Groundwater Reliability Partnership for the San Mateo Plain Sub-basin

April 19, 2016

BAWSCA

“A multicounty agency authorized to plan for and acquire supplemental water supplies, encourage water conservation and use of recycled water on a regional basis.”

[Bay Area Water Supply and Conservation Agency Act, AB2058(Papan-2002)]
Welcome!

- Agenda for today’s meeting:
  - Welcome and introductions
  - Summary of previous meetings
  - Groundwater 101 – Shallow groundwater
  - Use and management of basins adjacent to the San Mateo Plain Sub-basin
    - The Niles Cone Sub-Basin
  - West Bay Sanitary District’s Recycled Project – Sharon Heights Golf Course
  - Activities in the San Mateo Plain Sub-basin
  - Next Steps
Agenda

• Welcome and introductions – Michael Hurley, Water Resources Manager, BAWSCA
• Summary of previous meetings
• Groundwater 101 – Shallow groundwater
• Use and management of basins adjacent to the San Mateo Plain Sub-basin
  o The Niles Cone Sub-Basin
• West Bay Sanitary District’s Recycled Project – Sharon Heights Golf Course
• Activities in the San Mateo Plain Sub-basin
• Next Steps
Agenda

- Welcome and introductions
- Summary of previous meetings – Adrianne Carr, Senior Water Resources Specialist, BAWSCA
- Groundwater 101 – Shallow groundwater
- Use and management of basins adjacent to the San Mateo Plain Sub-basin
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Where is the San Mateo Plain Sub-basin?

• Many cities and communities overlie the basin
• Many water agencies overlie the basin
• The USGS defines a different basin: the San Francisquito Cone
What Basins are Adjacent to the San Mateo Plain Sub-basin?

- San Mateo Plain Sub-basin is a part of the Santa Clara Valley Basin
  - Santa Clara
  - Niles Cone
  - East Bay Plain
- Degree of connectivity between all sub-basins not well understood
- Westside basin to north, connectivity not known
Meetings Have Provided a Forum for Information Sharing and Learning

- October 19th, 2015 meeting
  - Presentations included BAWSCA, San Mateo County, City of East Palo Alto, update on Sustainable Groundwater Management Act
  - Good discussion on potential goals:
    - Increased understanding of the hydrology and geology of the Basin
    - Serving as a forum for sharing information among all stakeholders
    - Continued sustainable use of the Basin to maintain groundwater quality and quantity and protect beneficial uses
Meetings Have Provided a Forum for Information Sharing and Learning

- January 11th, 2016 meeting
  - Presentations included: Westside Basin, Santa Clara Valley Water District – Santa Clara Sub-Basin, San Mateo County, Sustainable Groundwater Management Act updates
  - Good discussion on lessons learned from adjacent basins
  - Good discussion with group and San Mateo County staff about their upcoming Assessment
Agenda

- Welcome and introductions
- Summary of previous meetings
- **Groundwater 101 – Shallow groundwater** – Adrianne Carr, Senior Water Resources Specialist, BAWSCA
- Use and management of basins adjacent to the San Mateo Plain Sub-basin
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An aquifer is an underground layer of water-bearing permeable rock, rock fractures or unconsolidated materials (gravel, sand, or silt) from which groundwater can be extracted using a water well.
What is a Shallow Aquifer?

- Typically (but not always) the shallowest aquifer at a given location is unconfined, meaning it does not have a confining layer (an aquitard or aquiclude) between it and the surface.
What is an Unconfined vs. a Confined Groundwater Basin
San Mateo Plain has Shallow and Deep Aquifers

Geologic Cross Section of Basin
What is an Unconfined vs. a Confined Groundwater Basin
General Properties of the Shallow Zone

• Deep zone is principal aquifer: thicker and more permeable
• Thickness varies ~70 ft
  o Water bearing zones even smaller
• Material varies from coarse near the foothills to finer grained near the bay
  o Material was deposited by streams and varies by distance from a channel
  o Course materials near foothills are directly connected to the deep zone
    ▪ Bay mud layer does not extend inland to the foothills
    ▪ This area is where recharge can occur
      • Rainfall infiltration, landscaping return flows
San Mateo Plain Basin’s Deep Aquifer is Recharged in West

Geologic Cross Section of Basin
Bay Mud Confining Layer

- Old bay mud extends under a large portion of the shallow zone
- Deep aquifer is confined below the bay mud layer
- Deep aquifer is unconfined in area near foothills
  - Recharge occurs where bay mud layer is absent

Source: East Palo Alto Groundwater Management Plan
Agenda

- Welcome and introductions
- Summary of previous meetings
- Groundwater 101 – Shallow groundwater
- Use and management of basins adjacent to the San Mateo Plain Sub-basin: The Niles Cone Sub-Basin – Michelle Myers, Groundwater Resources Manager, Alameda County Water District
- West Bay Sanitary District’s Recycled Project – Sharon Heights Golf Course
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- Next Steps
Alameda County Water District

Niles Cone Groundwater Basin Management

April 19, 2016
ACWD Overview

- Founded in 1914
- Serve Fremont, Newark, and Union City
- Population Served: ~344,000
- Nearly 83,000 Connections
- Elected Board: 5 Directors
ACWD Water Supply Sources – Typical

- 40% Watershed Runoff
- 40% State Water Project
- 20% San Francisco PUC
Niles Cone Groundwater Basin: Seawater Intrusion

- Salt water intrusion observed in the 1920s
- Growing water demand from farmers, ranchers, and nearby towns
- Groundwater level dropped below sea level - landward migration of sea water
- Unregulated installation and abandonment of wells
SALT-WATER DEGRADATION OF GROUND WATER IN THE SHALLOW NEWARK AQUIFER AND DEEP CENTERVILLE AQUIFER IN THE BAY PLAIN
Sea Level
SAN FRANCISCO BAY SALT PONDS
100 -100 -200 -300 -400 -500 -600 -700
BELOW HAYWARD FAULT
APEX OF NILES CONE

INTRUSION OF SALT WATER INTO THE FREMONT STUDY AREA

LEGEND
- PIEZOMETRIC LEVELS
- AQUIFERS
- PATH OF SALT WATER INTRUSION

HAYWARD FAULT
ABOVE HAYWARD FAULT

AN FRANCISCO BAY
SALT PONDS
NEWARK AQUIFER
CENTERVILLE AQUIFER
FREMONT AQUIFER
DEEP AQUIFERS

USC & GS DATUM

DEPTH IN FEET USC & GS DATUM

INTRAFOCAL DEPOTULT OF WATER
Salt Water Intrusion
Aquifer Reclamation Program

LEGEND
- BRACKISH WATER
- FRESH WATER
- DIRECTION OF GROUNDWATER MOVEMENT

NEWARK AQUIFER
CENTERVILLE AQUIFER
FREMONT AQUIFER
DEEP AQUIFER

SAN FRANCISCO BAY
SALT PONDS

“BELOW HAYWARD FAULT”
“ABOVE HAYWARD FAULT”

ARP/PRODUCTION WELLS
RECHARGE PONDS
FOREBAY
Aquifer Reclamation Program
ALAMEDA COUNTY WATER DISTRICT
WATER SUPPLY/DEMAND INVENTORY FY 2014/15 (ACTUAL*)
(1000's OF ACRE-FEET)

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<th>SUPPLY</th>
<th>PRODUCTION</th>
<th>CONSUMPTION</th>
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<tr>
<td>SWP</td>
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<tr>
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<td>2.5</td>
<td>6.6</td>
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<tr>
<td>EVAP.</td>
<td>10.6</td>
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<tr>
<td>Natural Saline Outflow</td>
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<td>Other Extractions &amp; Outflow</td>
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<td>Total Recharge</td>
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<tr>
<td>Less Natural Saline Outflow</td>
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<td>Basin Balance</td>
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NILES CONE GROUNDWATER BASIN
(1000's of Acre-Feet)

PLATE 11

* Based on actual historical conditions, but quantities herein may deviate from true values due to limitations in accuracy of flow model and/or measurements.
Groundwater Monitoring

Monitoring Well Water Level Measurement

Monitoring Well Sampling
Groundwater Protection Program - Cooperative Agreements

- Agreement: Oversight of the investigation and remediation of unauthorized releases that threaten groundwater.
- Scope: (1) All LUFT Sites (95 Open)  
  (2) Most SCP Sites (81 Open)
- Term: Indefinite
- Adopted: Regional Board – June 27, 1996  
  Fremont – March 25, 1997  
  Newark – ACDEH – Oct. 8, 2009  
  Union City – August 12, 1997  
  Hayward – July 27, 2000

LUFT = Leaking Underground Fuel Tank; SCP = Site Cleanup Program
Well Ordinance Program-ACWD
Groundwater Protection Act

- Drilling Permits (537 permits in 2015)
- Inspection (886 inspections in 2015)
- Well Records
- Historical Maps
- Well Destruction
Groundwater Studies & Projects

- DWR Local Groundwater Assistance Grant
- First Grant in FY 1994/95
- Recently Awarded $225,000 in April 2014
- Total of 86 Wells Installed from Grants
FY 2016/17 PROJECTED GW BASIN COSTS

Total: $16,055,000
Questions?
Agenda

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- Use and management of basins adjacent to the San Mateo Plain Sub-basin:
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- West Bay Sanitary District’s Recycled Project – Sharon Heights Golf Course – Phil Scott, District Manager, West Bay Sanitary District
- Activities in the San Mateo Plain Sub-basin
- Next Steps
* Overview of the *Recycled Water Project – Sharon Heights GCC*
* Project Description
* Anticipated Costs and Benefits of Project
* Timeline and Current Status
Menlo Park
Atherton
Portola Valley
Portions of East Palo Alto
San Mateo and Santa Clara Counties
Recycled Water Project - Sharon Heights Overview

200 miles of pipe
3.5 MGD

Sent to SVCW

cc: jumpingspider : https://www.flickr.com/photos/75695140@N00
West Bay & GCC partners

cc: Tyello – http://www.flickr.com/photos/8835699@N05
152 AFY

Non-potable demand
Project Description

- RW Pump Station
- Waste Solids to Sewer
- RW Delivery to SLAC
- Forcemain from PS
- Treatment Facility

280 Junipero Serra Freeway
Phase I
Treatment Facility
Pump Station

- Existing Sewer
- New Sewer
- Forcemain to Treatment Facility
- Below-grade Pump Station
- Below-grade Valve Box
- Above-grade Electrical Equipment
- Existing Sewer
SLAC

Phase II

84 AFY

cc: Arenamontanus - https://www.flickr.com/photos/87547772@N00
Costs & Benefits
Sharon Heights only
Cap X $15.6M, O&M $233k/yr, Unit cost $6,100/AF
152 AFY

Recycled Water

cc: DonaldinPortlandia - https://www.flickr.com/photos/88933581@N06
New water supply
Use Less Potable Water

c: jenny_downing - https://www.flickr.com/photos/7941044@N06
20 by 2020

water conservation goals
Timeline

Hose Co. No. 4

DUC 354-350-351-346
Design 2016

Phase I

cst-flickr.com/photos/21066171@N08
2017

Irrigate

cc: Katrina M Wilkins - https://www.flickr.com/photos/79906178@N02
Phase III - 2019+
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San Mateo County’s Assessment of San Mateo Plain Sub-basin

April 19, 2016
San Mateo Plain Groundwater Reliability Partnership

Environmental Health Services
Heather Forshey, Director
Charles Ice, Groundwater Protection Program Lead
County’s Objectives for Assessment of San Mateo Plain Sub-Basin

- Assess the groundwater resources, current usage, and current condition
  - Evaluate the hydrogeologic and groundwater conditions of the entire sub-basin
  - Evaluate surface water and groundwater interactions in the sub-basin
  - Evaluate threats to the sub-basin quality and quantity
  - Assess recharge areas
  - Interactions with adjacent basins and sub-basins
County’s Objectives for Assessment of San Mateo Plain Sub-Basin

• Some more details
  – Data compilation, unification, and sharing
  – Basin hydrogeologic conceptual model
  – Basin water balance
  – Assess threats to water quality
  – Initial basin conceptual model
  – Groundwater numerical model
  – Fill data gaps
  – Update and refine hydrogeologic and numerical models
  – Scenario evaluations
County’s Objectives for Assessment of San Mateo Plain Sub-Basin

• Describe all of the various groundwater management strategies available and identify all GSA-eligible and non-GSA-eligible agencies and various interested stakeholder groups

• Identify long-term strategies to sustainably manage groundwater resources through local policies and cooperative relationships
County’s Actions in San Mateo Plain Sub-Basin

- Measure A Letter of Intent (January 2015)
- Revised Groundwater Assessment Plan for San Mateo Plain (September 2015)
- Resolution to Board approving contract with Erler and Kalinowski, Inc., Todd Groundwater, and Hydrofocus (April 2016)
- Tentative 1st Workshop May 17, 2016 City of San Mateo Library, Oak Room
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Next Steps

• BAWSCA board to fund ongoing efforts of the Groundwater Reliability Partnership

• BAWSCA to continue to host meetings to further goals:
  o Increased understanding of the hydrology and geology of the Basin
  o Serving as a forum for sharing information among all stakeholders
  o Continued sustainable use of the Basin to maintain groundwater quality and quantity and protect beneficial uses