Next Steps in Potable Reuse for Padre Dam

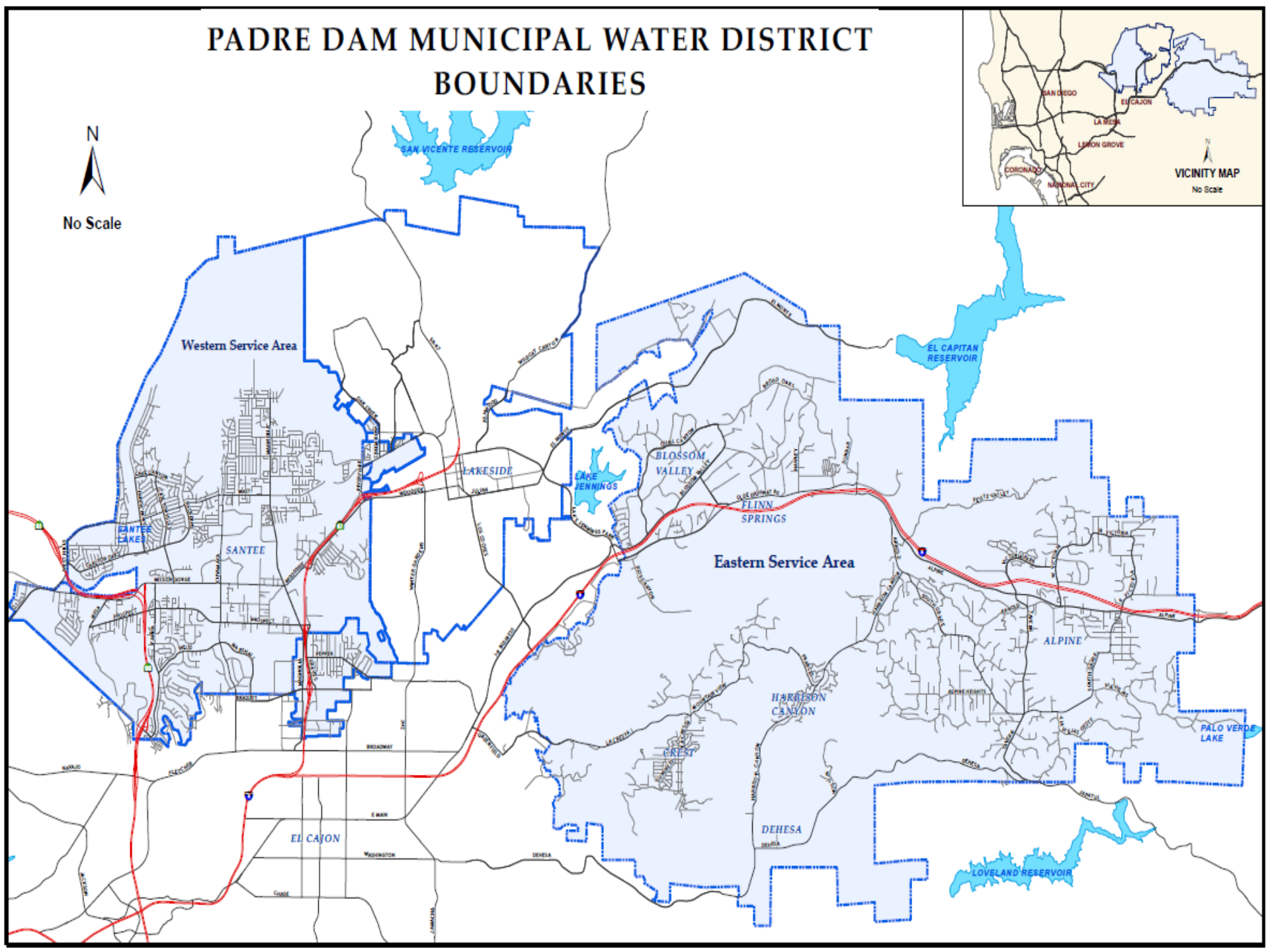
PADRE DAM
Municipal Water District

WateReuse San Diego Chapter Meeting
October 9, 2013

Presentation Outline

- District Description
- IPR Program
- Santee Basin Status
- Full Advanced Treatment Demonstration Project
- Questions

PADRE DAM MUNICIPAL WATER DISTRICT BOUNDARIES



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Potable Water

- 100% imported
- ~12,000 ac-ft/year
- 34% reduction due to conservation

Wastewater

- 5 MGD generated
- 2 MGD Ray Stoyer WRF
- Remaining to PLWWTP
- Owns ~ 3% Metro treatment capacity

Recycled Water

- ~ 900 ac-ft/yr irrigation
- ~ 1,120 ac-ft/yr to Santee Lakes
- Only permitted inland live stream discharger

Santee Lakes

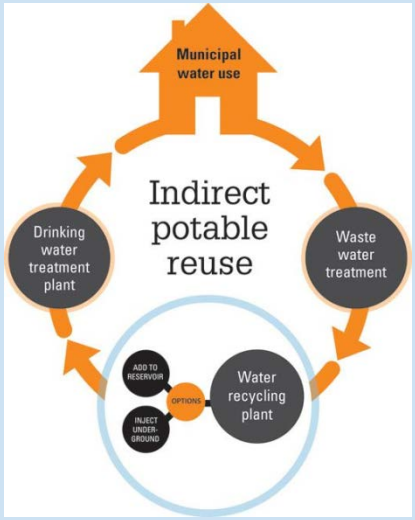
- 2nd largest RV camp ground in SD County (including 10 cabins)
- ~750,000 visitors/year
- Year round special events

Padre Dam & IPR

Adopted Strategic Goal to increase water, wastewater and energy independence

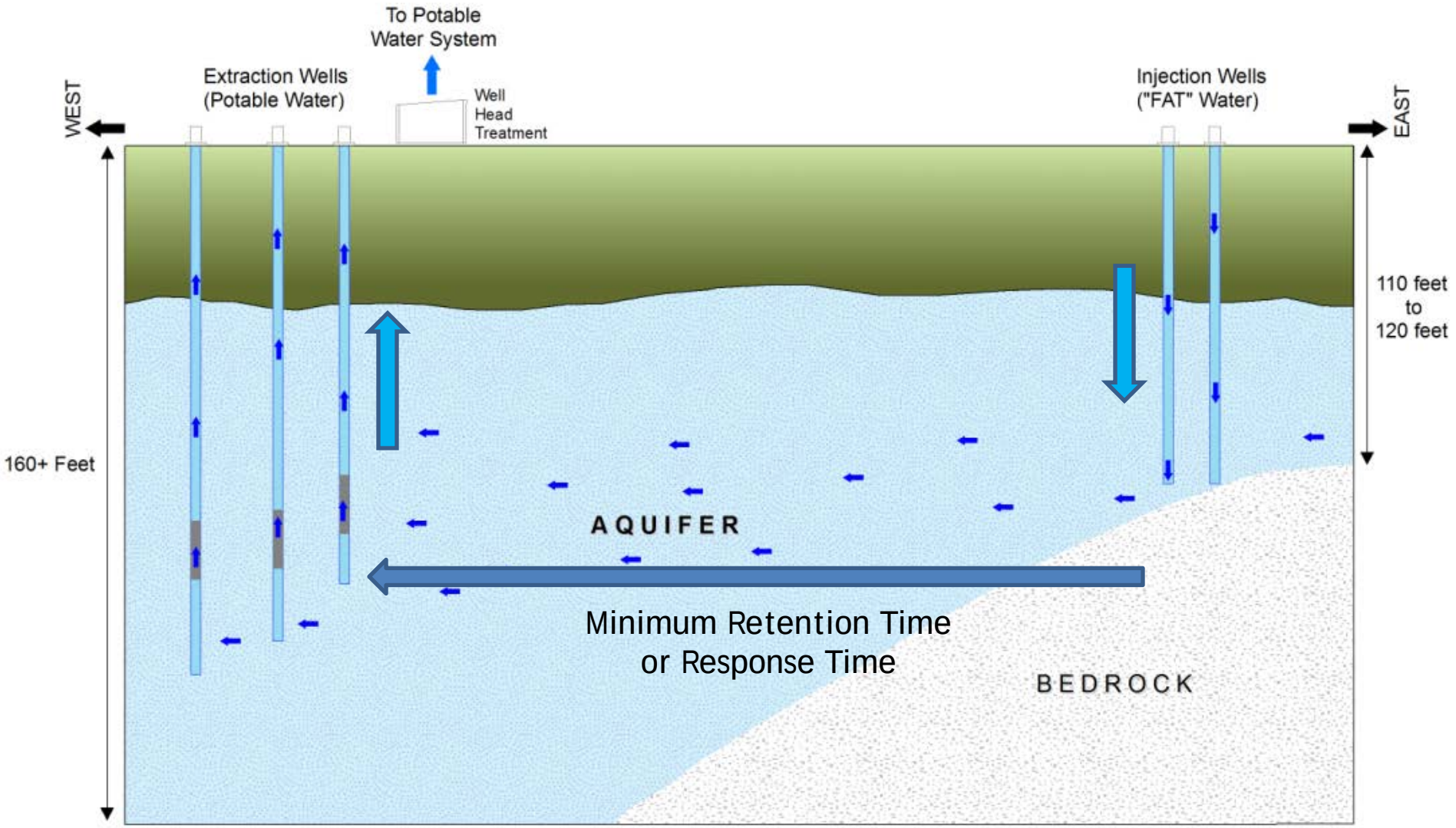
- Add drought resistant local water supply
- Continue to meet Title 22 obligations
- Minimize future financial obligations associated with Pt. Loma waiver

- Add capacity for IPR and GRRP




4000'
A'
Riverwalk Dr
Ramo Rd
Cambury Dr
Mission Creek Dr
River Park Dr
Riverwalk Dr
Park Center Dr
Palm Glen Dr
Rochelle Ave
Braverman Dr
N Magnolia Ave
Continental Ave
USBOR Study Boundary
Santee Basin Study Area
Chuck Ln
Spur Ln
4000'
Proposed Observation Well O
Town Center Pkwy
Riverview Pkwy
T Proposed Test Well
Proposed Study Boundary
O Proposed Observation Well
4800'
A
Mission Gorge Rd
Riverview Pkwy
Continental Ave
Park Ave
N Magnolia Ave

Santee GRRP Concept



Bureau of Reclamation Studies Completed To-date

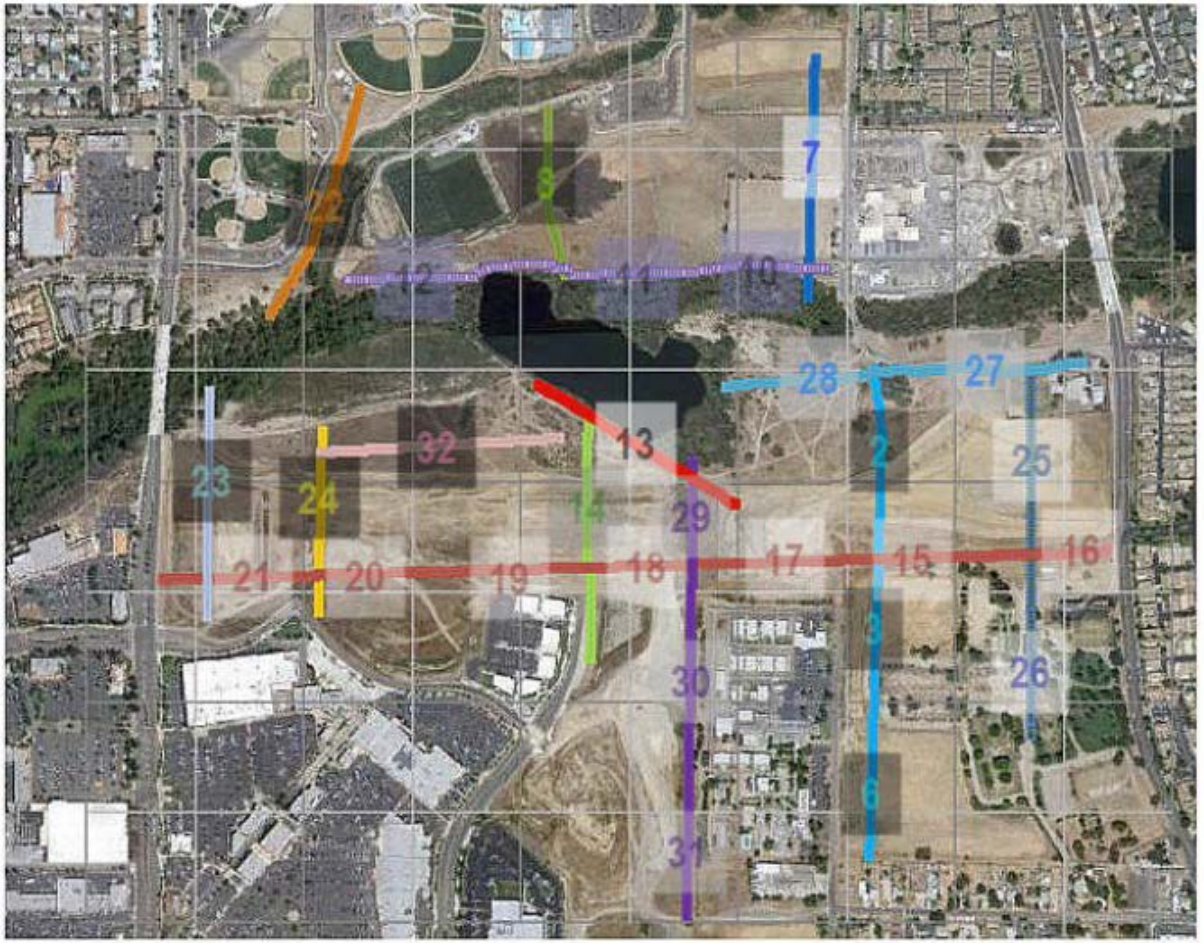
- Phase 1 – Feasibility Study completed in October 2011;
  - literature review and interpretation,
  - regulatory viability
  - engineering viability

- Phase 2 – Electrical Resistivity Surveys, complete in December 2012

Phase 1 – Feasibility Study Results and Recommendations

- Project has potential as a recharge project site
- Capacity up to 3 mgd
- Additional Study phases should occur to further refine data and analyses
- Recommended that the next phase define the bedrock topography through geophysical methods.

Phase 2 - Resistivity Testing



Conductivity Survey

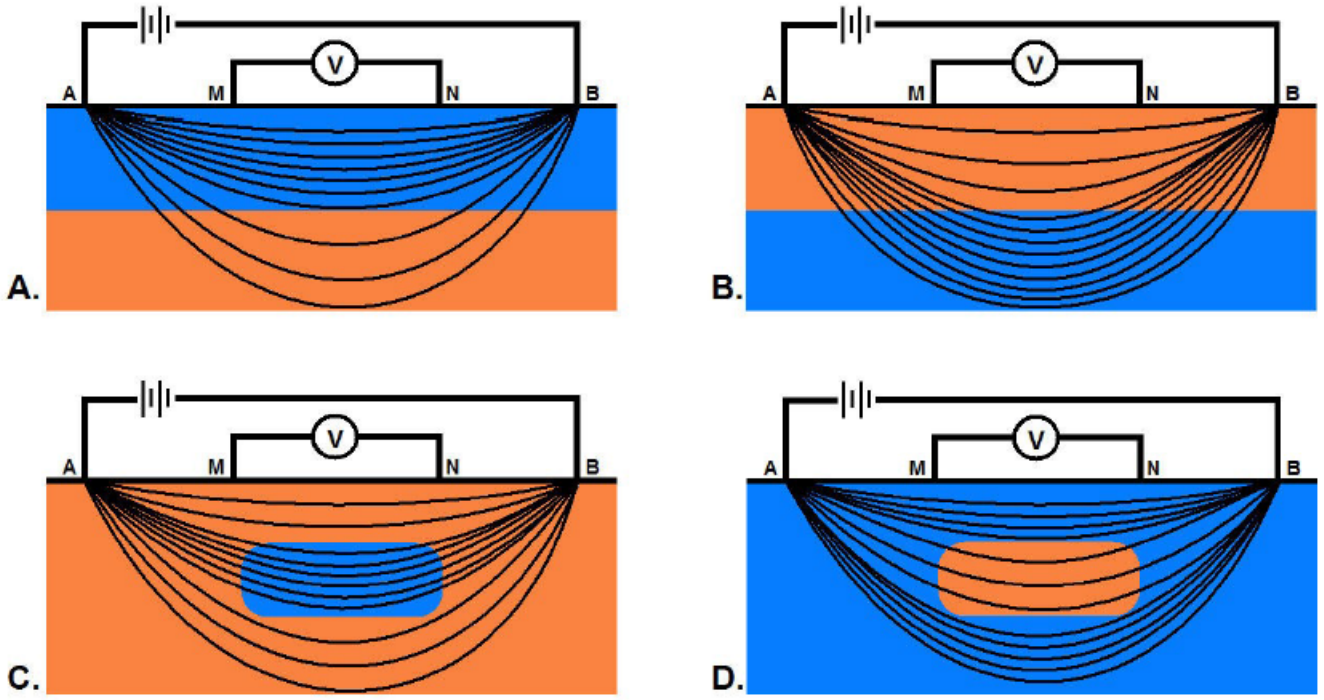


Figure 2: Variations in subsurface electric current density will occur with variations in earth resistivity. In all images the blue material is more conductive than the orange material. In image **A** the majority of the electrical current flows close to the surface, in the more conductive layer, leaving very little current flow to penetrate the resistive layer at depth. In image **B** the electrical current is drawn to the more conductive layer at depth. In image **C** the current flow lines merge to concentrate through the conductive anomaly at the center of the survey. In image **D** the current flow lines diverge away from the resistive anomaly at the center of the survey area.

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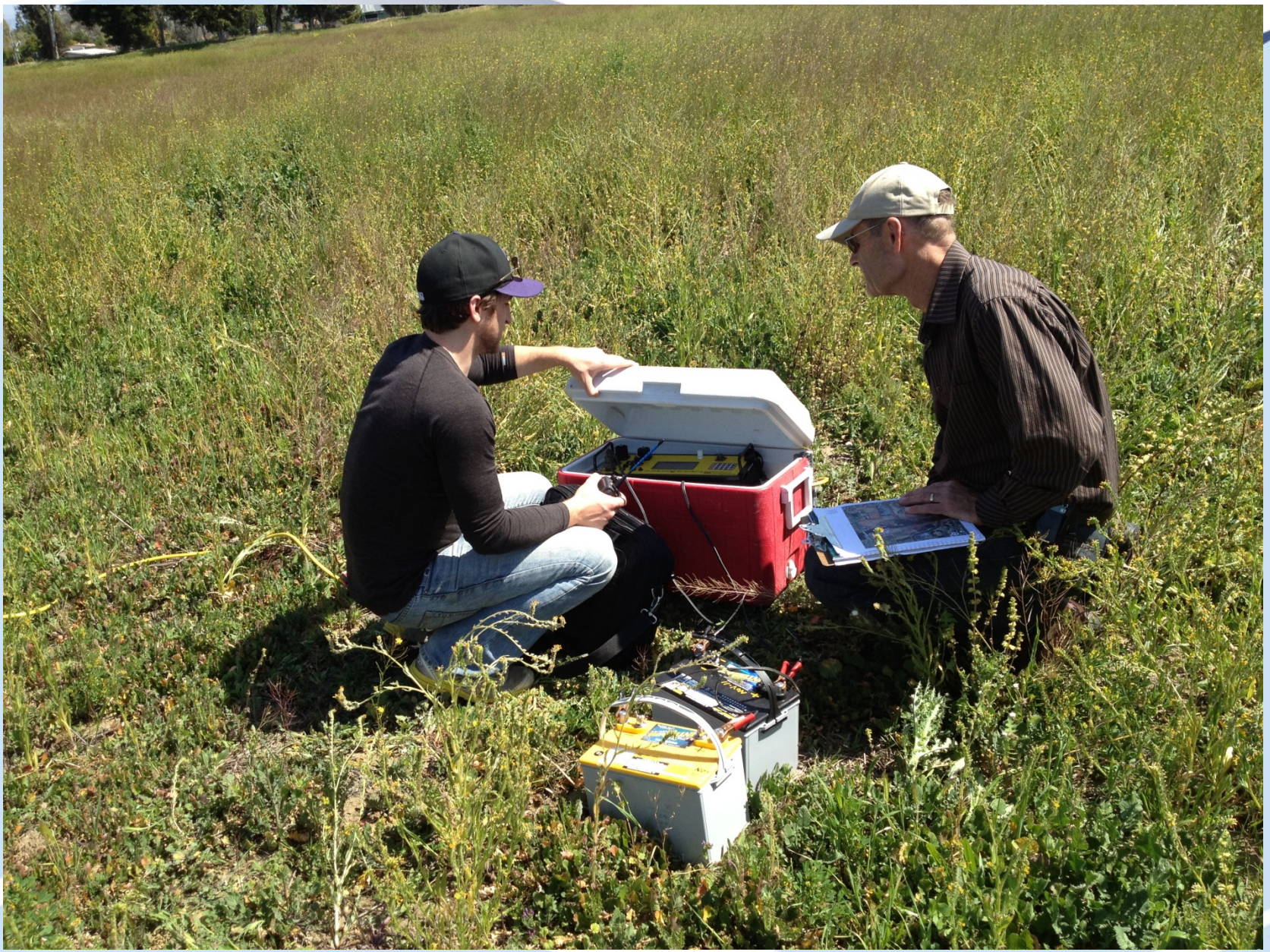
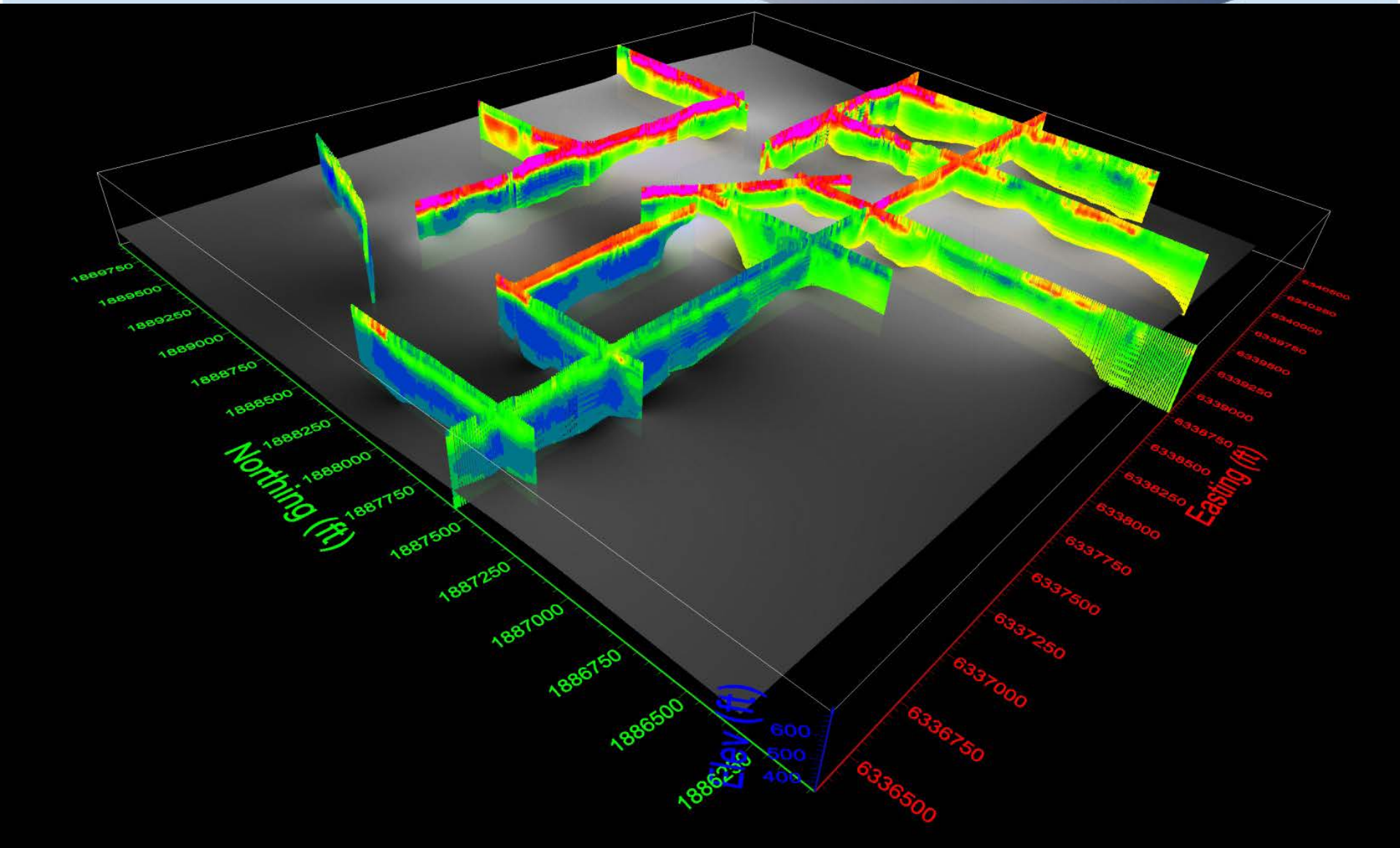


Resistivity Testing, Cont'ed

3-D Representation



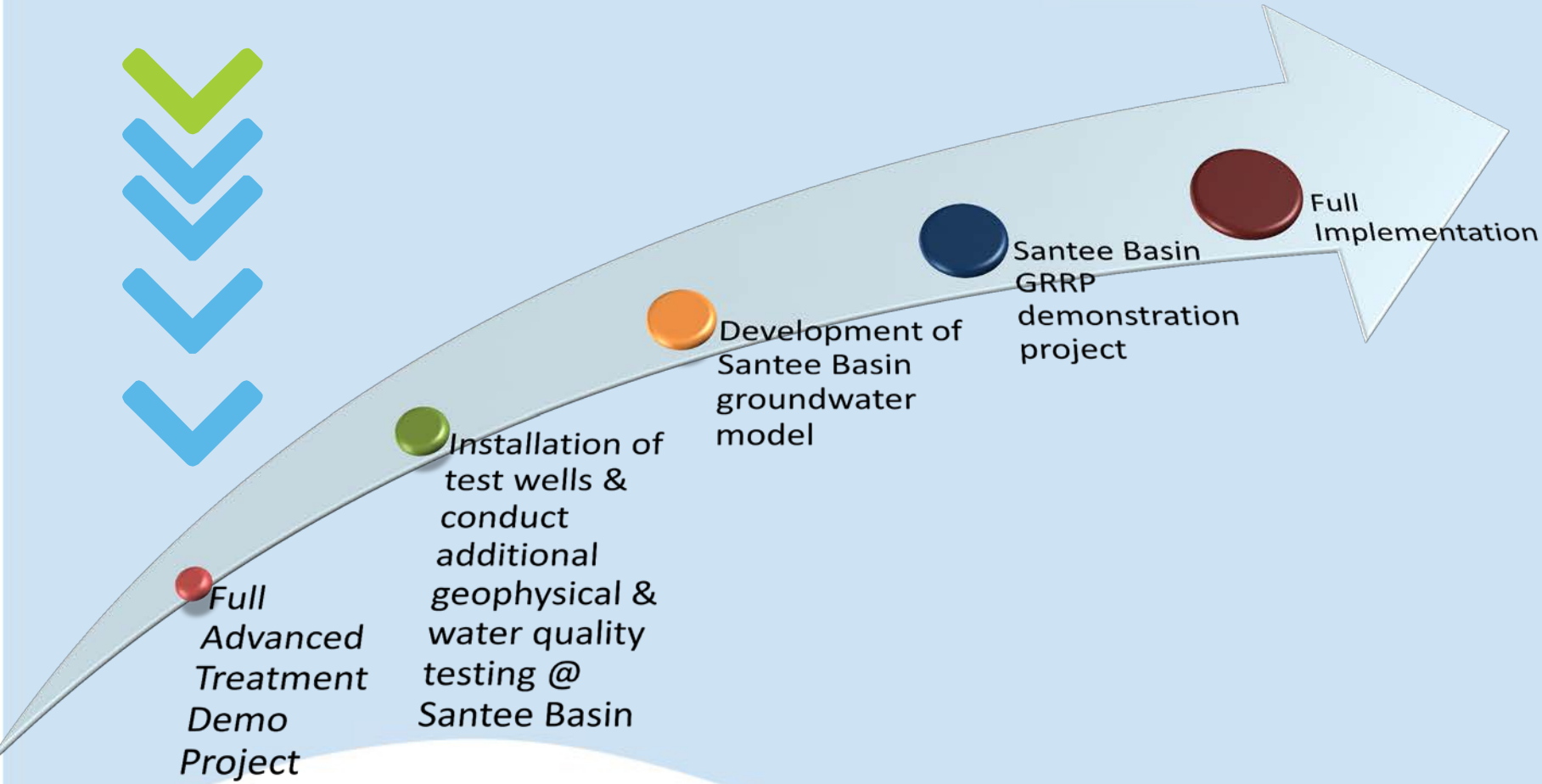
Phase 2 – Electrical Resistivity Results

- Depth to bedrock indicated by the ERI surveys is greater than assumed in the Phase 1 study
- Capacity of the aquifer could be higher than what was estimated previously

Phase 2 – Electrical Resistivity Recommendations

- Phase 3 – Targeted drilling to further calibrate the ERI results and determine hydraulic conductivities and transmissivities
- Phase 4 – Development of a Groundwater Model and Management Plan
- Phase 5 – Development of injection and extraction wells placements and operating strategies

IPR Program Timeline



PDMWD's IPR Program Goals

1. Produce minimum of 15% of Districts Potable Supply (2,000 to 3,000 AF/Y of local supply)
2. Price of water < $2,000 /AF
3. Full Scale GRRP operation meeting regulatory requirements
4. Support District Strategic Goal 4 (Increase Water, Wastewater and Energy Independence
5. Limit Financial Obligations to the METRO wastewater system

Demonstration Project Contracts

Envisioned to be accomplished under 2 separate contracts

1. Contract 1 – Program Management (Trussell Technologies, Inc.)

2. Contract 2 – Design and Installation of the Demonstration Facility

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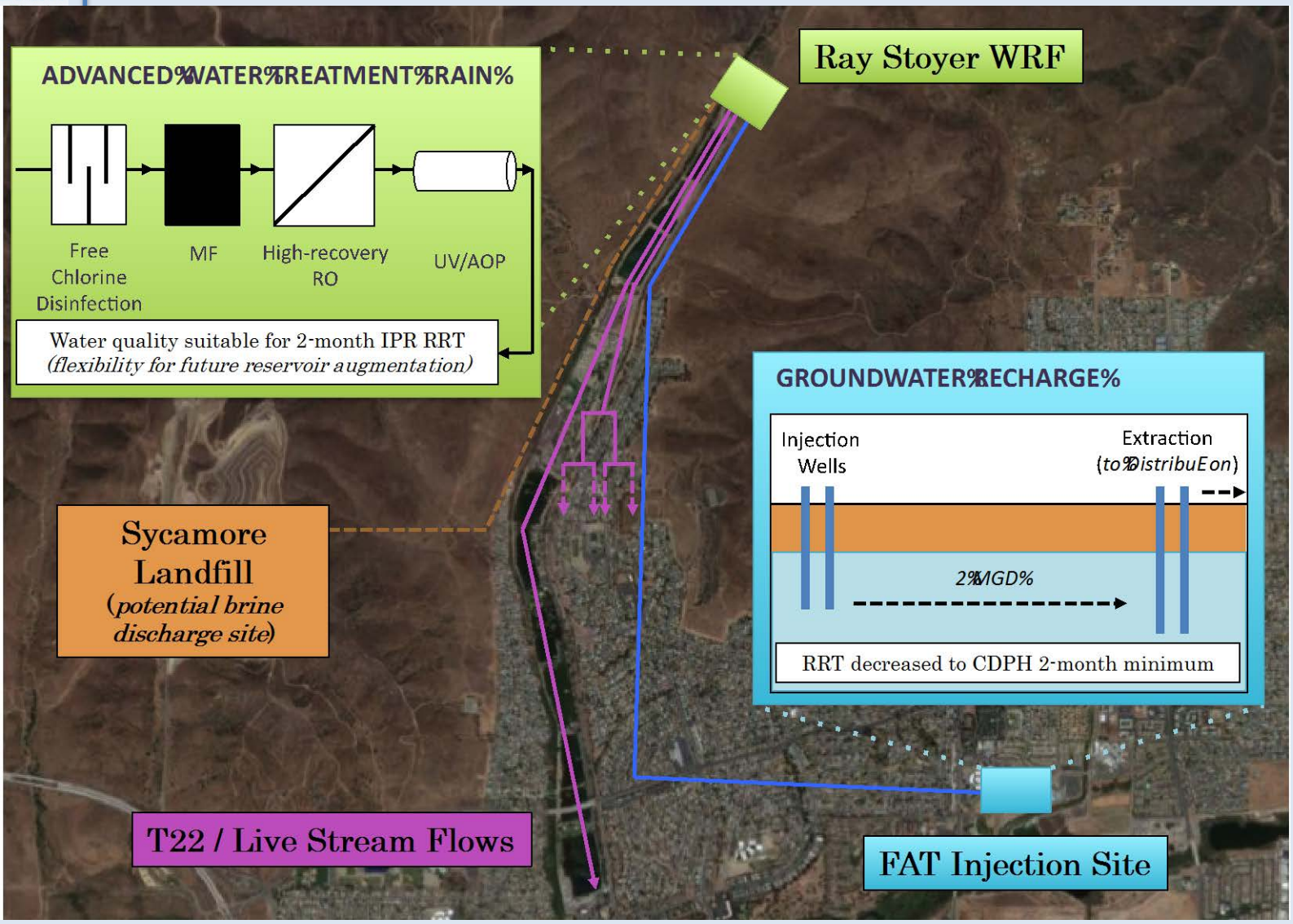
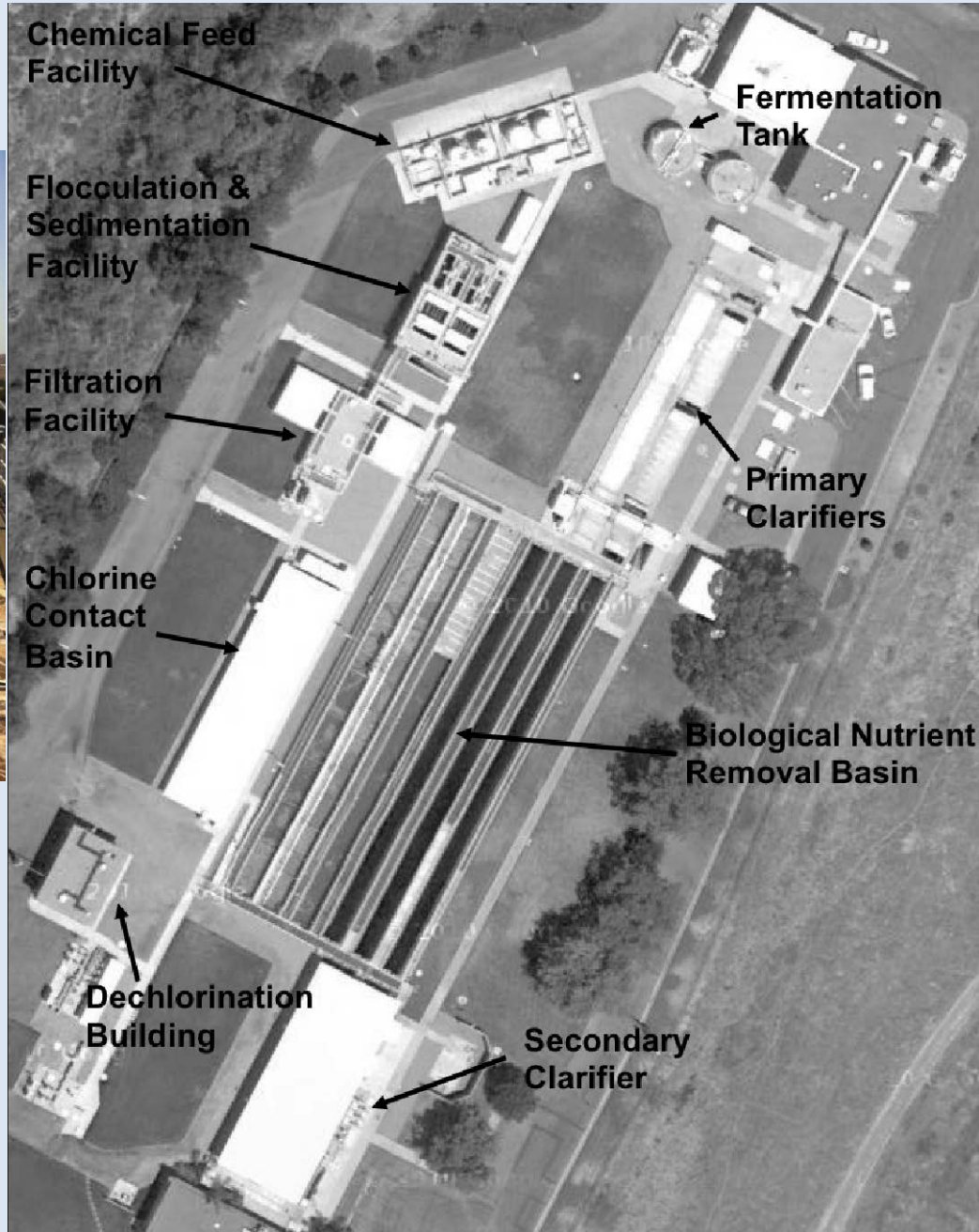
Shane Trussell, PhD.
Trussell Technologies, Inc.

FAT Demonstration Project

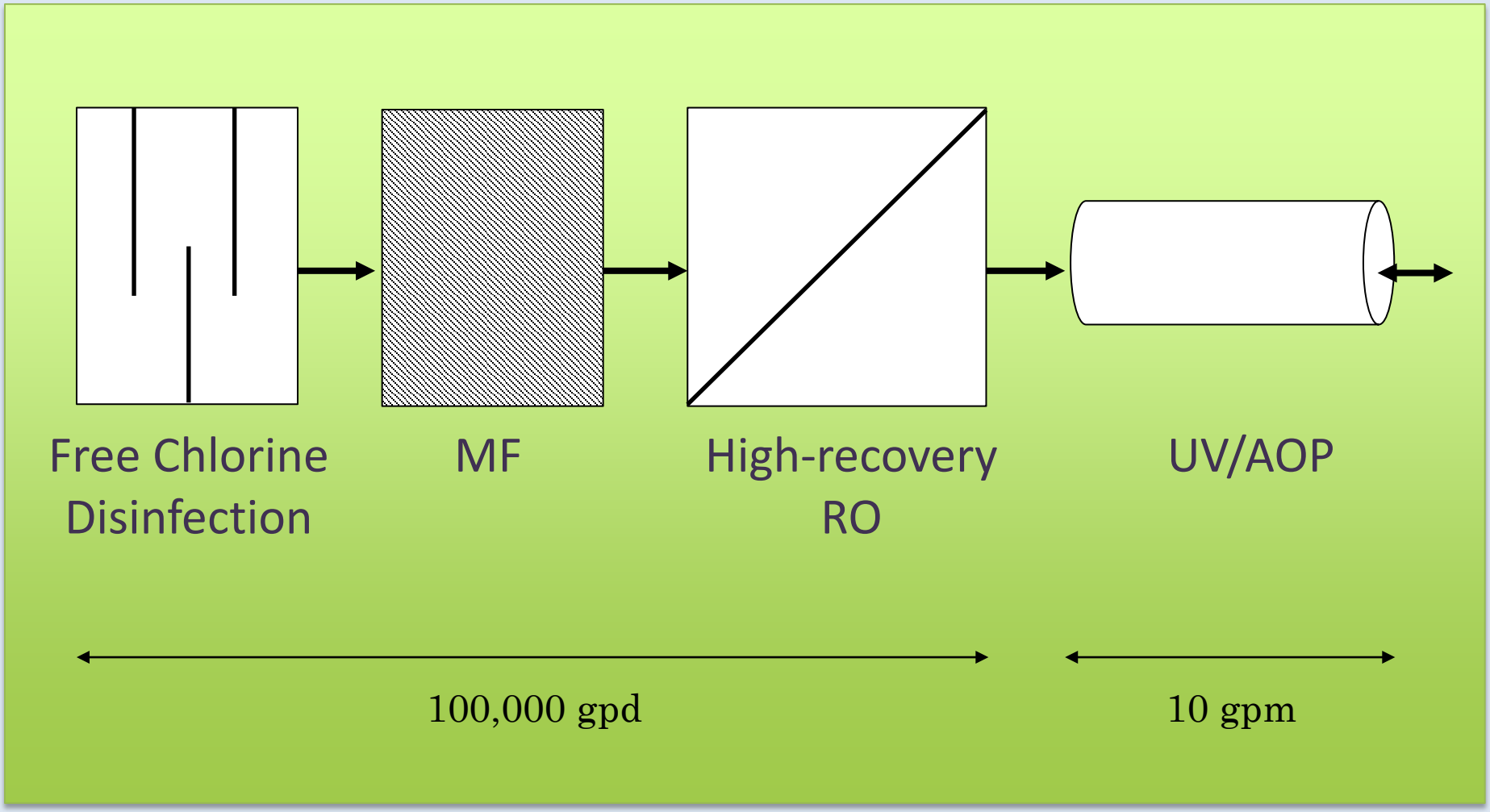
Padre Dam's Full-Scale Vision



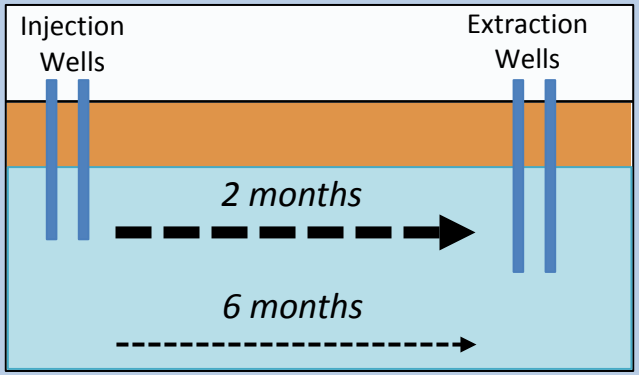
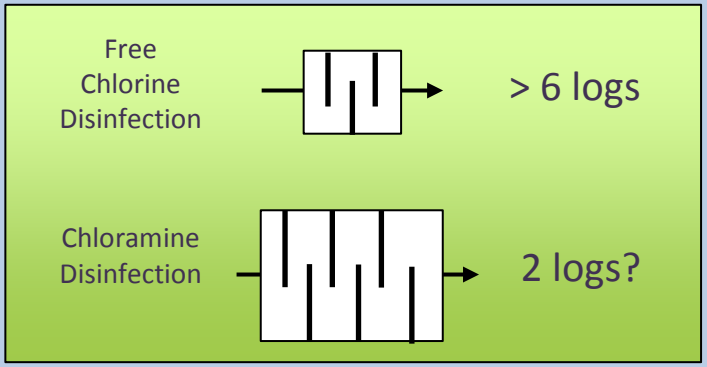
Ray Stoyer WRF



FAT Demo Treatment Train



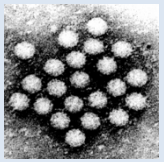
Principal FAT demo goals

Issue	Description	Importance
Shortened response retention time		• Higher IPR production • Critical for reservoir augmentation and DPR
Free chlorine disinfection credit		• Higher pathogen credits at reduced costs • Boosts capacity of existing infrastructure

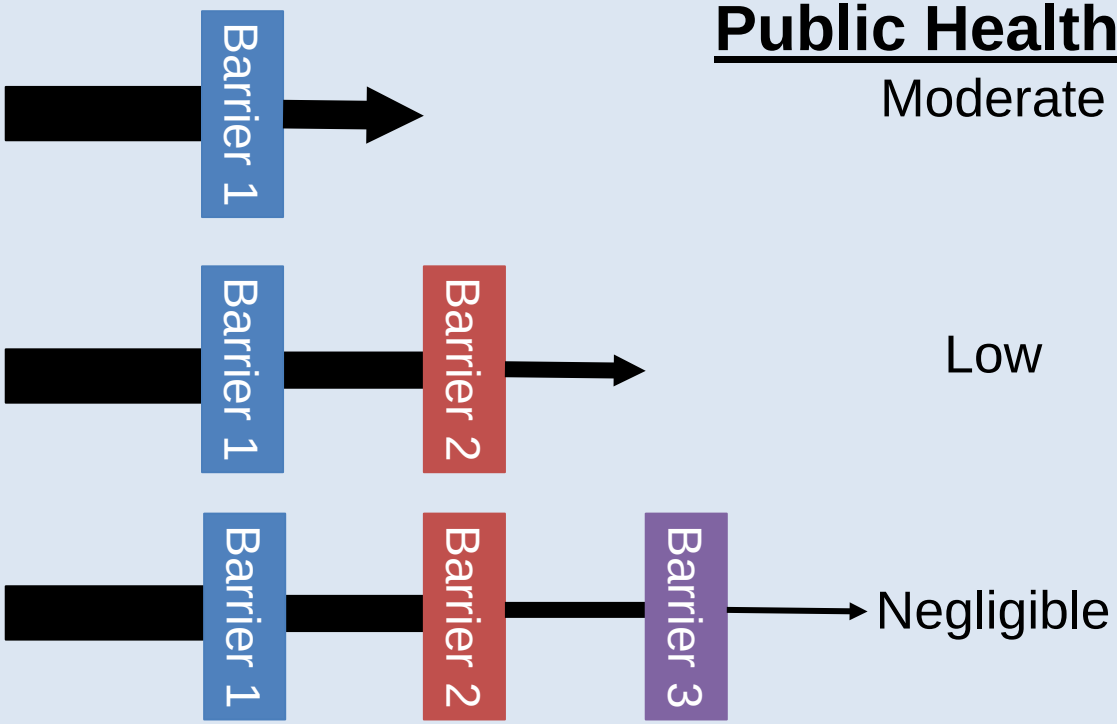
Response Retention Time

- Biggest issue is pathogen contro

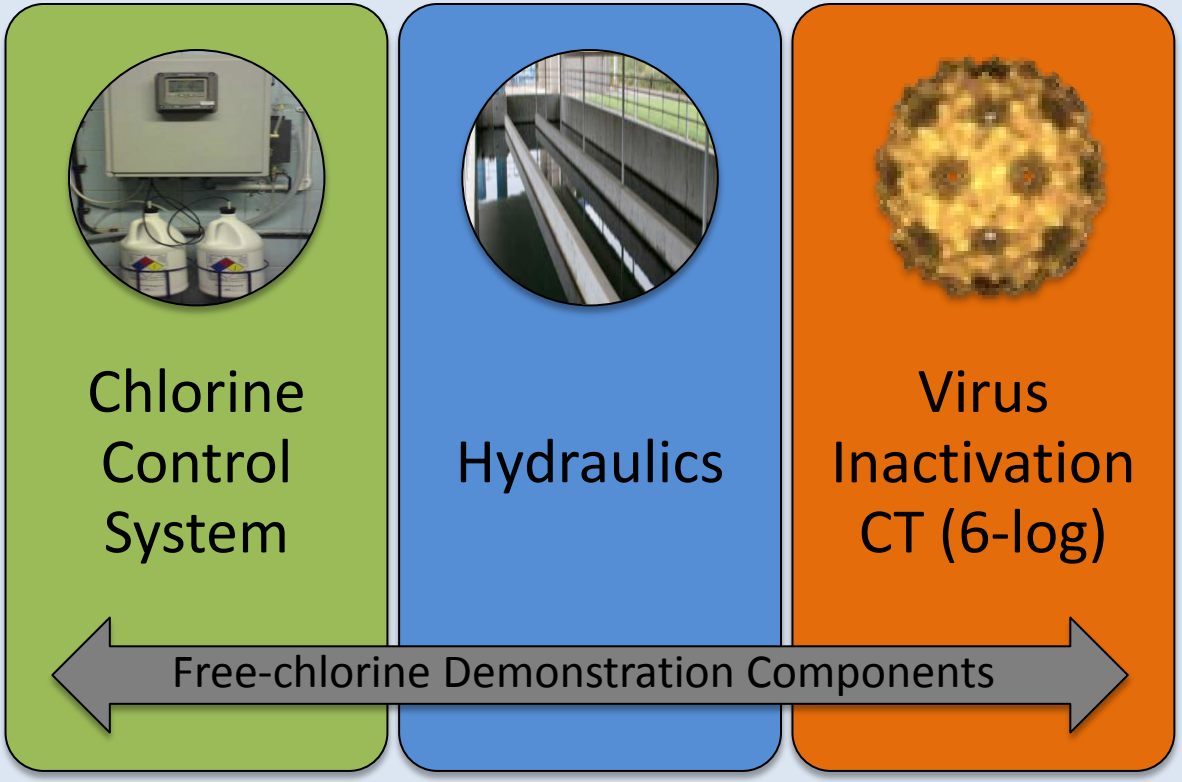


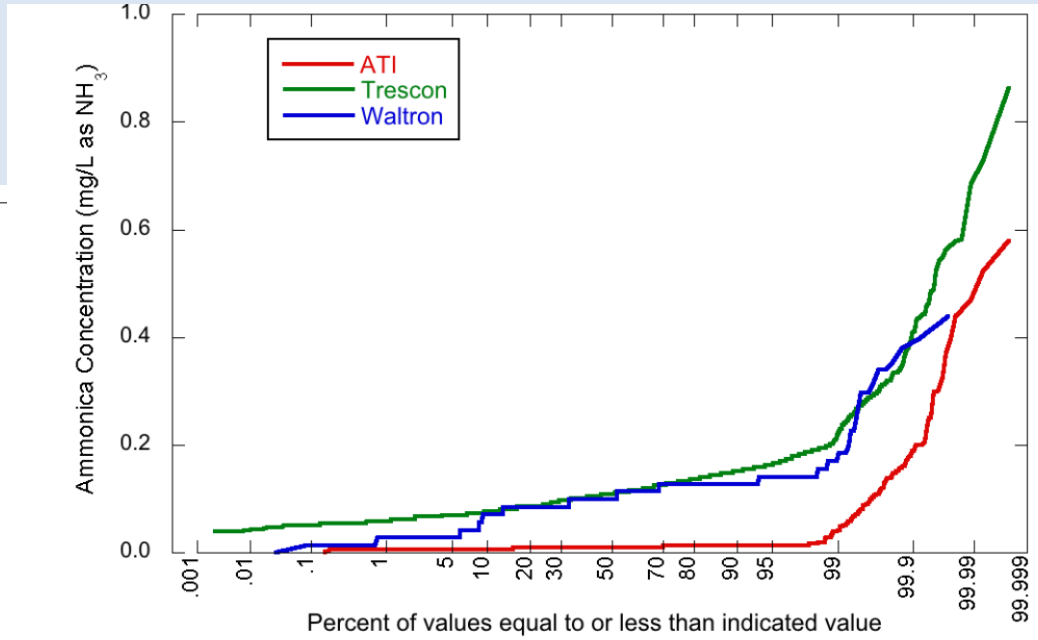
- Redundant barriers → best path to shorter RRTs

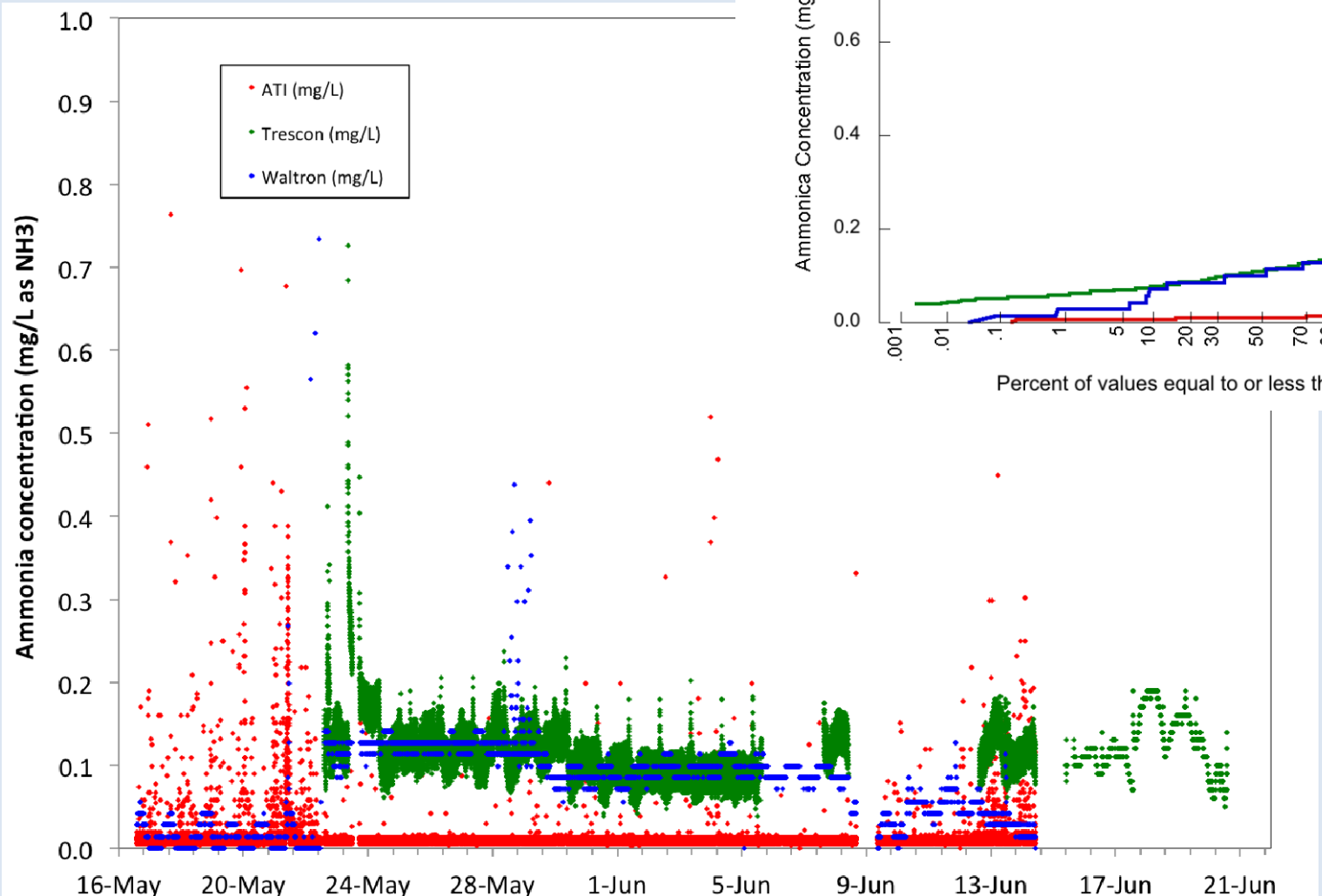


Free-Chlorine Demonstration

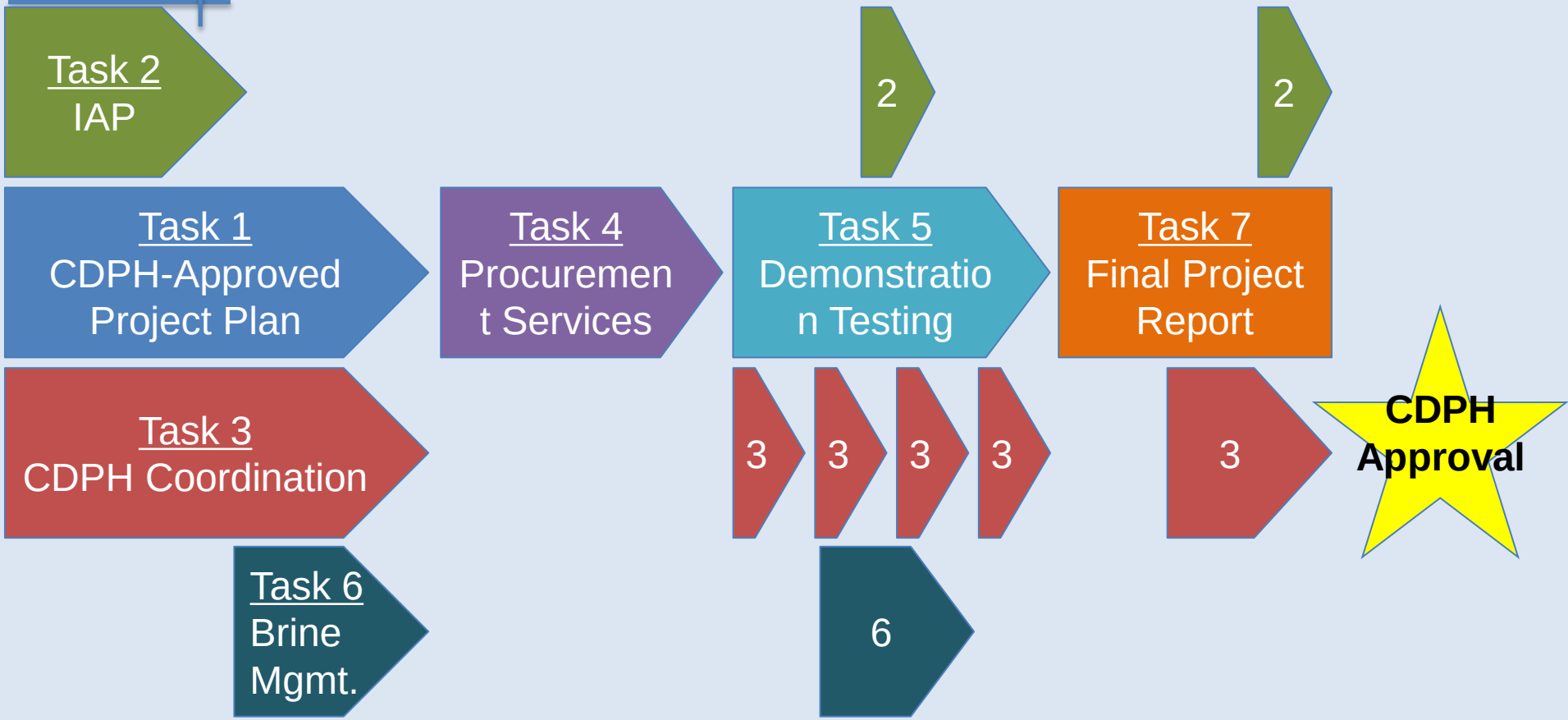


Nitrification Reliability





Schedule



Sept 2013 **Timeline** June 2016

Padre Dam MWD

Arne Sandvik, P.E.

Project Manager

Expert Advisors

Independent Advisory Panel

James Crook (chair)
Amy Childress – *USC*
Jason Dadakis – *OCWD*
Dan Gerrity – *UNLV*
Rick Gersberg – *SDSU*
Channah Rock – *U. of AZ*

Project Engineer

Advanced Treatment

CDPH / Regulatory Strategy

Questions and Discussion