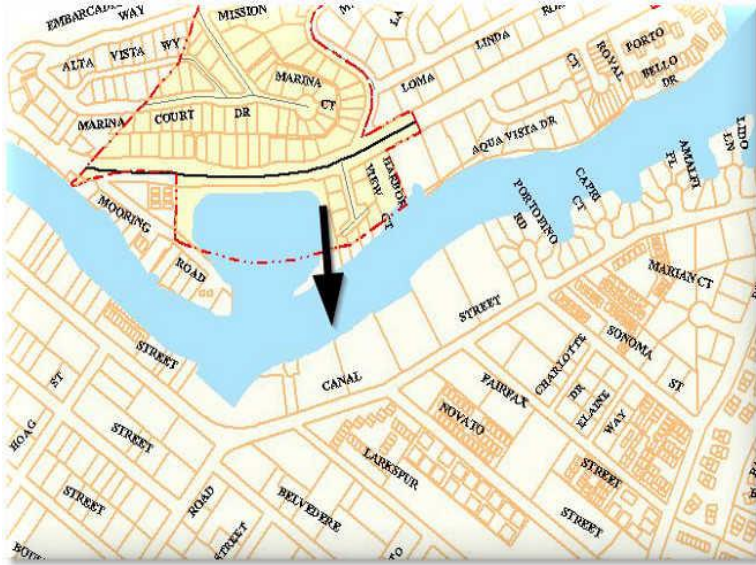


C.2
Example of Sea Wall.
83 Summit Ave.
Owner: Joanne C. Dunne
Zoning: P/OS-WO-C



Appendix C

Examples of Private Improvements



C.4
Example of Private Sea Wall
330 Canal Street
Apartments
Owner: 330 Canal St. LP
Zoning: HR1-C, W



Appendix D

Bibliography & Acknowledgements

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Appendix D

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Appendix D

Bibliography & Acknowledgements