



Conceptual Regional Groundwater Development

BOARD OF DIRECTORS MEETING

September 20, 2023

Discussion Outline

1. Background
2. Groundwater Model Upgrade
3. Well Master Plan Update
4. Assessment of Current PFAS Condition and the long-term PFAS management strategy
5. Need for Supplemental Groundwater Supply
6. Cost and Schedule Comparisons
7. Next Steps and Recommendations





Initiative 1

Establish a diversified water supply plan

Initiative 2

Evaluate and develop appropriate new water supply and reliability opportunities

Initiative 3

Continue to effectively implement infrastructure projects in the water system Capital Improvement Program (CIP)

Background

- Zone 7 is updating the groundwater model and the Well Masterplan for supplemental groundwater development
- The City of Pleasanton is investigating water supply alternatives to recover their groundwater pumping quota – 3,500 acre-feet per year or 3 million gallons per day
- Pleasanton is open to explore a regional groundwater project with Zone 7
- Need to evaluate the regional project concept to see if it could be mutually beneficial for Pleasanton and the region
- Need to propose recommendations to Zone 7's Board

Groundwater Model Upgrade:

- First developed in the 1980s and last updated in 2016
- Model domain needs to cover all fringe and upland areas
- Need to incorporate current hydrogeological data and basin information
- The upgraded Model will be useful for various analyses and assessments including:
 - Calculating water budgets and groundwater storage;
 - Analyzing climate change and drought impact
 - Supporting well master planning and well site selection
 - Analyzing PFAS management and purified water studies
 - Evaluating SGMA's sustainability criteria and
 - Complying with Executive Orders and legislations



Well Master Plan (WMP) Update:

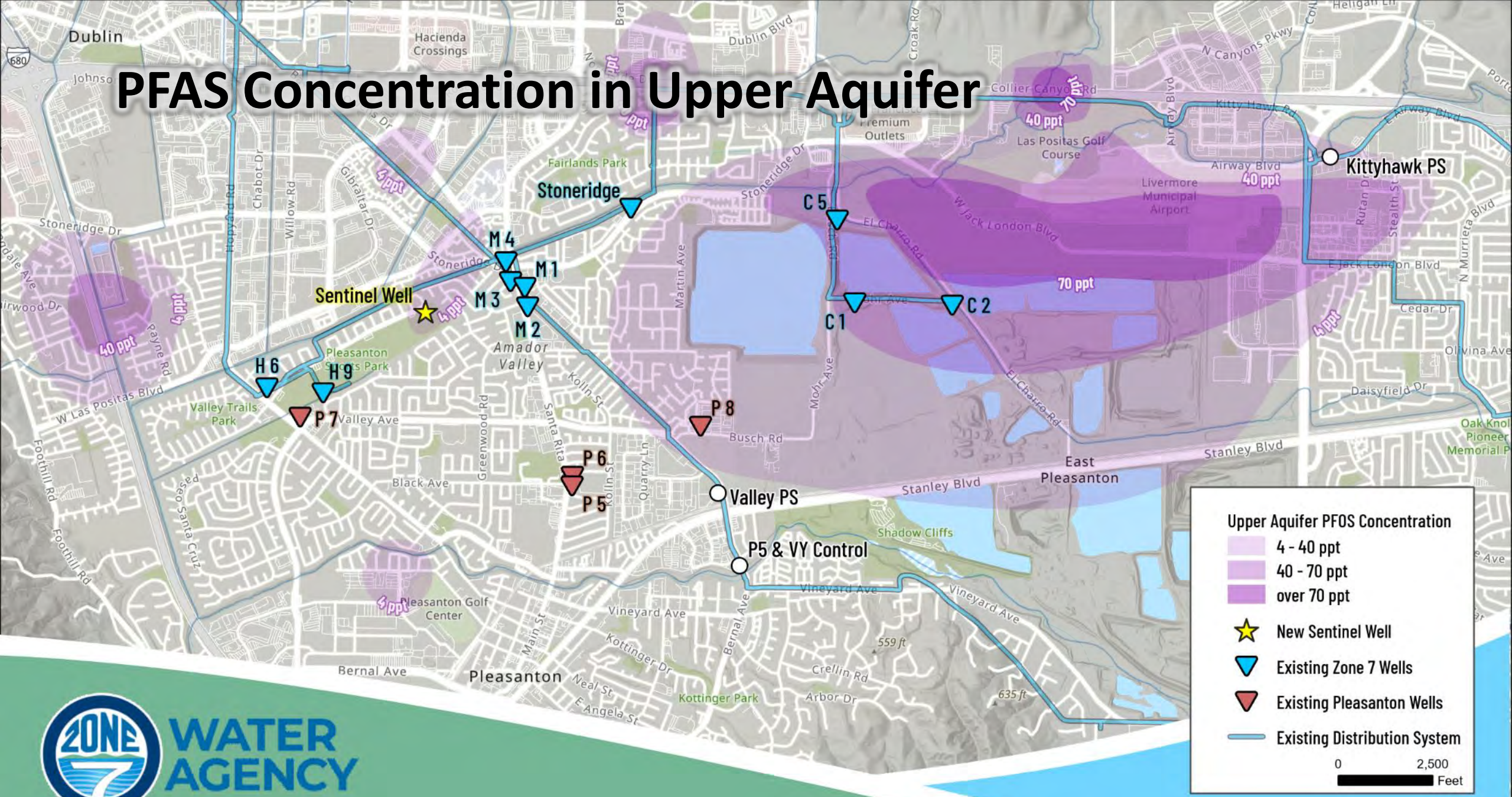
- The objective is to develop a strategic roadmap to develop supplemental groundwater supply
- In 2005, Zone 7 prepared the WMP (2005)
 - The “preferred alternative” identified installing seven new wells
 - Installed three municipal water supply wells (COL1, COL2, and COL5)
- In October 2012, the Board adopted Resolution No. 13-4230, the water supply reliability policy,
 - at least 85% of M&I water demands in 99% of the time, and
 - 100% of M&I water demands in 90% of the time
- Among multiple objectives, the WMP is to address:
 - Unpredictable hydrologic conditions stemmed from global climate change
 - Changing regulatory environment, and
 - Water quality threats from emerging contaminants such as PFAs compounds and Chromium 6

Assessment of Current PFAS Condition and Long-term PFAS Management Strategy

Overview of Existing Municipal Wells



PFAS Concentration in Upper Aquifer



PFAS Concentration in Lower Aquifer

Lower Aquifer PFOS Concentration

- 4 - 40 ppt
- 40 - 70 ppt
- over 70 ppt

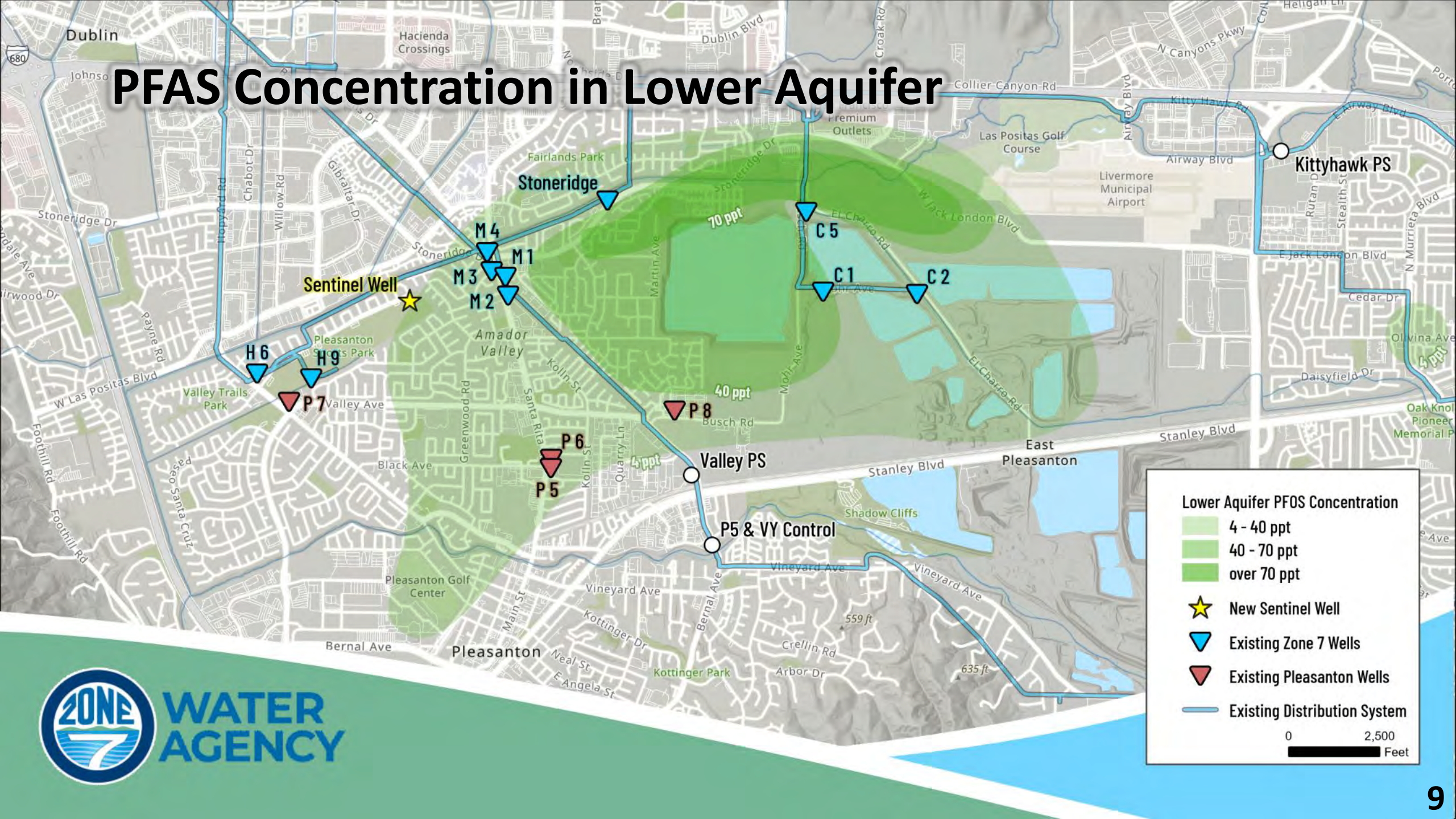
★ New Sentinel Well

▼ Existing Zone 7 Wells

▼ Existing Pleasanton Wells

— Existing Distribution System

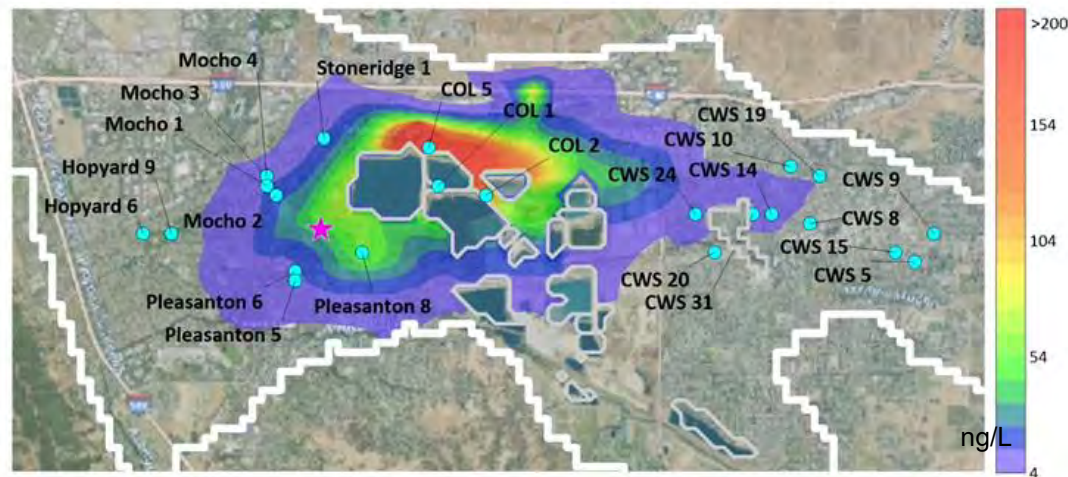
0 2,500 Feet



Pump & Treat at Mocho and Chain of Lakes Wells

- This model scenario analyzed pumping and treating PFAS plume at Mocho and Chain-of-Lake locations for 20 years.
- It showed that the plume could be reduced and managed but won't be cleaned up entirely.

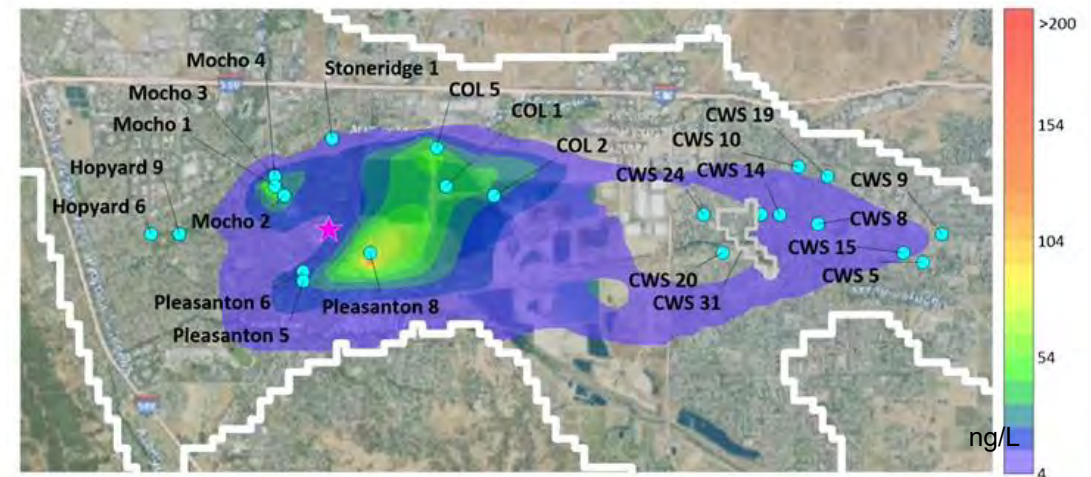
Upper Aquifer



Scale = feet

0 20,000 40,000

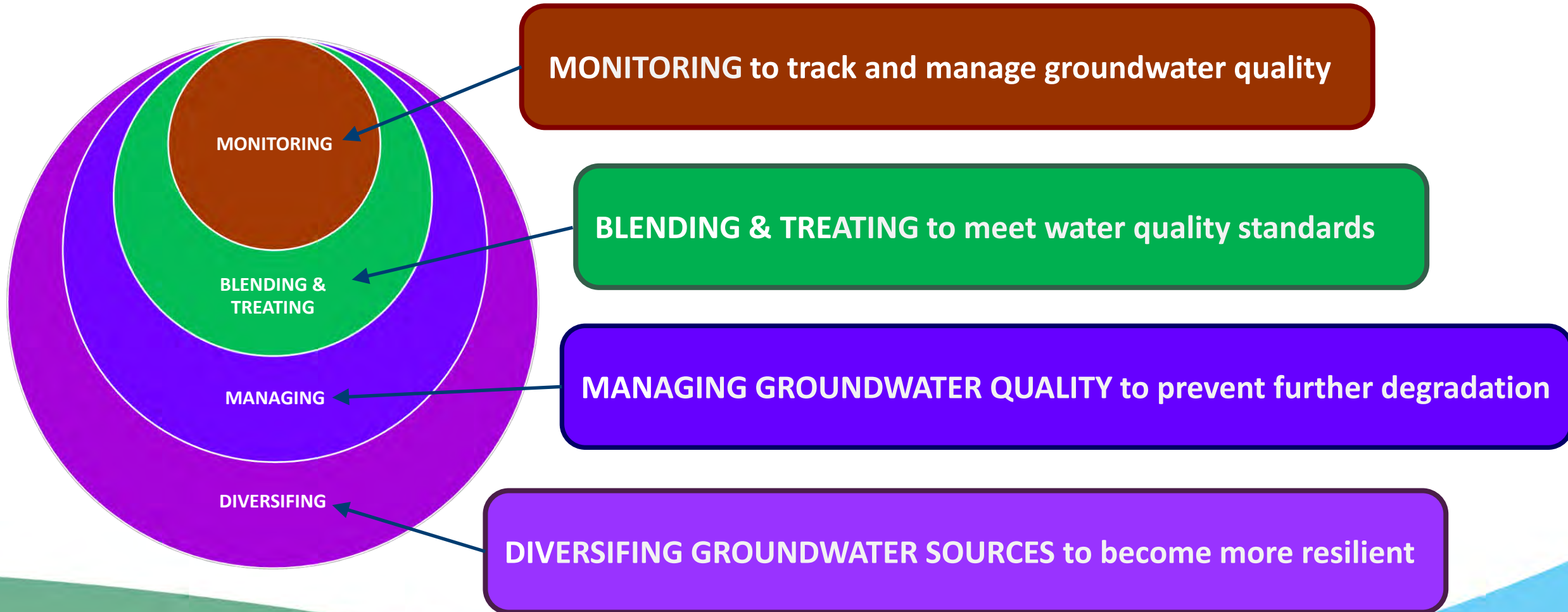
Lower Aquifer



Scale = feet

0 20,000 40,000

Components of Long-term Strategy (Post 2023)



Need for Supplemental Groundwater Supply

Net Capacity Need with Allowance for Losses

Supplemental GW Supply Need	
Zone 7 only (mgd)	5
Zone 7 + Pleasanton GPQ (mgd)	8
Zone 7 only with added capacity for losses (mgd)	8
Zone 7 + Pleasanton GPQ with added capacity for losses (mgd)	12

Hop 6 - 5.5 mgd

Mocho 3 - 6 mgd

Stoneridge - 6.6 mgd

- To meet Zone 7's need, a minimum of 2 x 4 mgd wells or 3 x 3 mgd wells will be needed
- To meet Zone 7 + Pleasanton's need, 2 x 6 mgd wells or 3 x 4 mgd wells will be needed

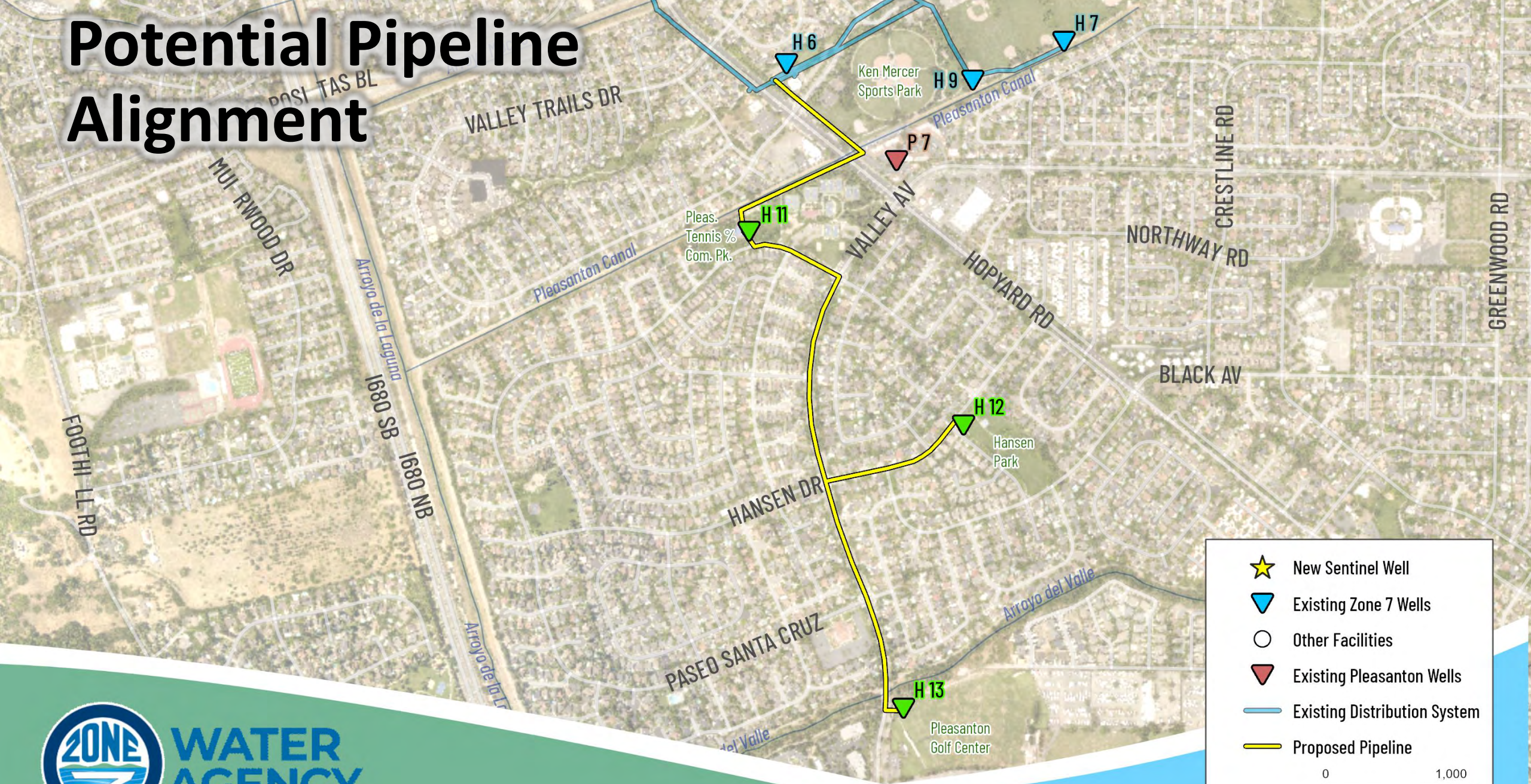
Notes:

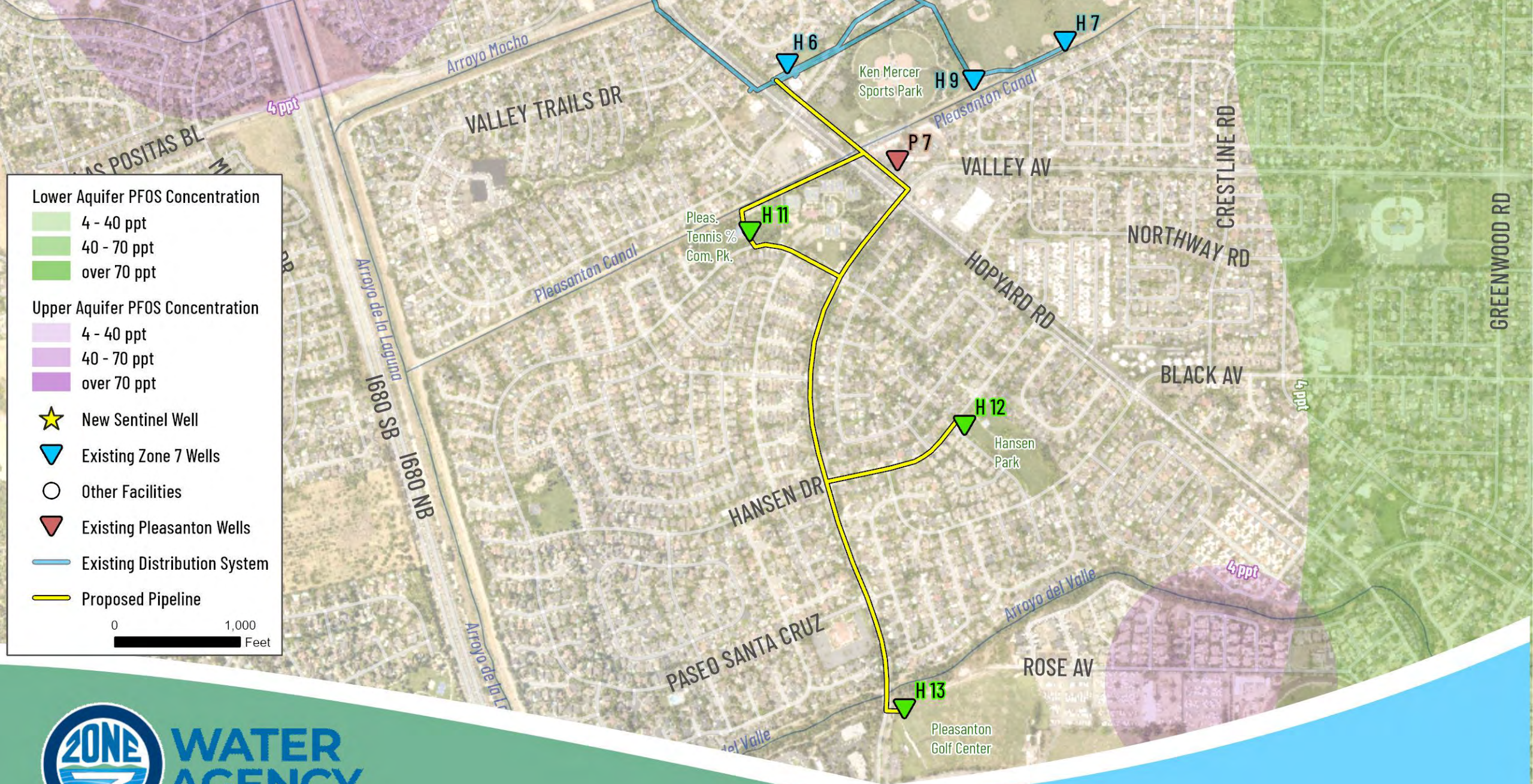
- **mgd** – million gallons per day
- **GPQ** – Groundwater Production Quota of **3,500 acre-feet per year** or approximately **3 mgd**

Notes:

1. Well sites shown on the following slides are based on conceptual locations
2. Actual well capacities could be greater than or less than listed capacities depending on actual yields
3. Well site screening -- using existing groundwater model, pilot borings, water chemistry analysis, yield analysis, fatal flaw analysis -- will be conducted prior to final site selection
4. Final well locations and capacities will be based on information obtained from field investigation
5. If feasible, submersible pumps will be used to minimize well profile
6. Centralized treatment at Hopyard 6 location is conceptualized for greater cost savings

Potential Pipeline Alignment







Cost and Schedule Comparisons



**WATER
AGENCY**

If two wells can produce sufficient yield:

Two 4 mgd wells

(Meet Zone 7 Demand Only)

- 8 MGD = 2 new wells × 4 mgd
- \$29M construction
- 100% Zone 7 Cost
- Capital cost per AF = \$327

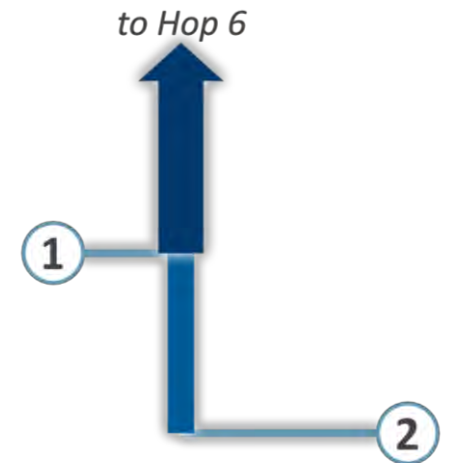
Zone 7 gains 8 MGD production capacity.

Upsized Two 6 mgd wells

(Meet Zone 7 + Pleasanton GPQ)

- 12 MGD = 2 new wells × 6 mgd
- \$32M construction
- 25% Pleasanton cost share (\$8M)
- Capital cost for Zone 7
 $\$32M - \$8M = \$24M$
- Capital savings for Zone 7
 $\$29M - \$24M = \$5M$
- Capital cost per AF = \$241

Zone 7 gains 9 MGD (75% of a total 12 MGD production capacity).
Pleasanton gets its GPQ of 3 MGD (25%).



If three wells are required:

Three 3 mgd wells

(Meet Zone 7 Demand Only)

- 9 MGD = 3 new wells × 3 mgd
- \$40M construction
- 100% Zone 7 Cost
- Capital cost per AF = \$400

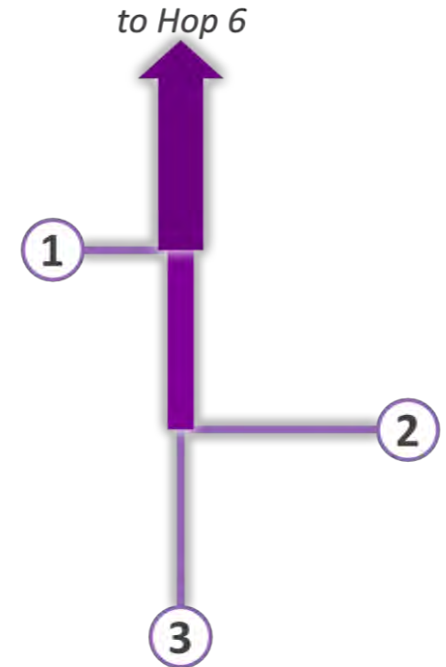
Zone 7 gains 9 MGD production capacity.

Upsized Three 4 mgd wells

(Meet Zone 7 + Pleasanton GPQ)

- 12 MGD = 3 new wells × 4 mgd
- \$41M construction
- 25% Pleasanton cost share (\$10.2M)
- Capital cost for Zone 7
 $\$41M - \$10.2M = \$30.8M$
- Capital savings for Zone 7
 $\$40M - \$30.8M = \$9.2M$
- Capital cost per AF = \$309

Zone 7 gains 9 MGD (75% of a total 12 MGD production capacity).
Pleasanton will get its GPQ of 3 MGD (25%).



Take-Aways

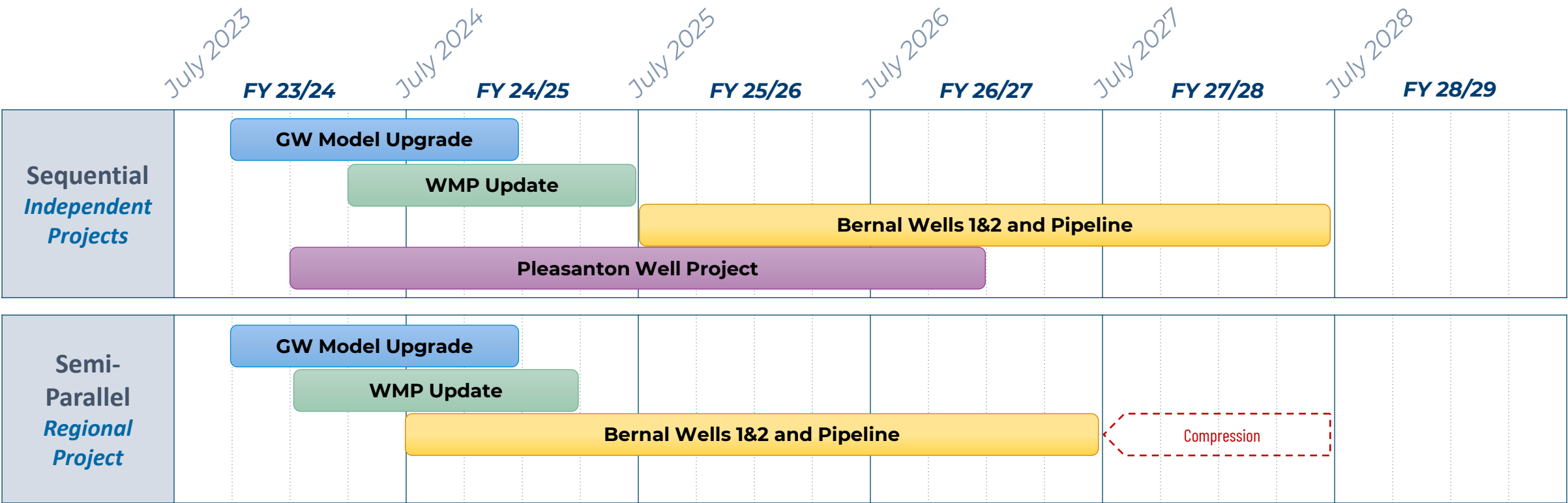
- If hydrogeologically feasible, maximizing (upsizing) well size is more cost-effective than adding wells.
- Centralized chemical facilities yield cost savings compared to treatment at each well site.
- Results reflect capital costs only.
- Cost savings from operational efficiencies are not yet included.
- Annual O&M and water production costs are not included.

Zone 7's FY27-FY31 CIP Funding and Schedules

In 2023 dollars, the total is \$28.88M (cost estimate was based on 6,000 feet of 24-inch pipeline):

Capital Improvement Program: Expansion - Fund 130 - Source of Funding - Water Connection Fees	FY 24/25	FY 25/26	FY 26/27	FY 27/28	FY 28/29	FY 29/30	FY 30/31	TOTAL
Bernal Wells 1 & 2 and Pipeline			2.22	1.11	13.33	6.11	6.11	\$28.88

Comparison of Project Schedules



Next Steps and Recommendations

Next Steps:

- Proceed with accelerated groundwater model upgrade and the well master plan update
- Continue with project development activities (planning, budgeting, easements for pilot boring, etc.) for installing new wells

Recommendations:

- Continue Zone 7's collaboration with Pleasanton
- Construct pilot wells in candidate sites and conduct yield analysis to evaluate groundwater production potential (actual available yields)
- Determine feasibility of regional groundwater development and synergetic cost advantage at preliminary design phase





Questions?