



# HAMILTON FIELD LEVEE SYSTEM

## FEMA ACCREDITATION PROCESS

*North Bay Watershed Association Presentation –  
September 11, 2015*

*By: Tony Williams, PE, City of Novato Public Works Department*



THE CITY OF  
NOVATO  
CALIFORNIA



# PRESENTATION AGENDA

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## Hamilton Field Levee System

- Brief Overview of the Hamilton Field Levee “System”
- FEMA Requirements (for accreditation)
  - 44 CFR 65.10
- Time, Effort, and Cost Required
- Flood Protection Commentary
- Example of Novato’s Submittal
- Questions



FEMA

# LEEVE “SYSTEM”

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## Hamilton Field Levee System

Hamilton Field Levee includes many distinct components as recognized by FEMA

- Levee Embankment
- “Floodwall” + “Closure”
- Seepage Collection System
- Interior Drainage
  - Pump Stations
  - Drainage System



# LEVEE "SYSTEM"

## Hamilton Field Levee System





# GEOTECHNICAL STUDIES

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## Hamilton Field Levee System

- Geomatrix Consultants, Geotechnical Engineering Study – Hamilton Field Phase 1 Development, Novato, California, Volume 1, 12 June 1995a.
- Geomatrix Consultants, Letter to Mr. Todd Wright (The New Hamilton Partnership) regarding “Response to HLA Review Comments, Hamilton Field Phase 1 Development, Novato, California”, 2 October 1995b.
- Geomatrix Consultants, “Flood Control Levee Inspection, Monitoring, and Maintenance Manual, Hamilton Field, Phase 1, Novato, CA” 21 February 1997.
- Geomatrix Consultants, Emergency Response Plan – Flood Control Levee, Hamilton Field Phase 1, Novato, California 22 May 1997.
- Geomatrix Consultants, Letter to Mr. Todd Wright (The New Hamilton Partnership) regarding “Construction of Flood Control Levee, Hamilton Field Phase 1, Novato, California”, 11 March 1998a.
- Geomatrix Consultants, Letter to Mr. Todd Wright (The New Hamilton Partnership) regarding “Evaluation of Effect of Placing Fill Against the Flood Control Levee, Hamilton Field Phase 1, Novato, California”, 2 April 1998b.
- URS, “Responses to Review Comments – Draft Report; New Hamilton Partnership Levee”, Letter to U.S. Army Corps of Engineers, dated 19 August 2003.
- URS, “Final Report: Geotechnical Investigation and Design Recommendations for the New Hamilton Partnership Levee, Hamilton Army Air Field, Wetlands Restoration Project”, 30 April 2004.
- URS/ARUP, “Final Report: Test Fill Construction, Monitoring, and Evaluation – Hamilton Wetlands Restoration Project – Part I: Performance During Construction”, 19 September 2005a.
- URS/ARUP, “Final Report: Test Fill Construction, Monitoring, and Evaluation – Part II: Performance After Construction – Six Month Monitoring Program – Hamilton Wetlands Restoration Project”, December 2005b.
- ARUP, “Final Report: Numerical Analysis of Proposed Revised Design of Seasonal Wetland Fill Along the Existing NHP Levee, Hamilton Wetlands Restoration Project”, 6 March 2006.
- Geomatrix Consultants, Letter to Mr. Glenn Young (City of Novato), “Geotechnical Peer Review, Test Fill Construction and Monitoring Program, Hamilton Wetlands Restoration Project, Novato, CA”, 3 April 2006.
- USACE, “Hamilton Wetlands Restoration Project – Project Information Report Engineering and Construction Adjacent to the Novato Public Finance Authority Levee (NPFA Levee)”, 24 November 2008.
- USACE, Letter to Mr. Glenn Young, “Seepage and Slope Stability Analysis”, 18 December 2008.
- Geosyntec Consultants, Letter to Mr. Jeffrey Walter (City Attorney, City of Novato) regarding “Evaluation of Levee Seepage Sources, Based on Review of Design and Construction Documents”, February 5, 2009.
- USACE, “Hamilton Wetlands Restoration Project – Project Information Report 2nd City of Novato Easement for Construction Adjacent to the Novato Public Finance Authority Levee (NPFA Levee)”, 12 June 2009.
- Geosyntec Consultants, “Geotechnical Evaluation of the Hamilton Field Levee, Novato, California”, December 2014



# FEMA REQUIREMENTS

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## Hamilton Field Levee System

### 44 CFR 65.10 - Mapping of areas protected by levee systems.

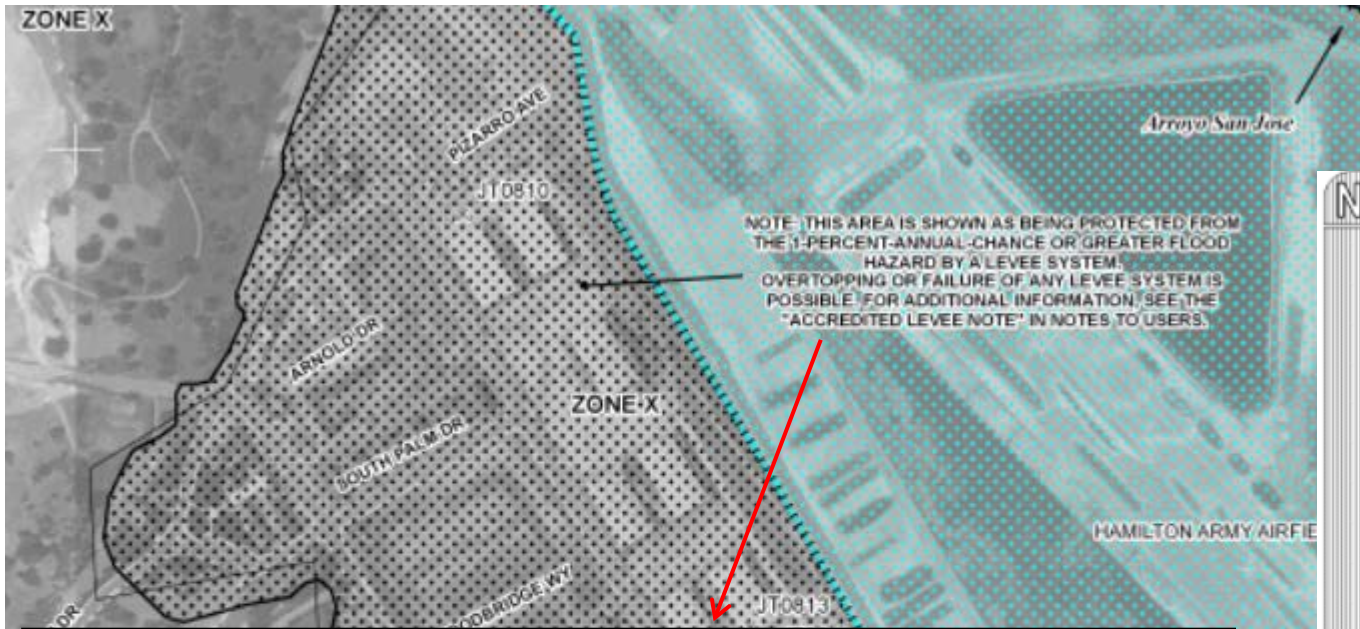
“For purposes of the NFIP, FEMA will only recognize in its flood hazard and risk mapping effort those **levee systems** that meet, and continue to meet, minimum **design, operation, and maintenance standards** that are consistent with the level of protection sought through the comprehensive flood plain management criteria established by § 60.3 of this subchapter.”



# FEMA REQUIREMENTS

## Hamilton Field Levee System

### FIRM – Hamilton Area



**NOTE: THIS AREA IS SHOWN AS BEING PROTECTED FROM THE 1-PERCENT-ANNUAL-CHANCE OR GREATER FLOOD HAZARD BY A LEVEE SYSTEM. OVERTOPPING OR FAILURE OF ANY LEVEE SYSTEM IS POSSIBLE. FOR ADDITIONAL INFORMATION, SEE THE "ACCREDITED LEVEE NOTE" IN NOTES TO USERS.**

**NFIP**

PANEL 0292D

**FIRM**  
FLOOD INSURANCE RATE MAP

MARIN COUNTY,  
CALIFORNIA  
AND INCORPORATED AREAS

PANEL 292 OF 531  
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARIN COUNTY	960173	0292	D
NOVATO, CITY OF	960178	0292	D

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

**MAP NUMBER**  
06041C0292D

**EFFECTIVE DATE**  
MAY 4, 2009

Federal Emergency Management Agency

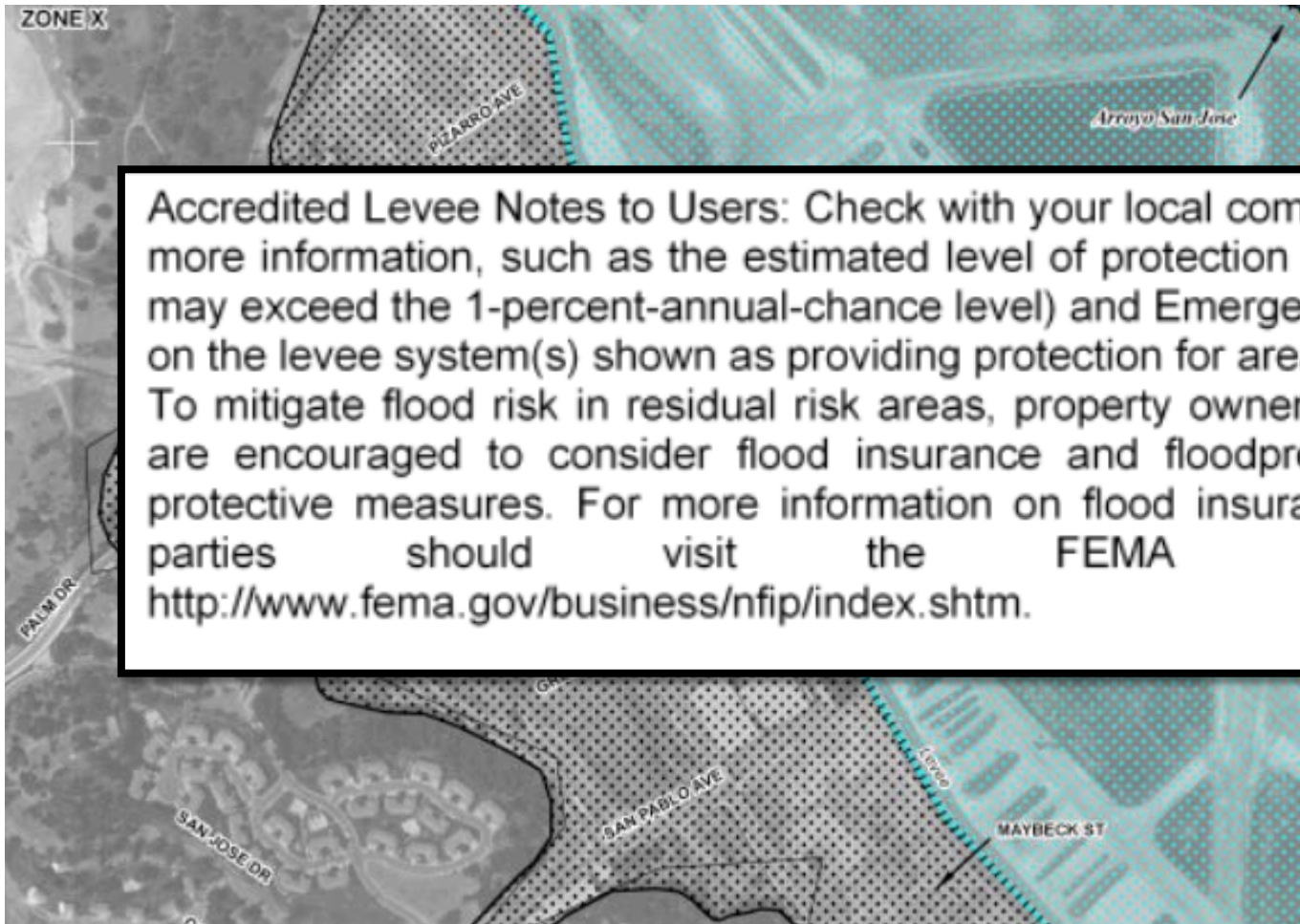
**NATIONAL FLOOD INSURANCE PROGRAM**



# FEMA REQUIREMENTS

## Hamilton Field Levee System

### FIRM – Hamilton Area







# FEMA REQUIREMENTS

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## Hamilton Field Levee System

### 44 CFR 65.10 – Design Criteria.

- Freeboard design
- Closure designs showing all openings have closure devices, closures are designed according to sound engineering practice and are a structural part of the levee during operation
- Embankment protection demonstrating no appreciable erosion of levee embankment during the base flood



# FEMA REQUIREMENTS

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## Hamilton Field Levee System

### 44 CFR 65.10 – Design Criteria - continued.

- Embankment and foundation stability analyses evaluating expected seepage during base flood loading conditions.
- Settlement analysis assessing potential freeboard loss due to settlement, showing that minimum freeboard will be maintained .
- An interior drainage analysis identifying the source(s) and magnitude of interior flooding



# FEMA REQUIREMENTS

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## Hamilton Field Levee System

### 44 CFR 65.10 – Design Criteria – Technical Resources

#### Stability\*:

U.S. Army Corps of Engineers (USACE) Engineering Manual *Design and Construction of Levees* (EM 1110–2–1913), Chapter 6, Section II, Case IV

USACE Engineering Manual *Slope Stability* (EM 1110-2-1902)

#### Settlement:

USACE Manual *Settlement Analysis* (EM 1110–1–1904)

#### Seepage:

USACE Engineering Technical Letter *Design Guidance for Levee Underseepage* (ETL 1110-2-569)

#### Interior Drainage:

USACE Engineering Manual *Hydrologic Analysis of Interior Areas* (EM 1110-2-1413)

**\*for seismic see DWR**



# FEMA REQUIREMENTS

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## Hamilton Field Levee System

### **44 CFR 65.10 – Operations and Maintenance.**

#### Operations Plan:

- Flood Warning System
- Plan of Operation
- Closures
- Interior Drainage

#### Maintenance Plan

- Must be under the jurisdiction of an approved agency and officially adopted by vote by a governing body.
- Frequency and assignment of maintenance activities

#### Inspection Program

*“A flood protection system simply cannot be relied upon if it hasn’t been properly maintained or if people aren’t trained and ready to operate it during high water”*



# FEMA REQUIREMENTS

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## Hamilton Field Levee System

### 44 CFR 65.10 – O&M Resources.

- *Levee Owner's Manual for Non-Federal Flood Control Works, The Rehabilitation and Inspection Program, USACE, 2006*
- *Emergency Preparedness Guidelines for Levees A Guide for Owners and Operators, FEMA, 2012*
- *Urban Levee Design Criteria, DWR, May 2012*

### Inspections:

<http://www.usace.army.mil/Missions/CivilWorks/LeveeSafetyProgram/LeveeInspections.aspx>



# FEMA REQUIREMENTS

## Hamilton Field Levee System

### 44 CFR 65.10 – Certification.

- Data submitted to support a given levee complies with the design criteria requirements and must be certified by a registered Professional Engineer.
- Certified as-built plans for the levee

**CERTIFICATION**

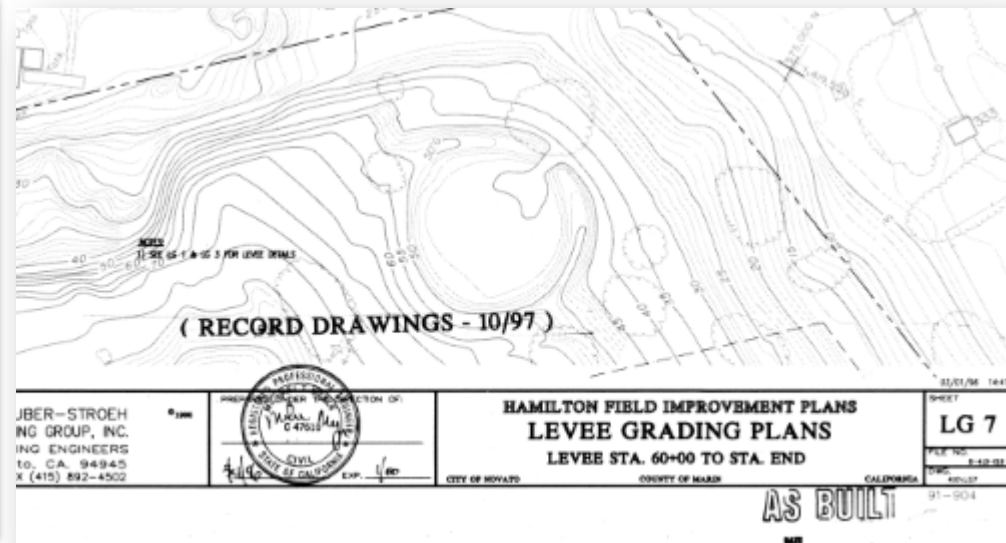
The design criteria data and associated documentation provided in this submittal under Section 2 complies with 44 CFR Section 65.10(b) (1) through (6). The certified as-built drawings of the levee, including the two storm water pump stations are provided in Attachment F (see Appendix B).

Certified By:   
(Signature)

#43069, March 31, 2016  
(Professional Engineer License# and Expiration Date)

Name: Russell Thompson Date: 6-25-15

Title: Public Works Director, City of Novato





# FEMA SUBMITTAL PROCESS

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## Hamilton Field Levee System

Provide data and documentation of the following:

- Engineering Design
- Interior Drainage Analysis
- Operation and Maintenance

### Riverine Levees:

- MT-2 Form 3, “Riverine Structures Form” with supporting documentation and backup data

### Coastal Levees:

- MT-2 Form 5 “Coastal Structures Form”



# FEMA SUBMITTAL PROCESS

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## Hamilton Field Levee System

### FEMA Region IX Contact:

**Ed Curtis, P.E., CFM**

**Risk Analysis Branch**

**FEMA Region IX**

**1111 Broadway, Suite 1200**

**Oakland, CA 94607-4052**

**(510) 627-7207 - office**

**(510) 295-5249 – mobile**





# RESOURCES

## Hamilton Field Levee System

- FEMA
- USACE
- DWR
- <http://www.leveesafety.org/>

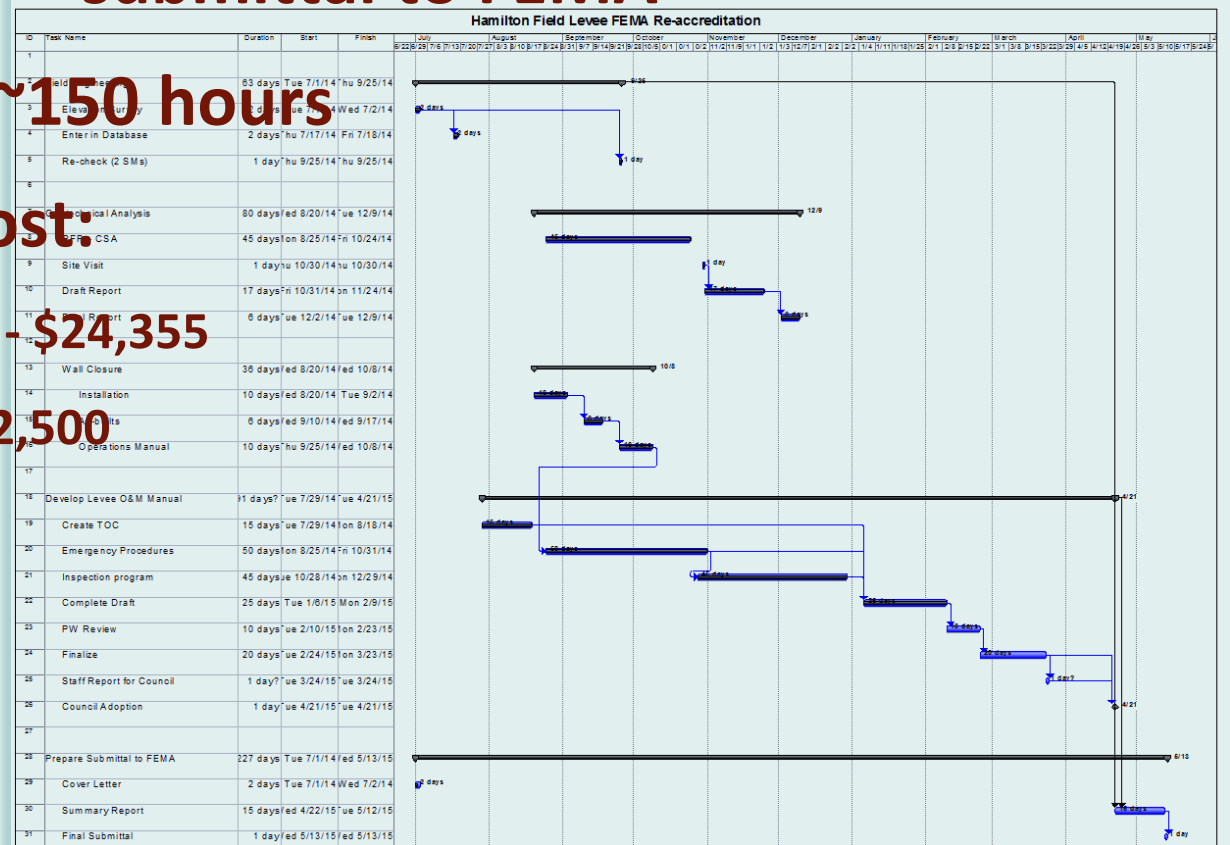




# TIME, EFFORT AND COST

## Staff and Consultant Time and Effort

- June 2014 - began effort
- June 30, 2015 – submittal to FEMA
- Staff Hours - ~150 hours
- Consultant Cost.
  - Geotechnical - \$24,355
  - Surveying - \$2,500
  - H&H - \$3,500





# FLOOD PROTECTION

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## Hamilton Field Levee System

“...there is still a flood risk associated with levees. While levees are designed to reduce risk, even properly maintained levees can fail or be overtopped by large flood events. Levees reduce risk, they do not eliminate it.”

# FLOOD PROTECTION

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## Hamilton Field Levee System

Declared Disasters or Emergencies - **FEMA vs. USACE**

*FEMA Recovery Policy RP 9524.3 (2011)*





QUESTIONS?

**Levee Accreditation  
NBWA September 11, 2015**

