Public Meeting (Virtual)

City of Dinuba Wellfield Remedial Investigation/Feasiblity Study Project

January 20, 2022 @ 6 p.m.

Presented by:
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Steve Spencer, PE, Provost & Pritchard Consulting Group
Kelly McEnerney, Provost & Pritchard Consulting Group

Grant Agreement No. D1912528

PROP 1 WATER BOND 2014

California Water Boards — State Water Resources Control Board, Regional Water Quality Control Boards

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Microsoft Teams Instructions

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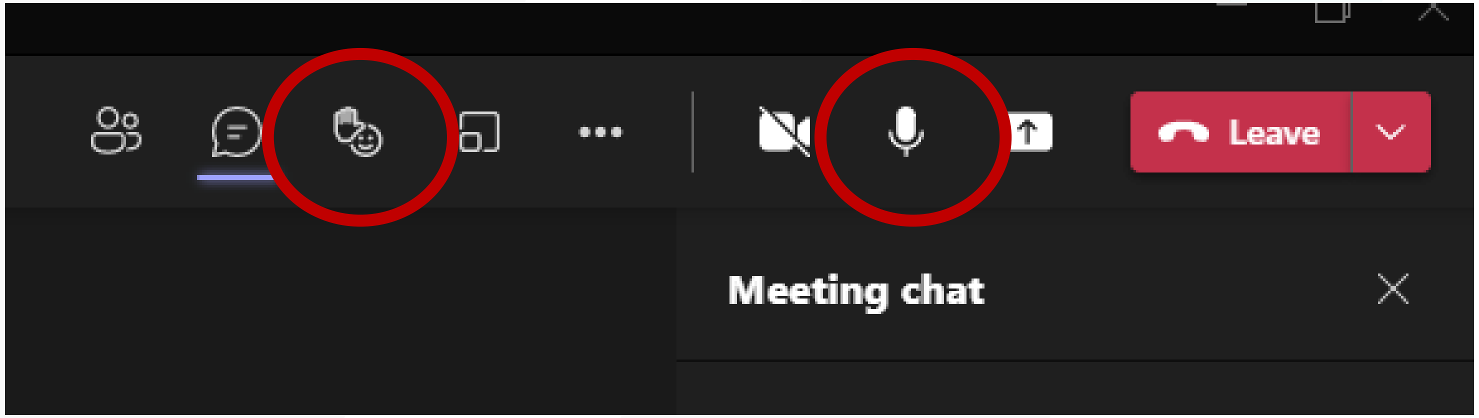

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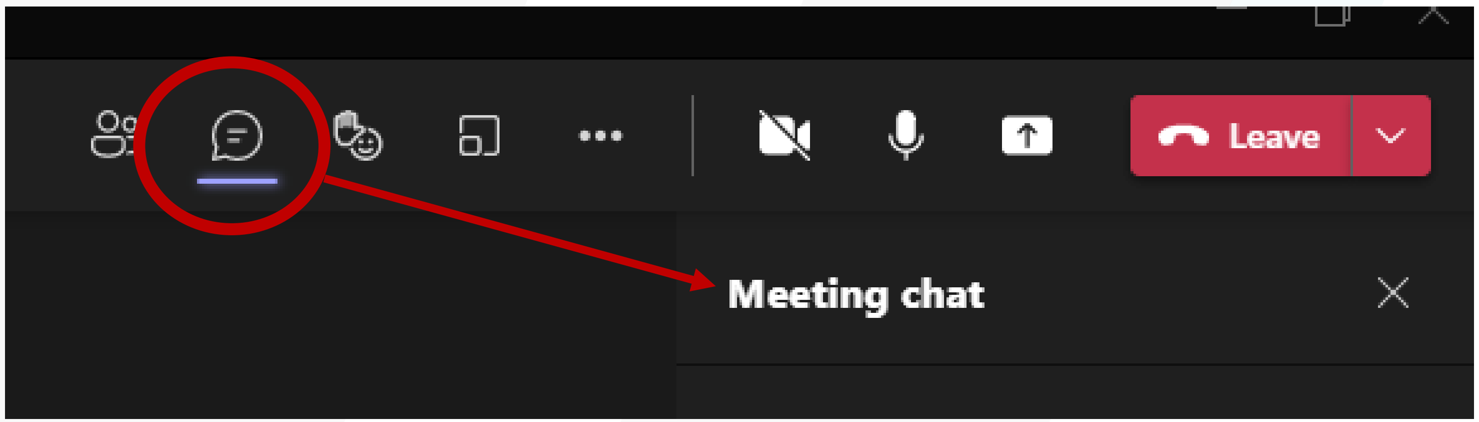

Agenda

1. Project Team Introductions
2. Proposition 1 Funded Project
3. Objectives, Goals & Benefits of the Project
4. Overview of the City’s Water Supply
5. RI/FS Tasks
6. Preferred Project
7. Next Steps
8. Public Comment & Questions/Answers

Funding Disclosure

Funding for this project has been provided in full or in part by Proposition 1 – the Water Quality, Supply, and Infrastructure Improvement Act of 2014 through an agreement with the State Water Resources Control Board. The contents of this presentation do not necessarily reflect the views and policies of the foregoing, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

Grant Agreement No. SWRCB D1912528

Project Team

CALIFORNIA WATER BOARDS
State Water Resources Control Board

Grant Program Management
Robin Guillot, Grant Manager

CITY OF DINUBA
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Grant Management
Municipal Engineering Support

Ismael Hernandez, City Project Manager, Public Works Director

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Technical Project Management
Hydrogeology
Water Quality

Mike Tietze, PG, CHG, Project Director
Sarah Raker, PG, CHG, Project Manager

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Project Engineering
Water Treatment
Field Work

Steve Spencer, PE, Lead Engineer
Kelly McEnerney, Senior Engineer
Trilby Barton, Public Outreach

Technical Advisory Committee and Stakeholder Advisory Group

Technical Advisory Committee

- Technical representatives from key regulatory agencies
- Review and advise project progress and direction
- Meet quarterly, review key documents

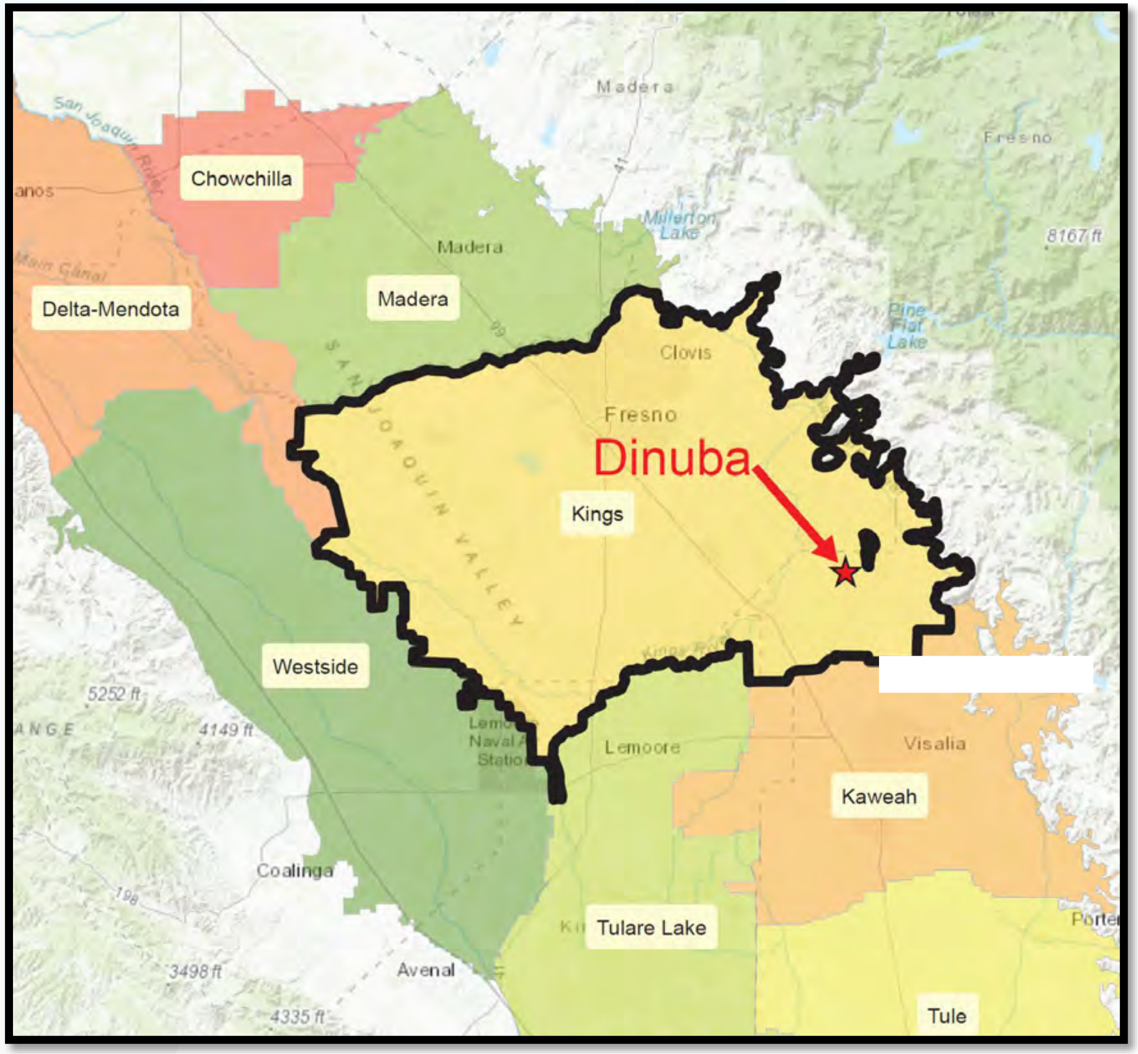
Stakeholder Advisory Group

- Community members, agency representatives, NGOs
- Informed of progress, review key documents
- Provide input and comment if desired
- Meet quarterly, review documents posted on website

Objectives, Goals & Benefits of the Project

Setting and Problem Statement

- ✓ Disadvantaged community in agricultural area
- ✓ Groundwater is sole municipal water supply
- ✓ Kings Groundwater Subbasin considered critically overdrafted, in Kings River East GSA
- ✓ Widespread groundwater impact from nitrate, DBCP and 1,23-TCP
- ✓ Priority basin for establishment of Nitrate Management Zones

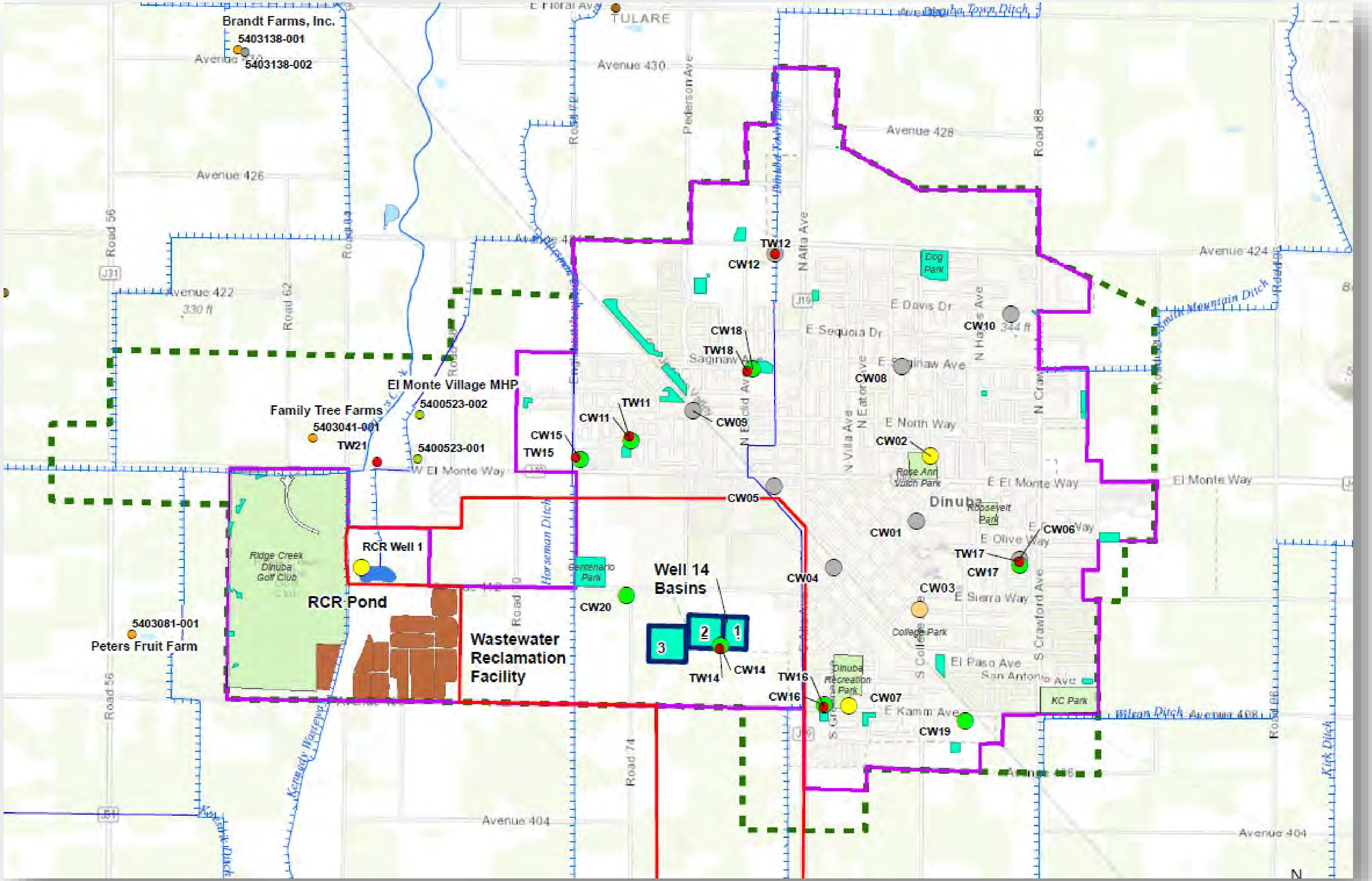


Project Overview

- City of Dinuba received a $1.75 million Proposition 1 Groundwater Grant from the SWRCB for the Dinuba Wellfield RI/FS Project.
- Study to develop potential implementation options to clean up or prevent the spread of non-point source pollutants in its municipal wellfield.
- Identify effective means to address nitrate, DBCP and 1,2,3-TCP, which are widespread in the shallow aquifers in the region and identify projects which can be funded under future implementation grants to help assure a more secure and higher quality water supply for the City.

Overview of the City's Water Supply

Overview Map



The Challenge

Dinuba has removed a number of wells from service due to Nitrate, DBCP or 1,2,3-TCP

Water from some wells must be treated to achieve drinking water requirements

Groundwater is increasingly important for reliable municipal water supply

Drilling deeper or providing wellhead treatment alone do not solve issues within the shallow aquifer

The Opportunity

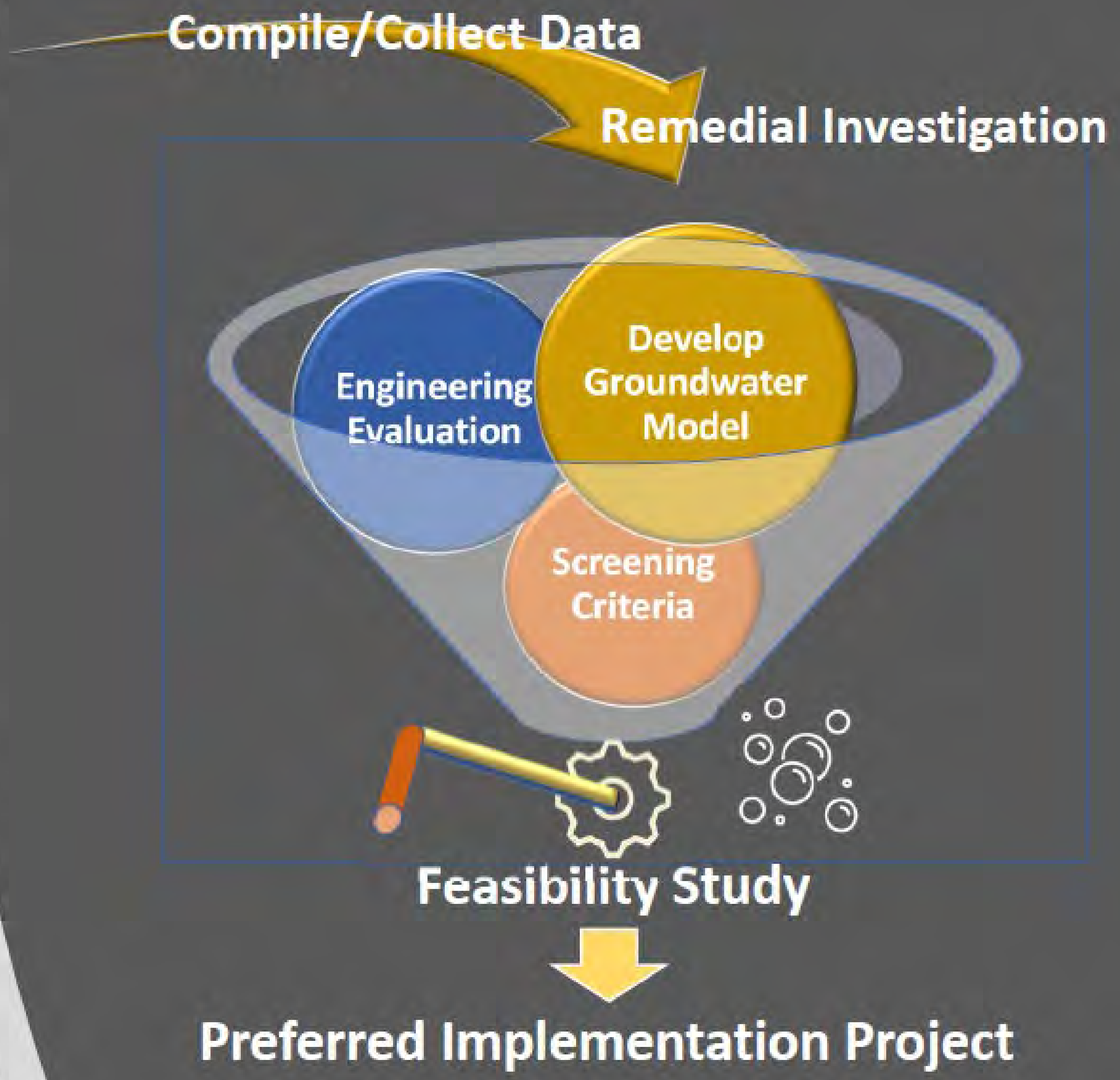
Dinuba is an ideal location to evaluate groundwater cleanup and supply management strategies

Build on USGS groundwater model and studies of nitrate conducted in the Dinuba area as part of CV-Salts program

Compile data from City of Dinuba, State databases and regional studies for CV-SALTS

Incorporate cutting edge technologies for well flow and contaminant profiling

Project Approach



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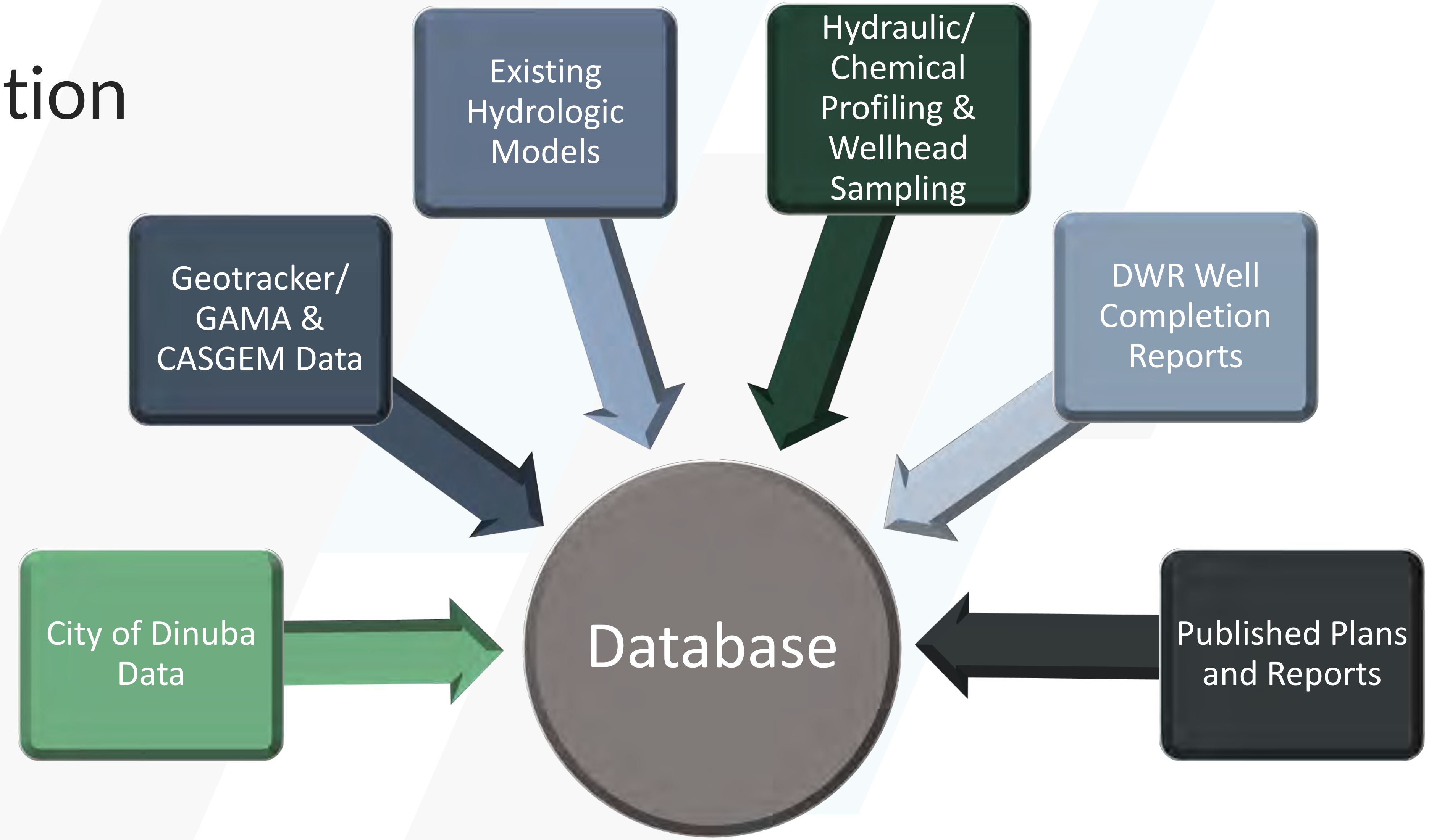
Data Compilation



Remedial Investigation Fieldwork

Well Monitoring & Sampling

- Water levels
- Sampling and analysis

Supply Well Profiling

- Ambient and pumping flow profiling
- Chemical flow profiling
- Well interference

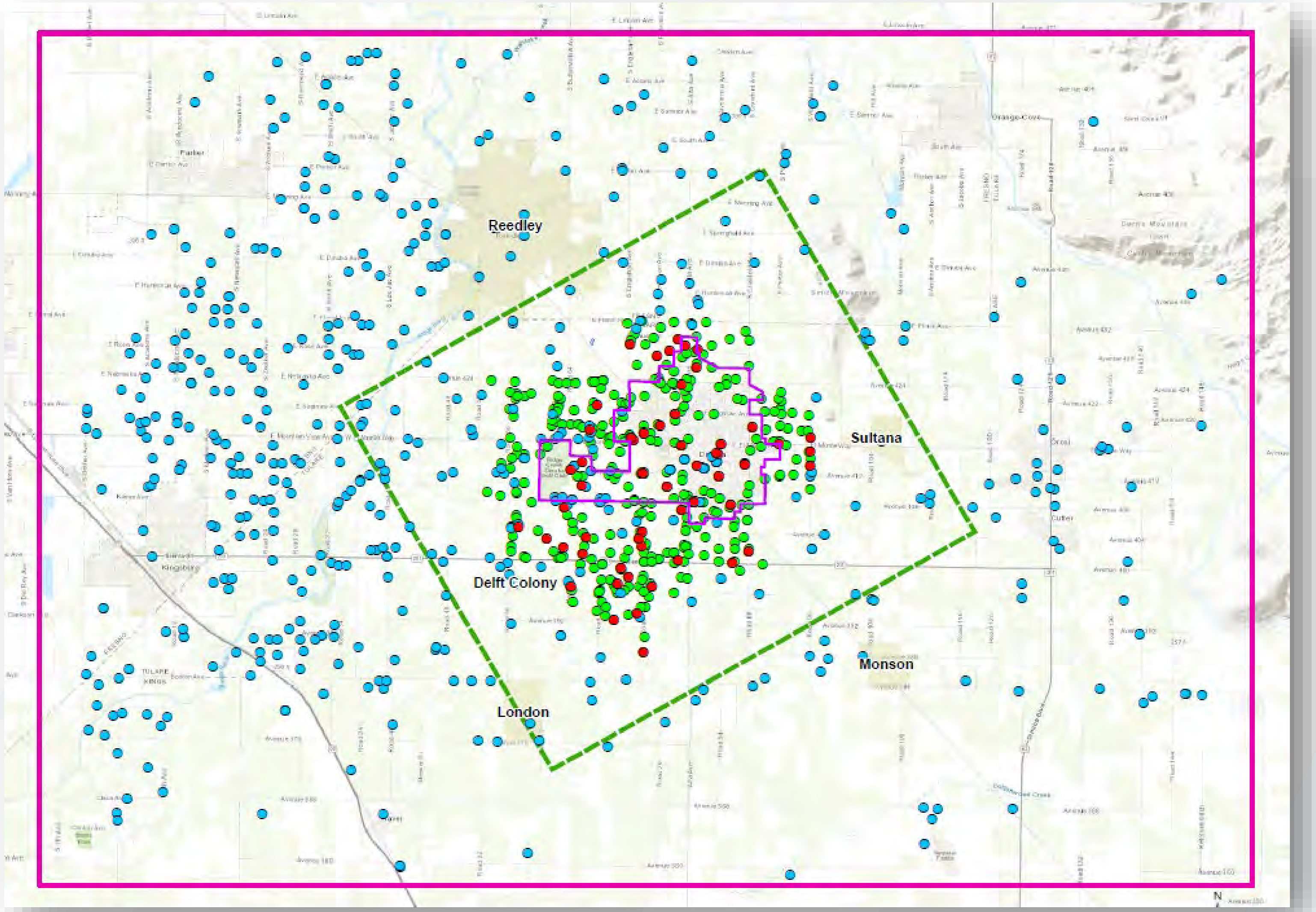
Opportunistic Sampling

- Sampling during ongoing monitoring programs
- Test well data
- Drawdown interference

RI Data Summary

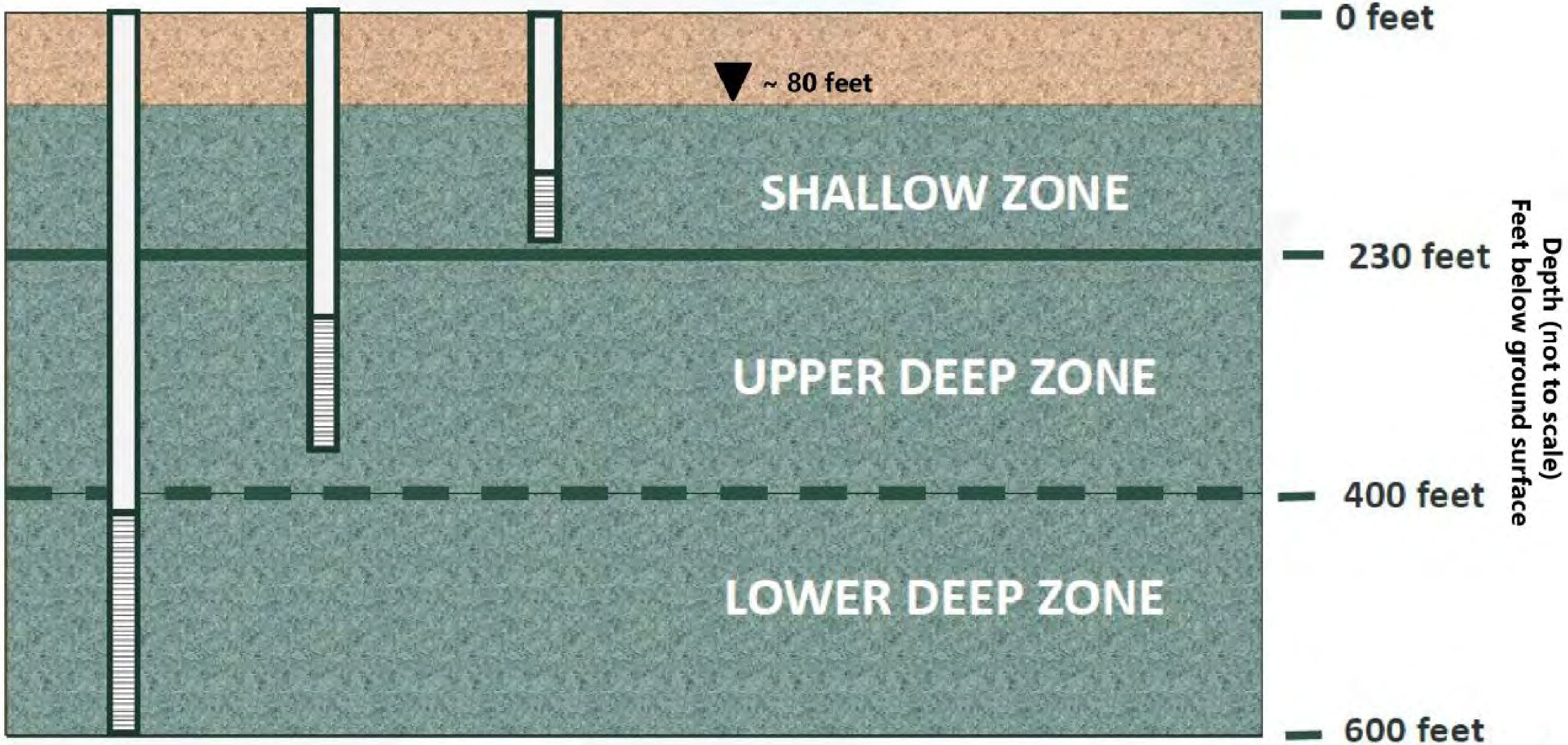
- **26** Wells sampled for Remedial Investigation
- **36** Well groundwater pumping data evaluated
- **57** Wells used to evaluate aquifer characteristics
- **387** Boring logs used to evaluate coarse/fine sediment distribution
- **140** Wells used for contaminant contour map development in the detailed study area
- **520** Wells used for contaminant contour map development in the surrounding area

Well Locations and Data Analysis

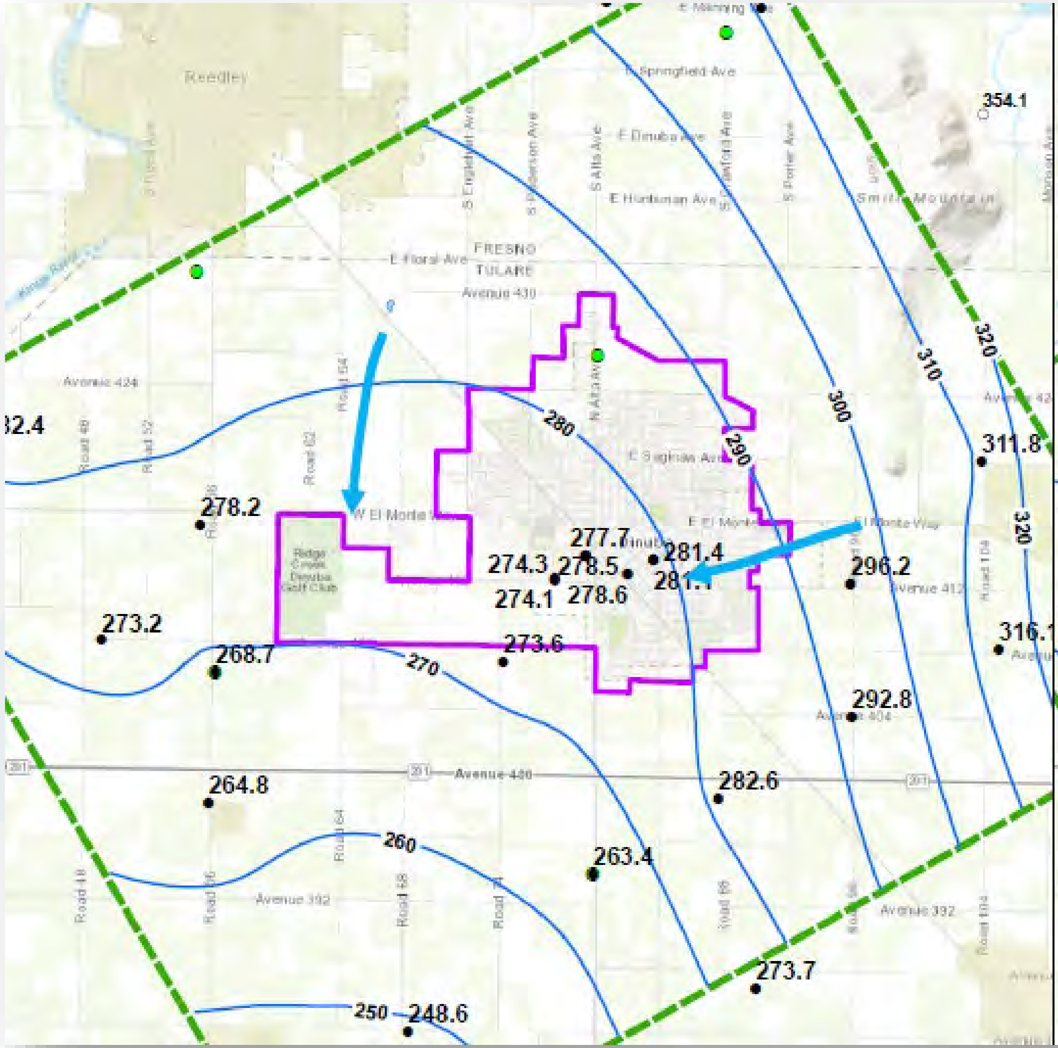


Legend

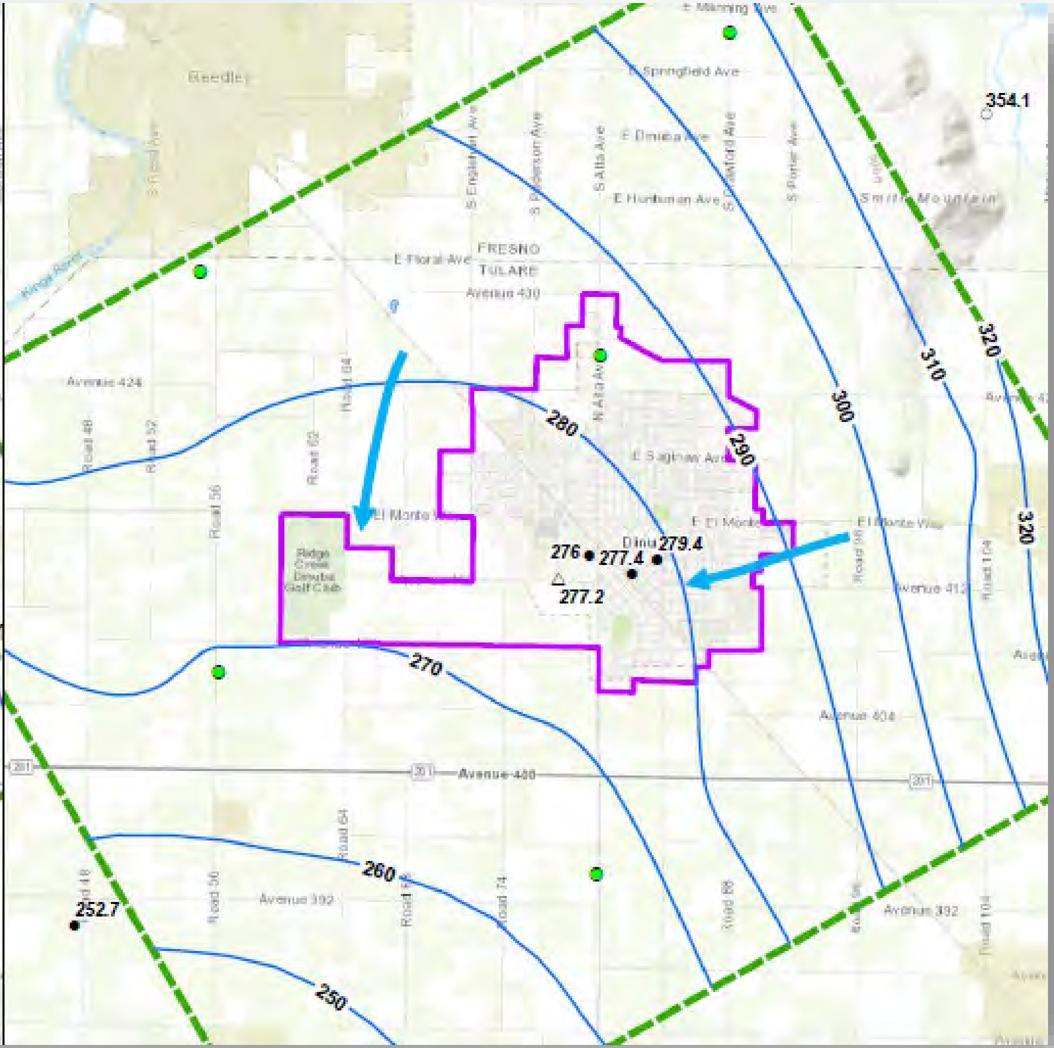
- Wells Used for Contaminant Contour Analysis
- Wells Used for Aquifer Textural and Specific Capacity Analysis
- Wells Used for Aquifer Textural Analysis
- Contaminant Contour Data Boundary
- Dinuba Refined Model Boundary
- Dinuba Water Service Area


~ 80 feet
SHALLOW ZONE
UPPER DEEP ZONE
LOWER DEEP ZONE
0 feet
230 feet
400 feet
600 feet
Depth (not to scale)
Feet below ground surface

Groundwater Elevations Spring 2005

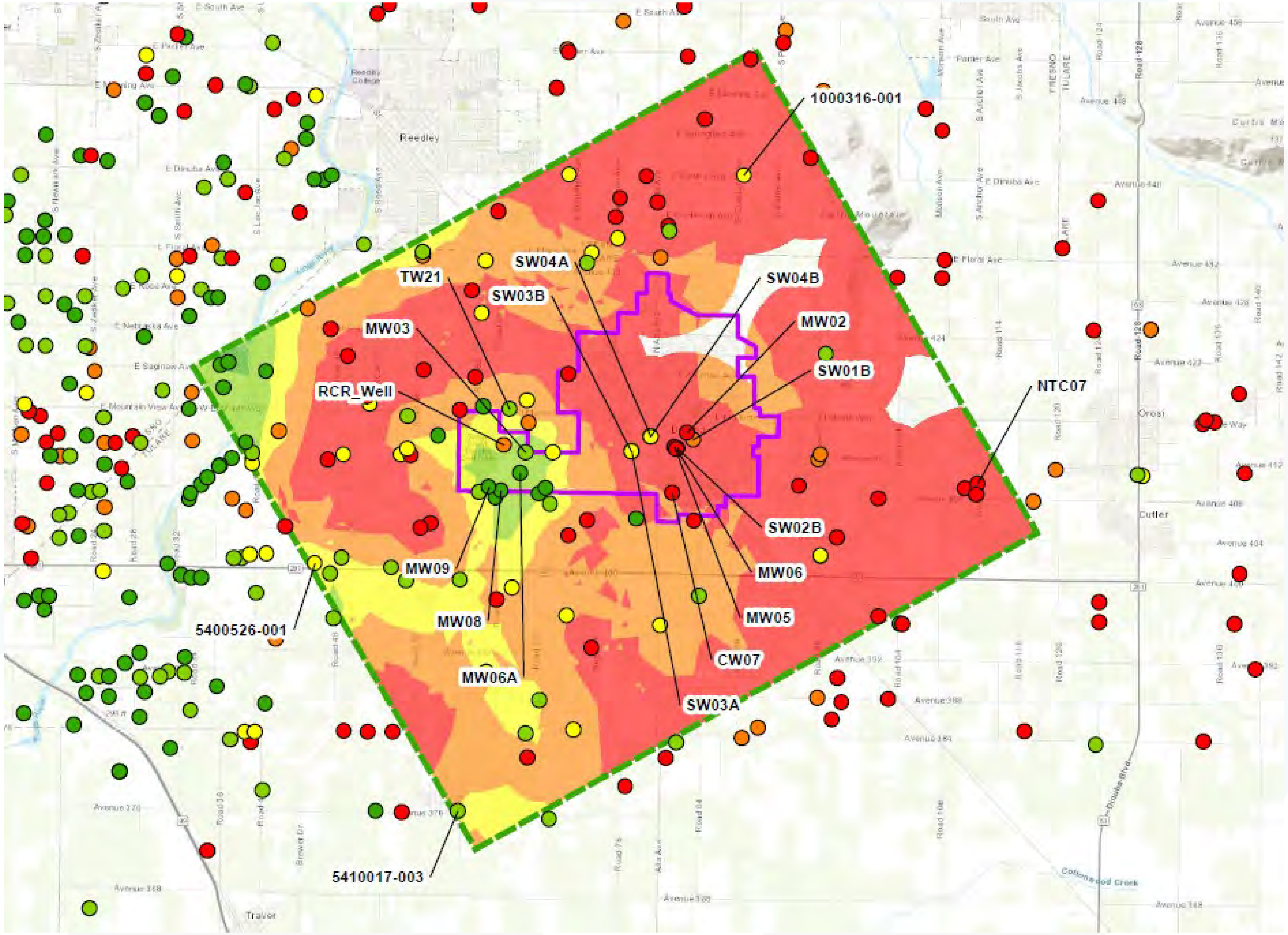


Shallow Groundwater <230 feet bgs



Deep Groundwater > 230 feet bgs

Nitrate in Groundwater (Average – Shallow)



Legend

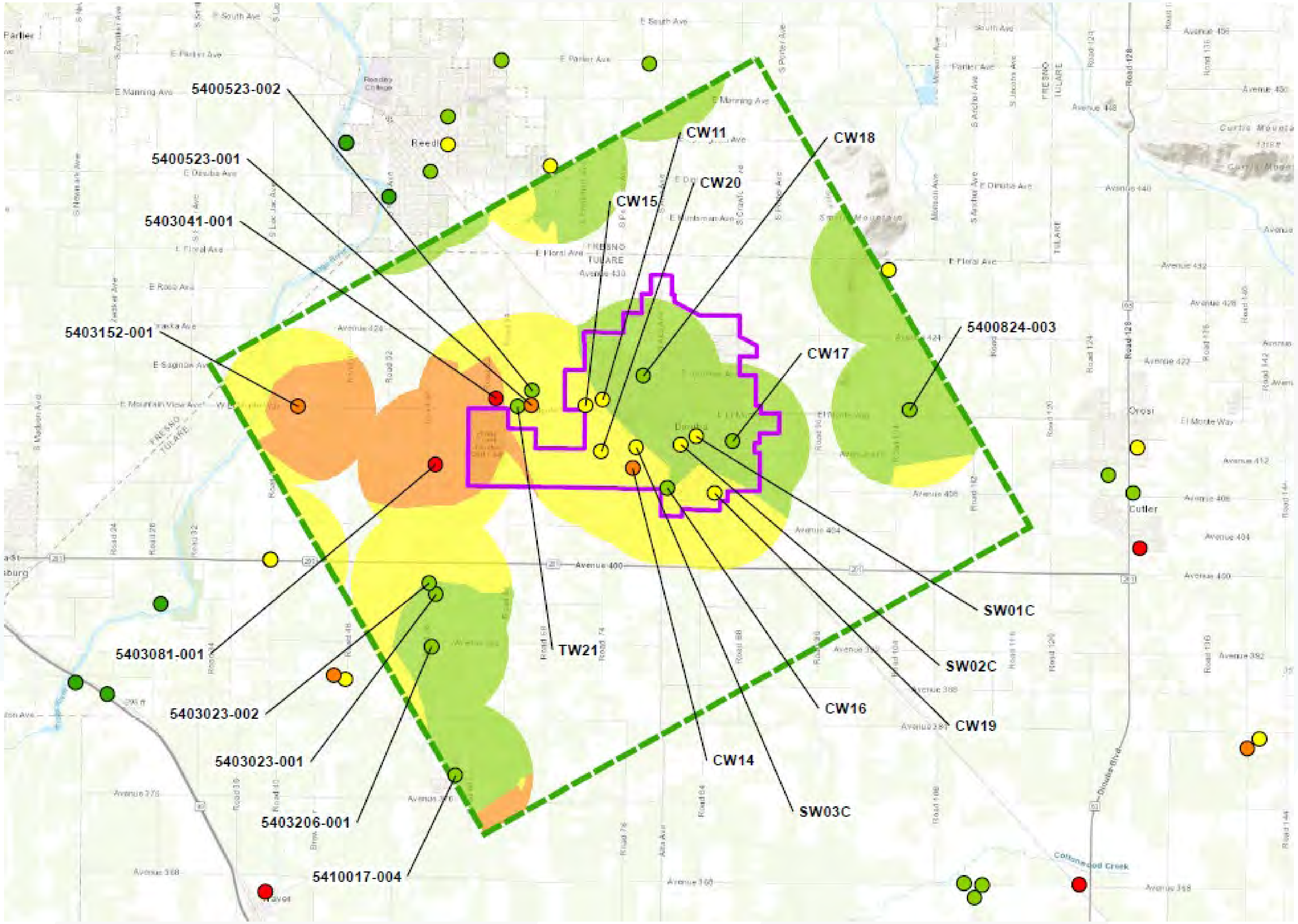
- Areas Used for Contaminant Concentration Contour Analysis
- Dinuba Regional Model Boundary
- Dinuba Water Service Area

Nitrate as Nitrogen

Miligrams per Liter

- <=2.5
- >2.5 - 5.0
- >5.0 - 7.5
- >7.5 - 10
- >10

Nitrate in Groundwater (Average – Deep)



Legend

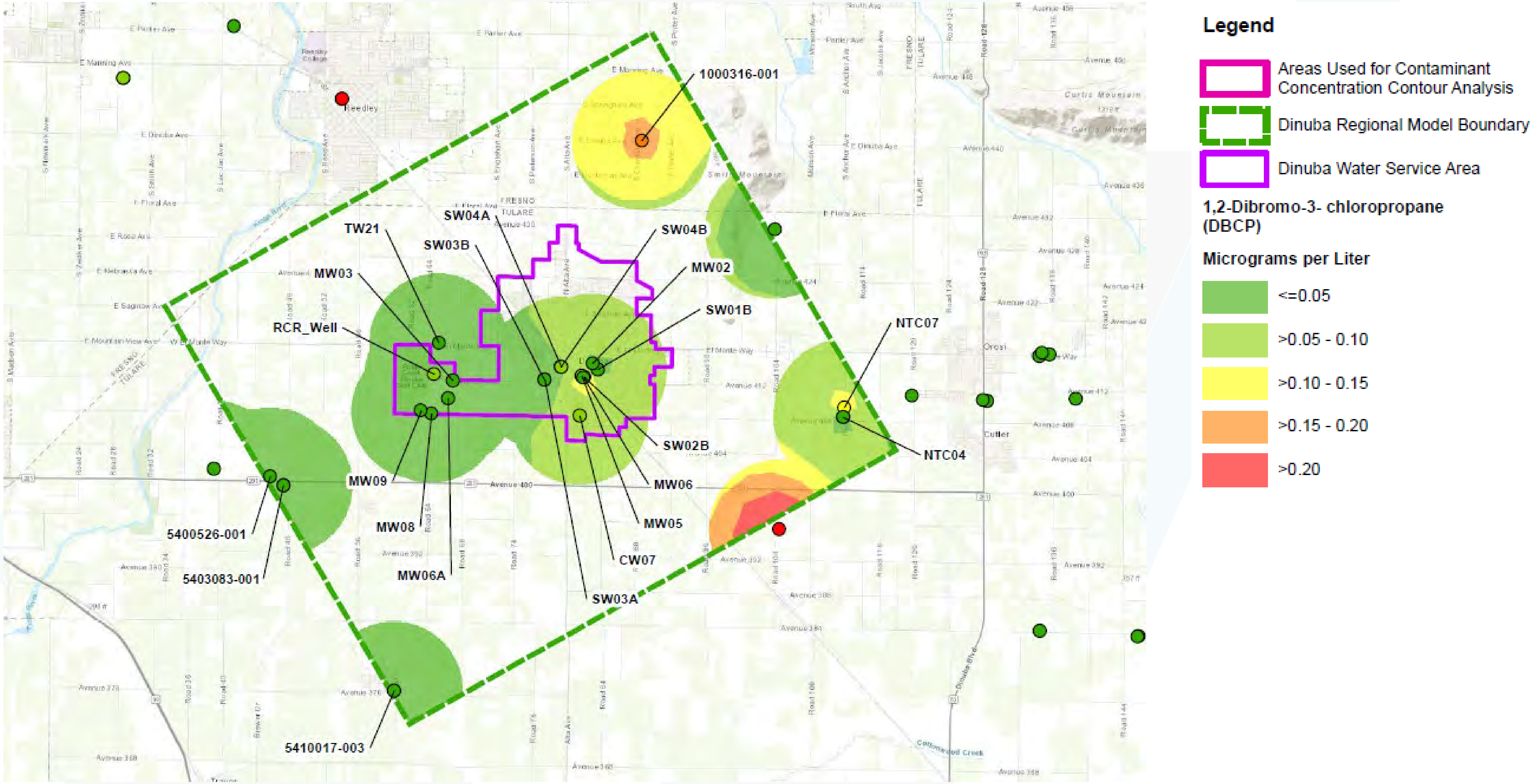
- Areas Used for Contaminant Concentration Contour Analysis
- Dinuba Regional Model Boundary
- Dinuba Water Service Area

Nitrate as Nitrogen

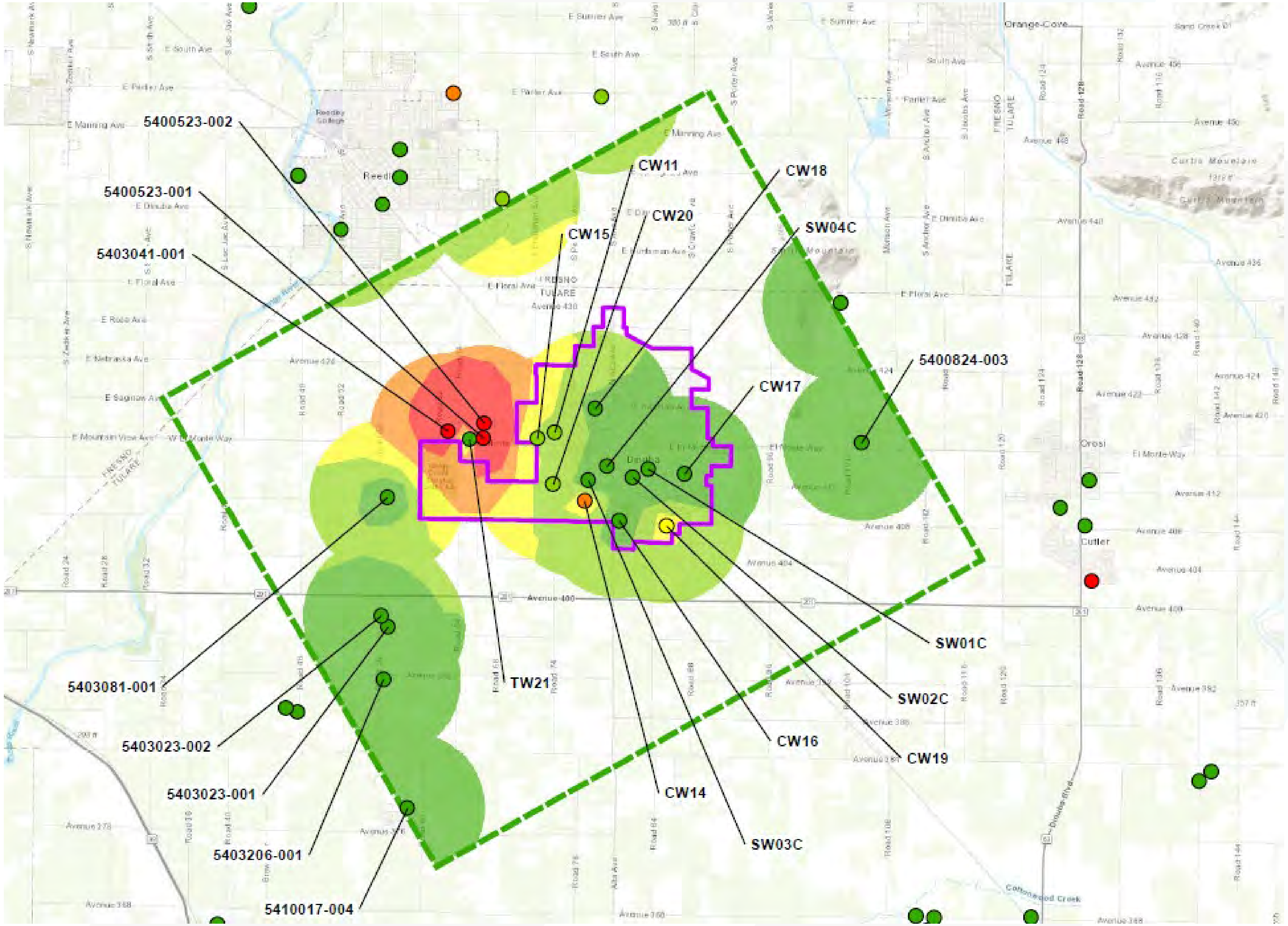
Miligrams per Liter

- <=2.5
- >2.5 - 5.0
- >5.0 - 7.5
- >7.5 - 10
- >10

DBCP in Groundwater (Average – Shallow)



DBCP in Groundwater (Average – Deep)



Legend

Areas Used for Contaminant Concentration Contour Analysis

Dinuba Regional Model Boundary

Dinuba Water Service Area

1,2-Dibromo-3- chloropropane (DBCP)

Micrograms per Liter

<=0.05

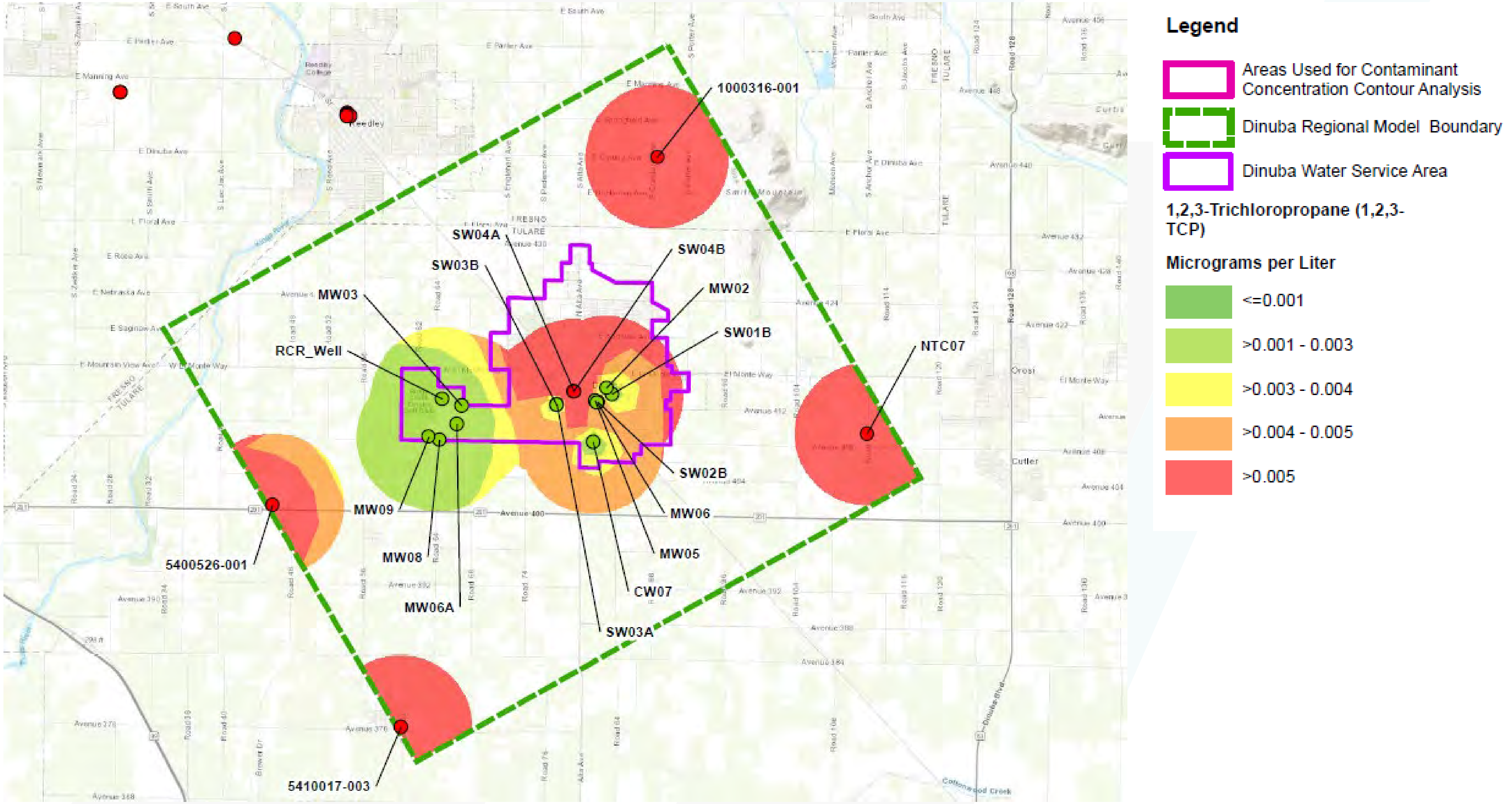
>0.05 - 0.10

>0.10 - 0.15

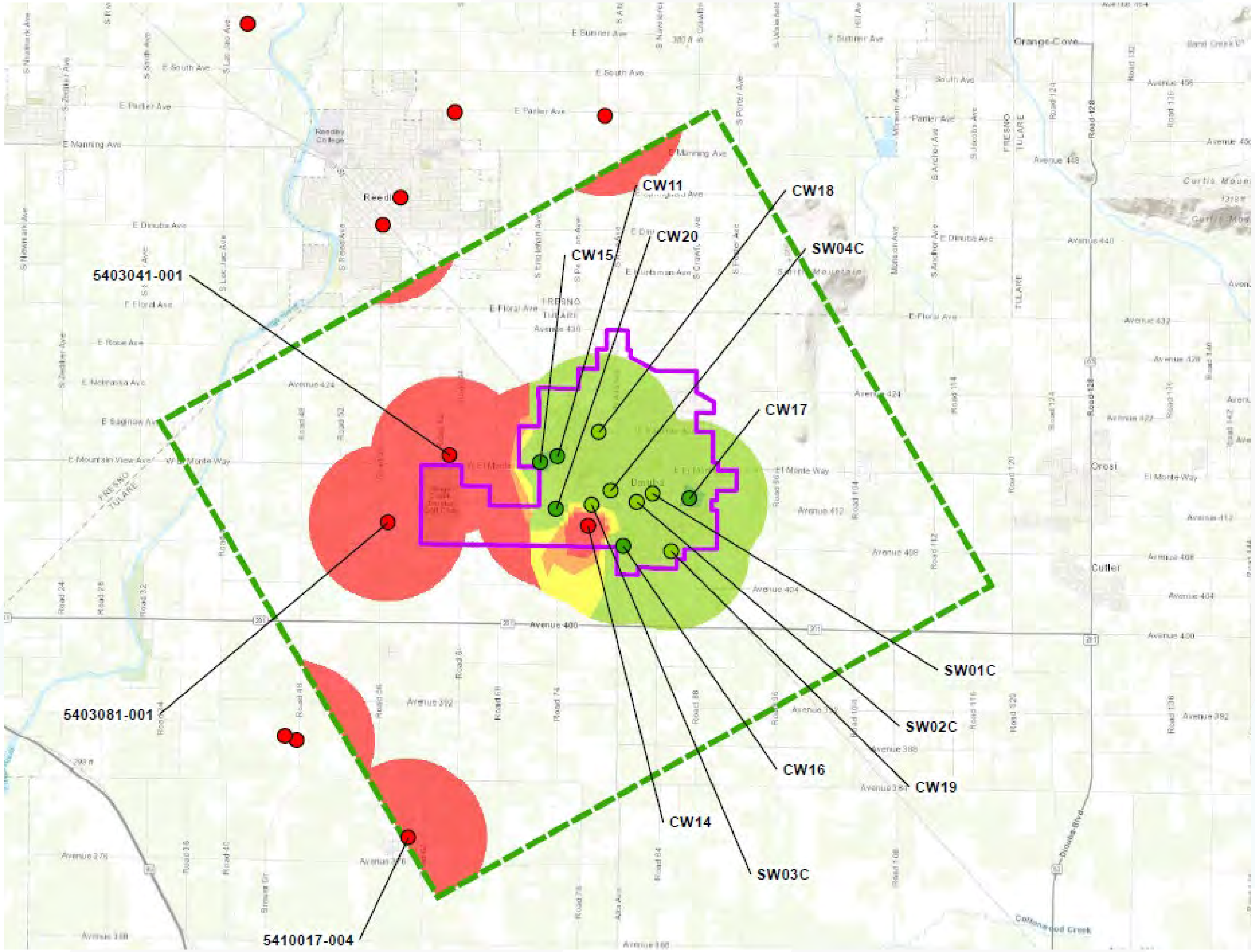
>0.15 - 0.20

>0.20

1,2,3-TCP in Groundwater (Average – Shallow)



1,2,3-TCP in Groundwater (Average – Deep)



Legend

- Areas Used for Contaminant Concentration Contour Analysis
- Dinuba Regional Model Boundary
- Dinuba Water Service Area

1,2,3-Trichloropropane (1,2,3-TCP)

Micrograms per Liter

- <=0.001
- >0.001 - 0.003
- >0.003 - 0.004
- >0.004 - 0.005
- >0.005

Feasibility Study Process

Screening of Technology Alternatives

- Identify Potentially Applicable Alternatives
- Establish Threshold Screening Criteria
- Screen out Failing Alternatives

Identification & Analysis of Implementation Project Alternatives

- Assemble Implementation Project Scenarios
- Evaluate Performance using Model
- Develop Feasibility Evaluation Criteria
- Evaluate and Rank Alternatives

Identify Preferred Project

- Define Top Ranked Project
- Prepare Conceptual Design
- Prepare Cost Estimate

Threshold Screening Criteria

Pass/Fail

- **P/F** Regulatory Compliance and Acceptance
- **P/F** Community Acceptance
- **P/F** Implementability
- **P/F** Risk and Uncertainty

Implementation Project Alternative Identification

Implementation Project Alternatives

Scenario 1 GSP Project

- Recharge surface water from AID in NE Dinuba
- Recharge surface water from AID in one or two recharge basins in NE Dinuba upgradient of wellfield

Scenario 2 Rebalanced Pumping

- Capture and remove DBCP and 1,2,3-TCP from groundwater
- Increase CW14 and decrease CW 16 and 20 pumping, shallow pumping in wellfield expansion area

Scenario 3 Deeper RCR Pumping

- Construct deeper well at RCR to capture nitrate in deep groundwater
- Pump water to RCR pond and use to irrigate new 58-acre park

Scenario 4 Shallow N Pumping

- Pump shallow groundwater in nitrate impacted areas
- Increase Well 7 pumping, install shallow irrigation wells and use for turf irrigation at athletic fields and new High school

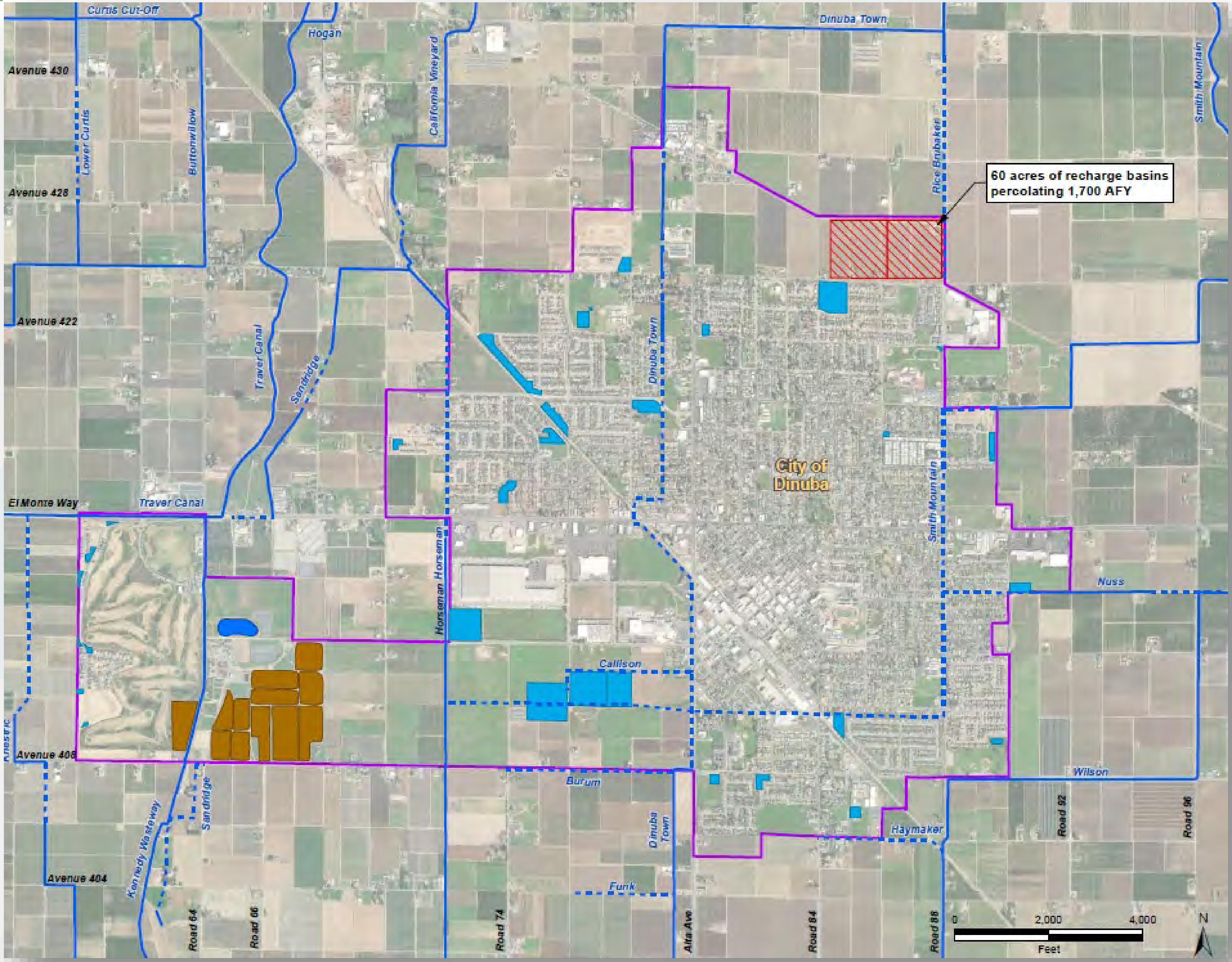
Scenario 5 Recharge & Extraction

- Recharge AID surface water; downgradient groundwater extraction
- Recharge at CW14 Ponds combined with downgradient groundwater extraction for non-potable use

Scenario 6 Stormwater Retention

- Increase City stormwater retention basin capacity
- Increase capacity of existing retention basin system to retain all stormwater in the City during normal years

Scenario 1 – Managed Aquifer Recharge, GSP Project



Legend

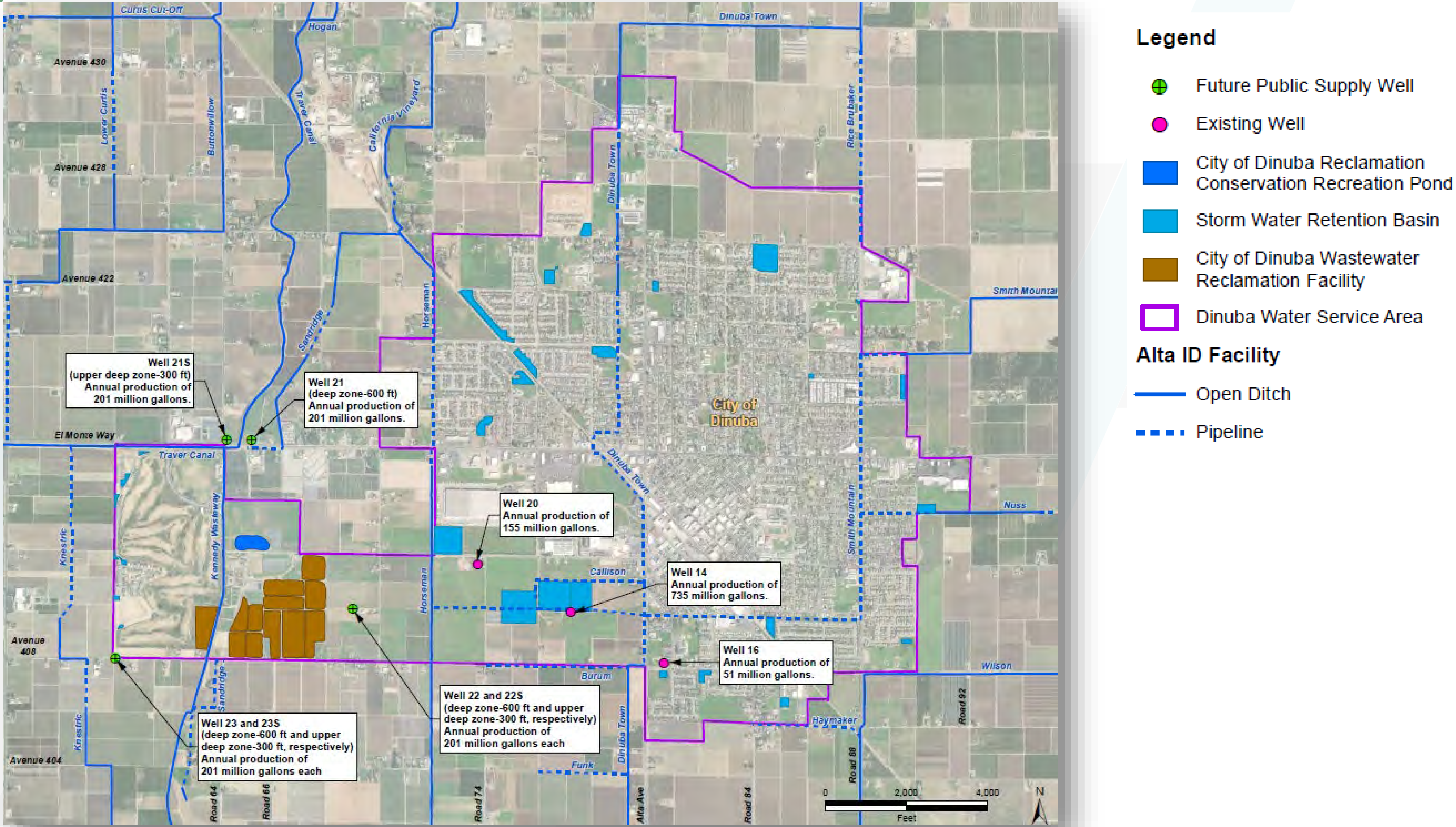
- Potential Recharge Basins
- City of Dinuba Reclamation Conservation Recreation Pond
- Storm Water Retention Basin
- City of Dinuba Wastewater Reclamation Facility
- Dinuba Water Service Area

Alta ID Facility

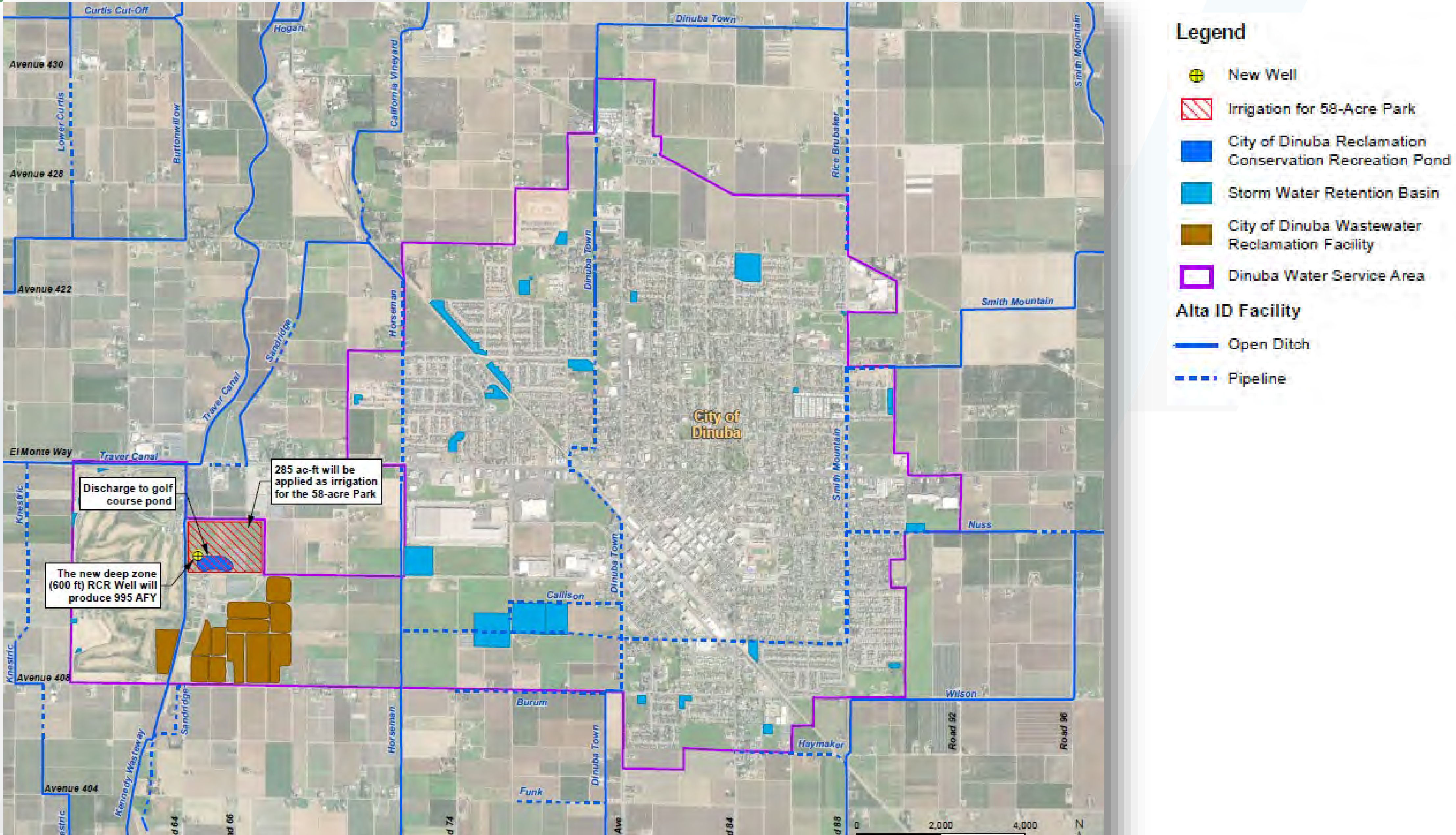
- Open Ditch
- Pipeline

AFY = Acre Feet per Year

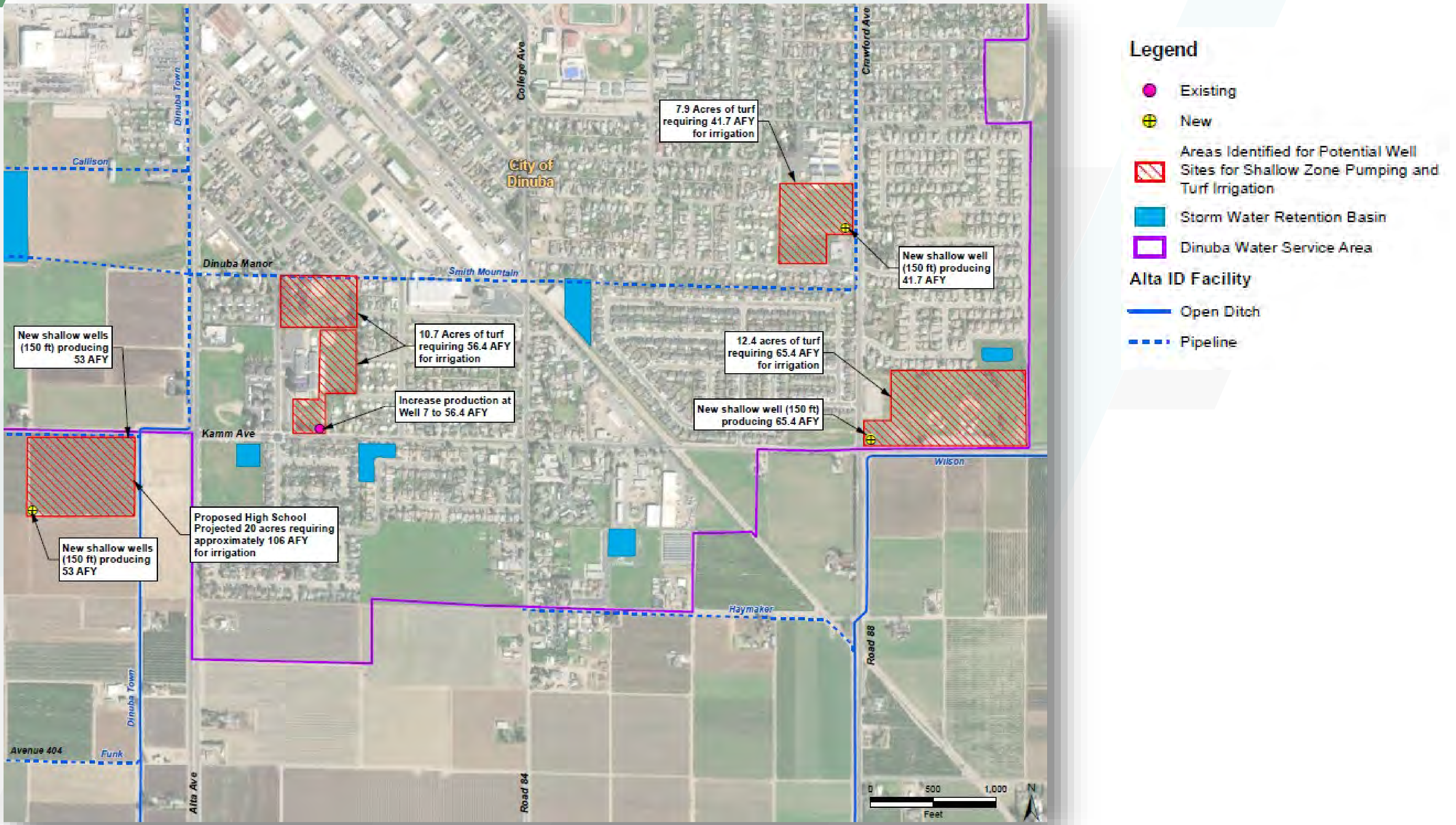
Scenario 2 – Administrative Controls for 1,2,3-TCP Mitigation



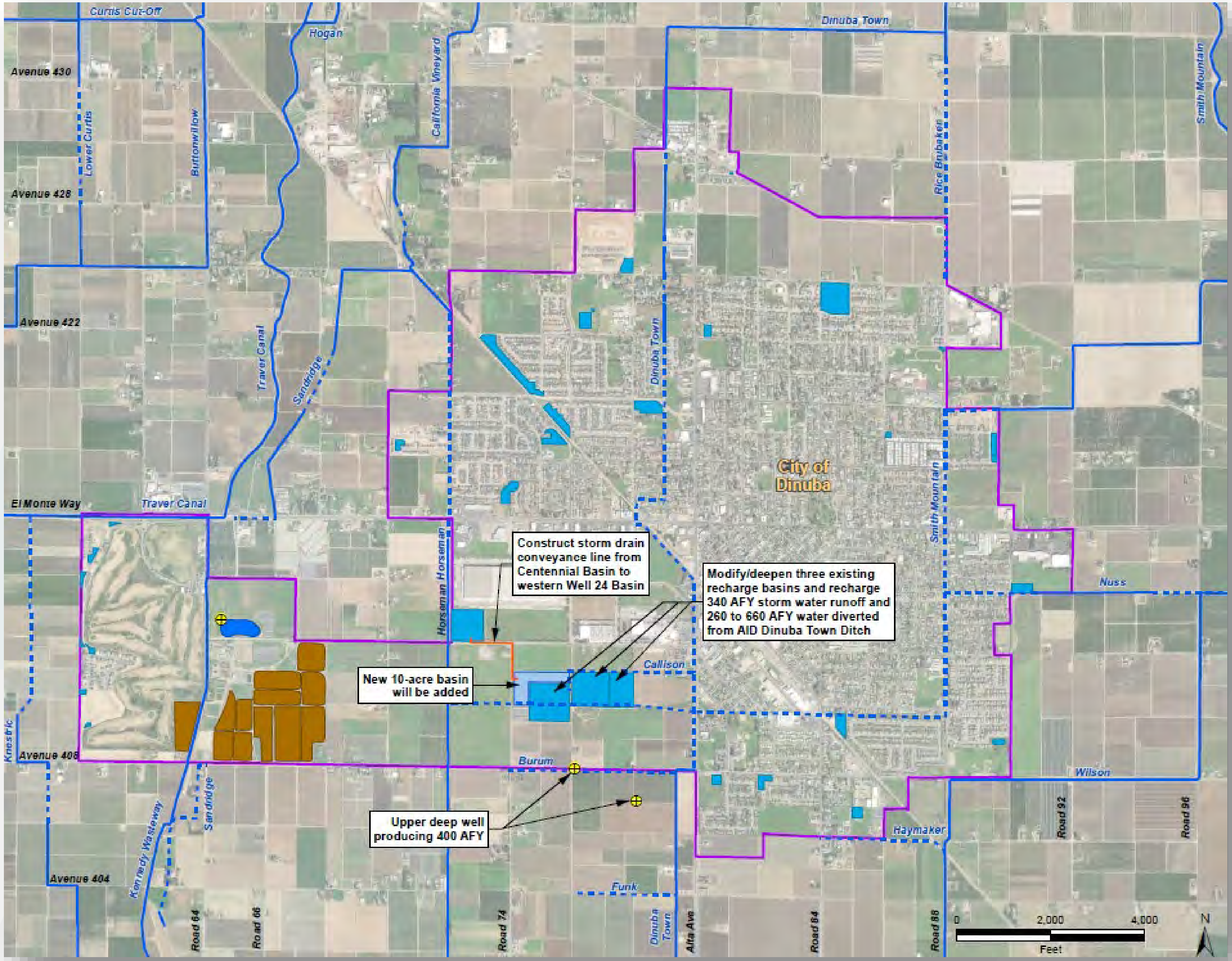
Scenario 3 – Administrative Controls for Nitrate (1)



Scenario 4 – Administrative Controls for Nitrate (2)



Scenario 5 – Managed Aquifer Recharge (Well 14 Basins) and Administrative Controls



Legend

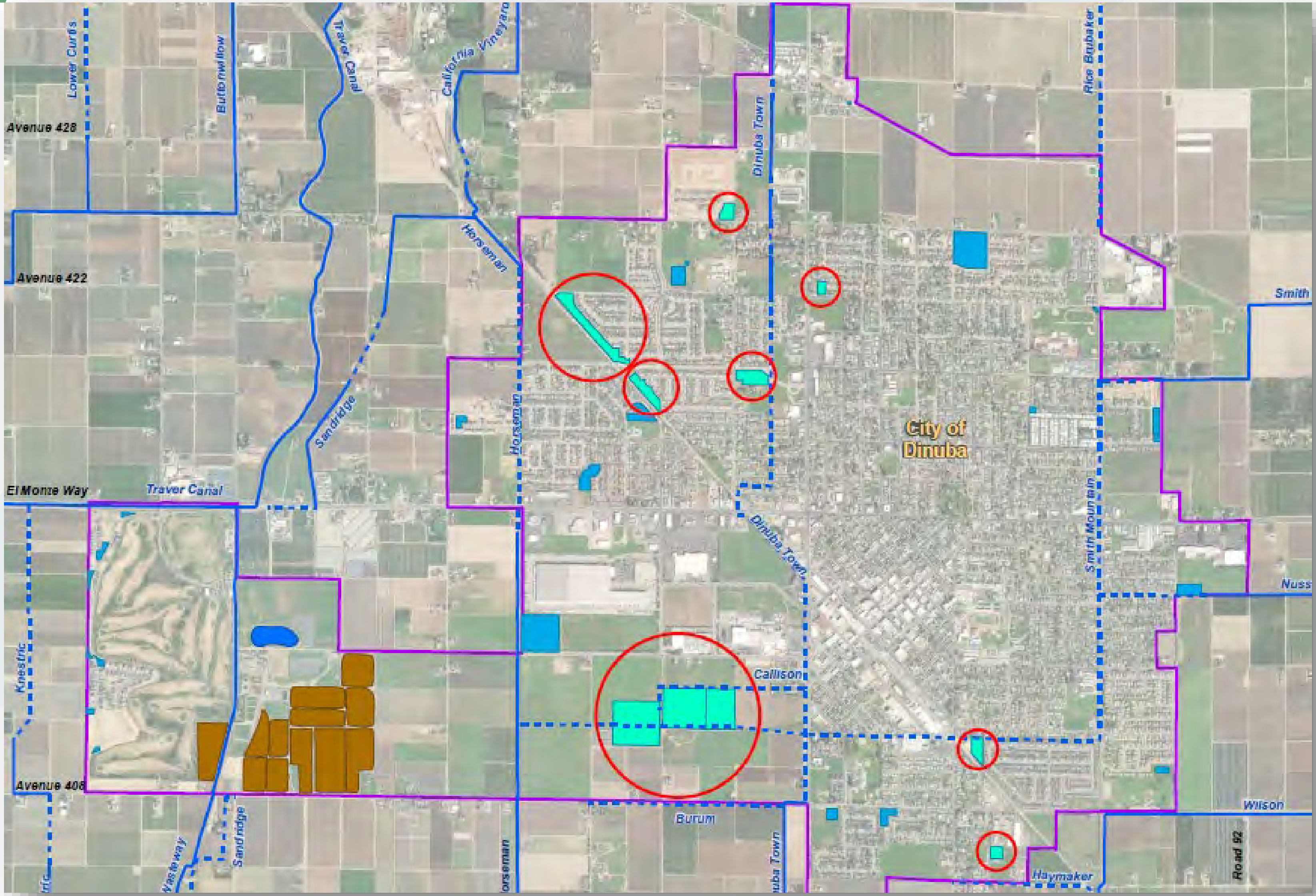
- New Well
- City of Dinuba Reclamation Conservation Recreation Pond
- Storm Water Retention Basin
- City of Dinuba Wastewater Reclamation Facility
- Dinuba Water Service Area

Alta ID Facility

- Open Ditch
- Pipeline

AFY = Acre Feet per Year

Scenario 6 – Stormwater Retention Basin Improvements



Legend

- City of Dinuba Reclamation Conservation Recreation Pond
- Storm Water Retention Basin
- Storm Water Retention Basin Potential Capacity Expansion
- City of Dinuba Wastewater Reclamation Facility
- Dinuba Water Service Area

Alta ID Facility

- Open Ditch
- Pipeline

Implementation Project Alternative Evaluation and Ranking

Feasibility Evaluation Criteria and Scoring

- **2.0** Effectiveness
- **1.5** Cost
- **1.25** Risk and Uncertainty
- **1.0** Promotion of Groundwater Sustainability
- **1.0** Grant Program Priorities and Preferences

Implementation Project Scenario Scoring and Ranking

Alternative Number	Alternative Description	Effectiveness		Cost		Risk/Uncertainty		Groundwater Sustainability		Grant Priorities/ Preferences		Weighted Score
		Score	Weighting	Score	Weighting	Score	Weighting	Score	Weighting	Score	Weighting	
3	Administrative Controls for Nitrate I	3	2	5	1.5	5	1.25	1.5	1	2	1	**23.25**
5	Managed Aquifer Recharge (Well 14 Basins)	4	2	2	1.5	2.5	1.25	4	1	5	1	**23.125**
1	Managed Aquifer Recharge (GSP Proposed Project)	5	2	1	1.5	2.5	1.25	5	1	1	1	**20.625**
2	Administrative Controls for TCP Mitigation	2	2	3.5	1.5	1	1.25	3	1	4	1	**17.5**
4	Administrative Controls for Nitrate II	1	2	3.5	1.5	4	1.25	1.5	1	3	1	**16.75**

Implementation Project Feasibility Evaluation Scoring and Ranking Results

Scenario 1 GSP Project	Scenario 2 Rebalanced Pumping	Scenario 3 Deeper RCR Pumping	Scenario 4 Shallow N Pumping	Scenario 5 Recharge & Extraction	Scenario 6 Stormwater Retention
Rank 3	**Rank 4**	**Rank 1**	**Rank 5**	**Rank 2**	**Not Ranked**
Best performance, but high uncertainty makes it unsuitable for implementation at this time	Limited performance and no obvious benefits	Limited performance, but obvious benefits, relatively low cost and low risk and uncertainty	Lowest performance. Proven technology and readily implementable, but low pumping rates limit effectiveness	Second best performance and most benefit to City water supply Some uncertainty and risk but can be managed	Insufficient data for evaluation at this time, but expected to result in groundwater sustainability and water quality benefits

Preferred Project

Scenario 3 Deeper RCR Pumping

Deeper pumping in the RCR project area to remove and contain nitrate mass, lessen vertical gradients between upper and lower Deep Zone, and increase vertical penetration of low nitrate recharge

- Install deeper RCR Well completed from 250 - 400 ft
- Pump at ~945 acre-feet/year
- Irrigate golf course and new 58-acre park area
- Little or no supplemental nutrients needed
- 90 percent nitrate uptake estimated

Scenario 5 Recharge & Extraction

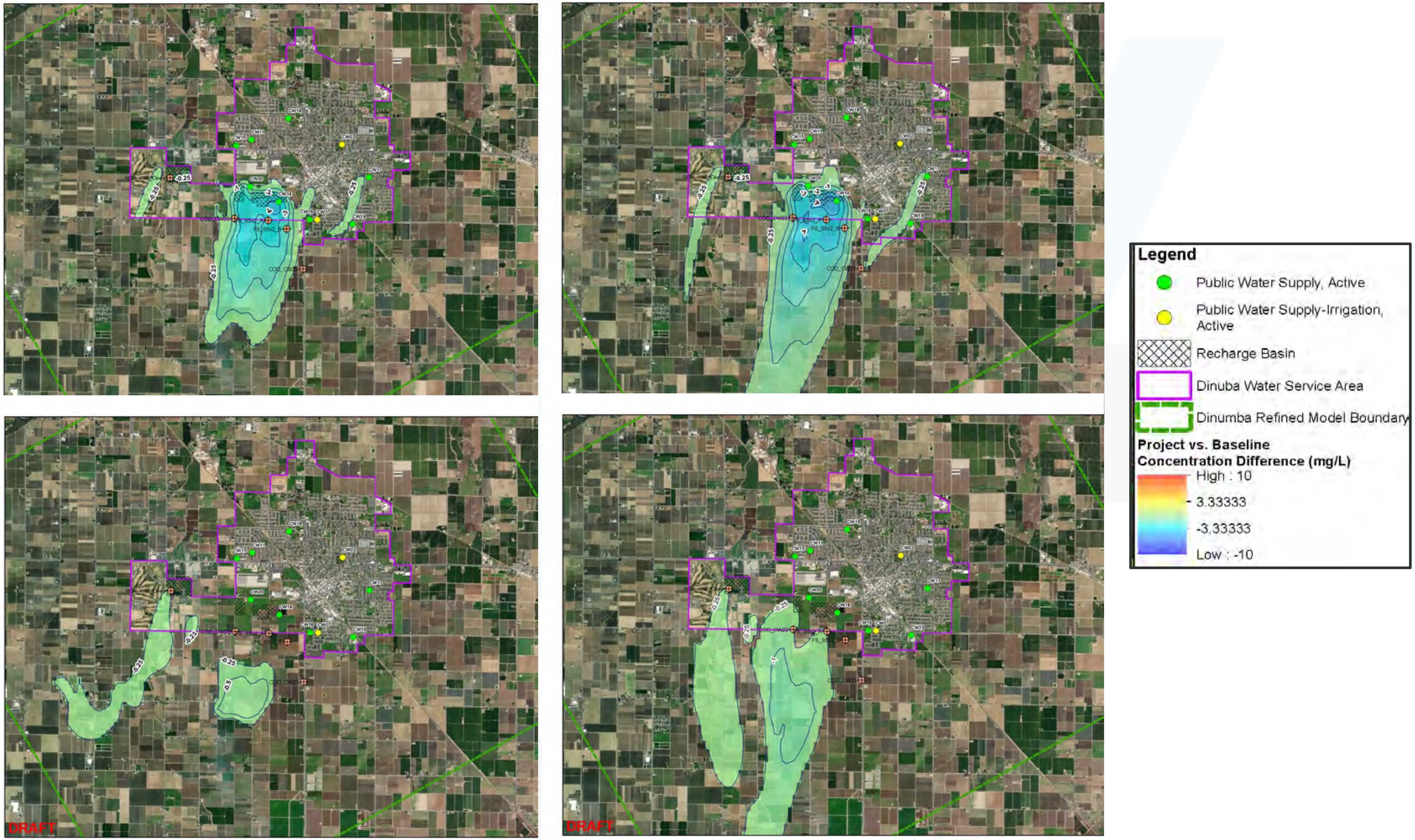
Recharge stormwater runoff and surface water delivered by AID combined with downgradient extraction for non-potable use. Improve water quality in the City wellfield expansion area and downgradient domestic well usage area, and to help offset City groundwater demand growth

- Improve and expand existing Well 14 basins
- Install stormwater pipeline from Centennial Basin to Well 14 Basins
- Deliver surface water from Dinuba Town Ditch
- Install two upper Deep Zone non-potable wells
- Relocate CW22 and CW23 to downgradient area

PREFERRED PROJECT (1,000 AFY)

Shallow Zone

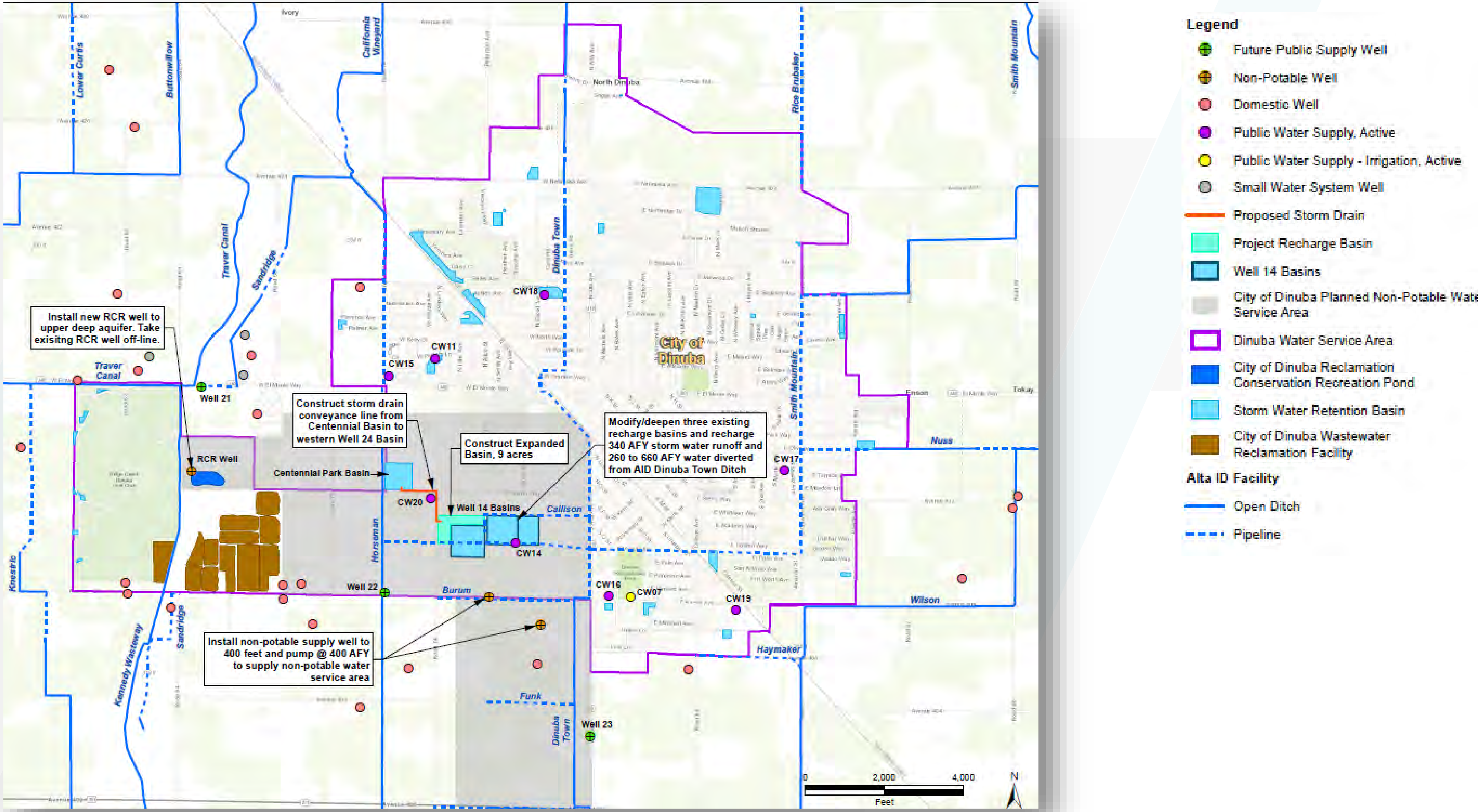
Upper Deep Zone



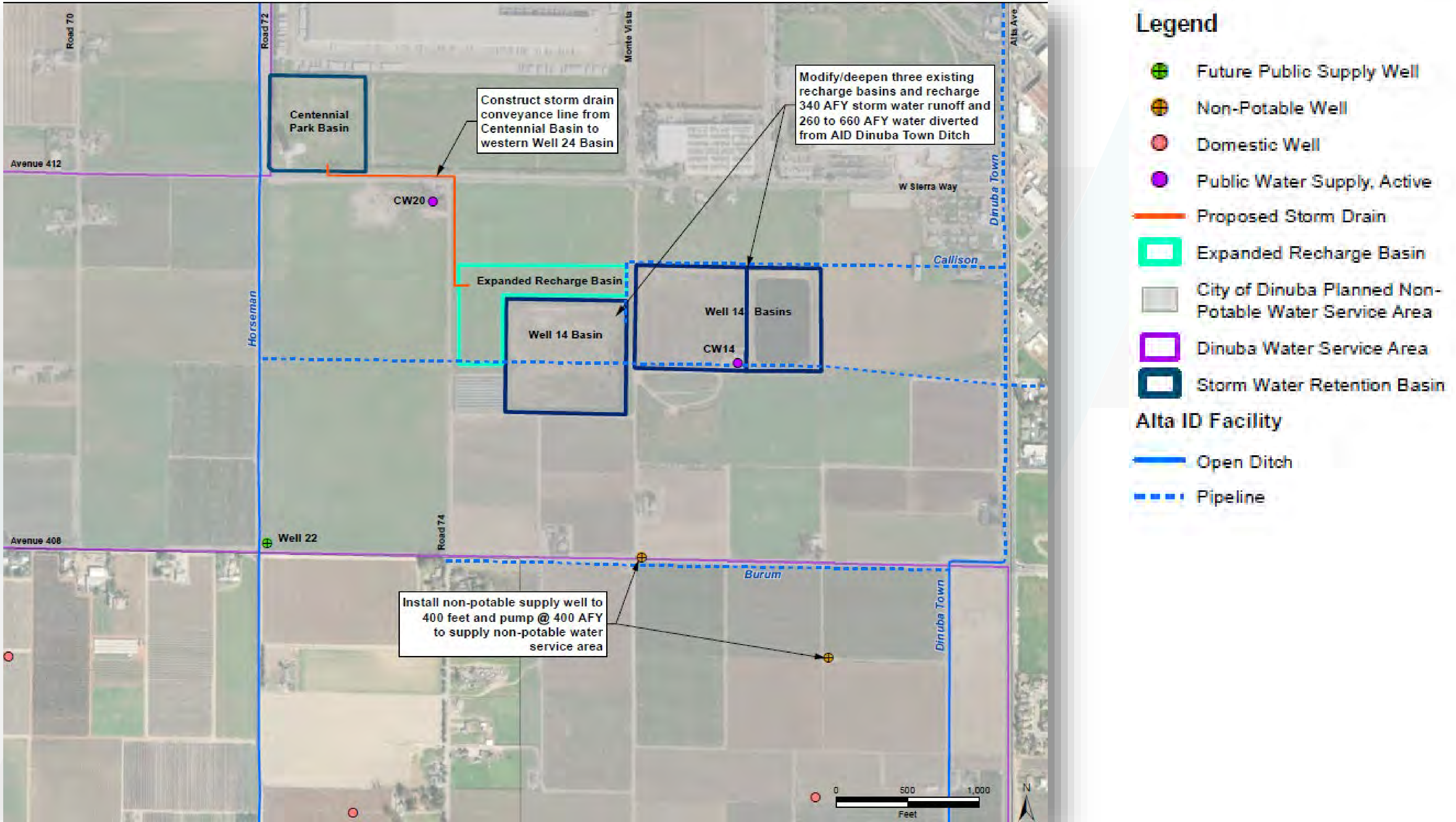
20 Years

50 Years

Prefered Project – Managed Aquifer Recharge (Well 14 Basins) and Administrative Controls



Prefered Project – Well 14 Basin Construction Details



Preferred Project Design Assumptions

Design Consideration	Low	High
Recharge Water Delivery Volumes		
Long-Term Average Total Recharge	600 acre-feet/year	1,000 acre-feet/year
Water Infiltration and Delivery Rates for 40-Acre Ponds and 0.5 foot/day Infiltration Rate		
Duration of AID Water Delivery	58 days	148 days
Water Infiltration and Delivery Rates for 40-Acre Ponds and 1.0 foot/day Infiltration Rate		
Duration of AID Water Delivery	29 days	74 days

Preferred Project Cost Estimate

Base Bid Items	Cost
General	$781,000
Earthwork to Deepen Well 14-1 Recharge Basin	$177,000
Earthwork to Deepen Well 14-2 Recharge Basin	$245,000
Earthwork to Deepen Well 14-3 Recharge Basin	$287,000
New Basin to Expand Well 14-3 Recharge Basin	$456,000
Pipeline, Basin Outfalls, Pipeline, Water Measurement	$534,000
Non-potable Wells (3) for 1300 Acres Light Industrial & Commercial plus RCR Replacement	$964,000
New Non-potable Well Site Construction (3 sites)	$1,918,000
CONSTRUCTION SUBTOTAL	$5,287,000
Contingency:	20%
Construction Total	**$6,345,000**

Questions & Discussion