LCSD
County of Santa Barbara

Groundwater Recharge Evaluation

Laguna County Sanitation District

Central Coast WateReuse Chapter Meeting

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carollo

Acknowledgements

Marty Wilder
Kevin Thompson
Jerry Nichols
Jesse Padfield

Matthew Young

Sarah Clark
Amos Branch
Graham Juby
Jon Marshall
Andrew Coulter
Anthony Cemo
Jeff Stovall
Cody Berg

Agenda

- Laguna County Sanitation District (LCSD) Background.
- Indirect Potable Reuse (IPR) Project Components.
- Groundwater Basin Considerations.
- Project Costs.
- Ongoing Activities.

01

LCSD Background

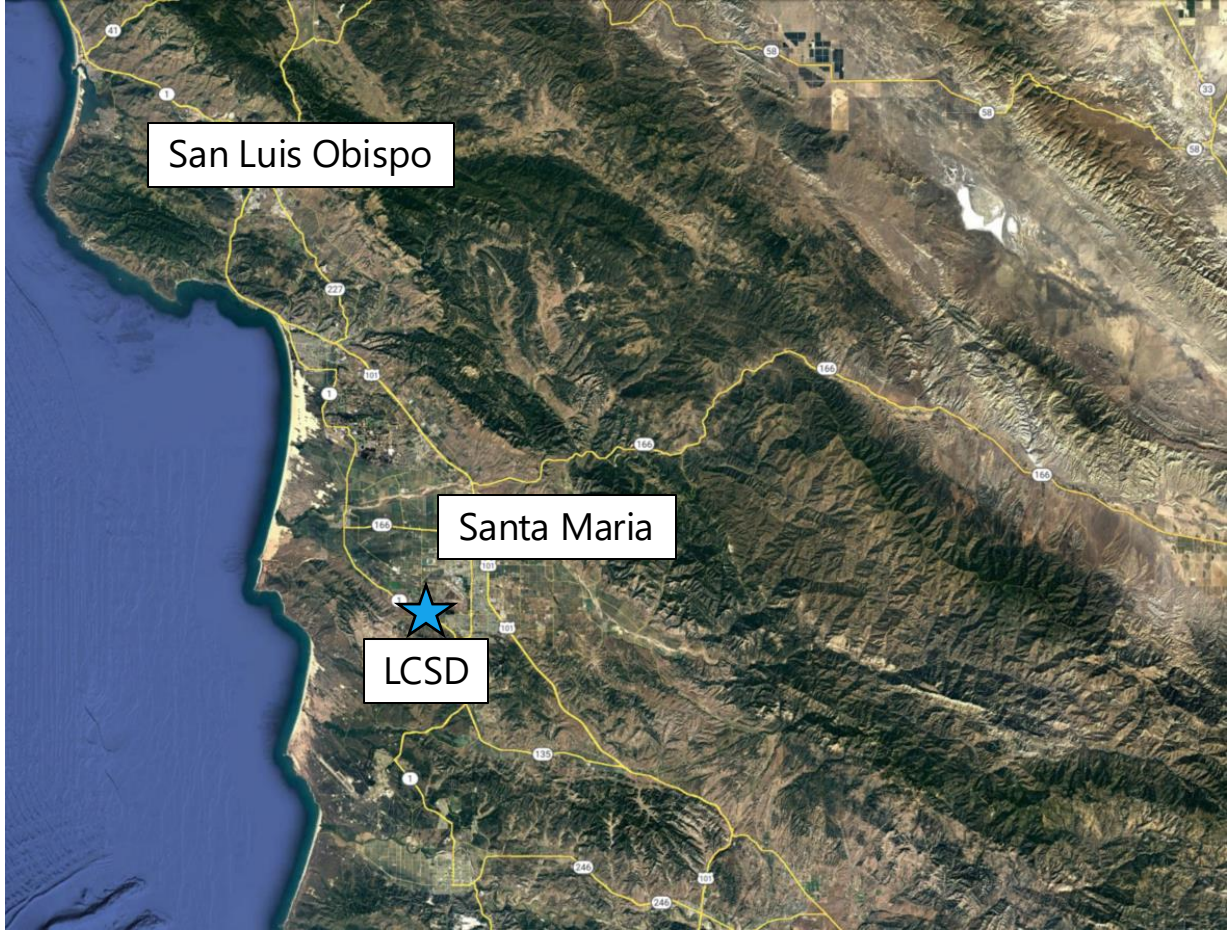
Project Background

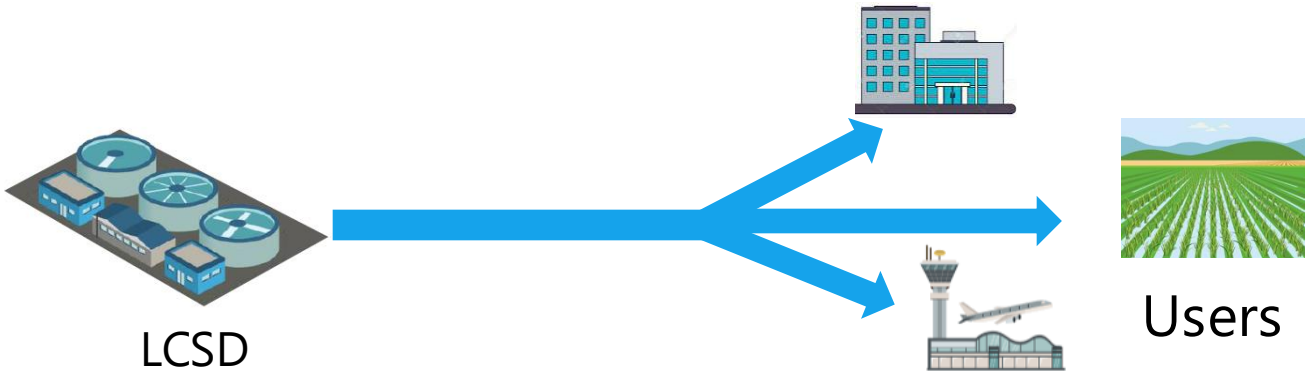
The Current Scenario

- Located southwest of the city of Santa Maria.
- Currently recycles 100% of its water.
- Treatment plant receives 1.7 mgd.

The Future Vision

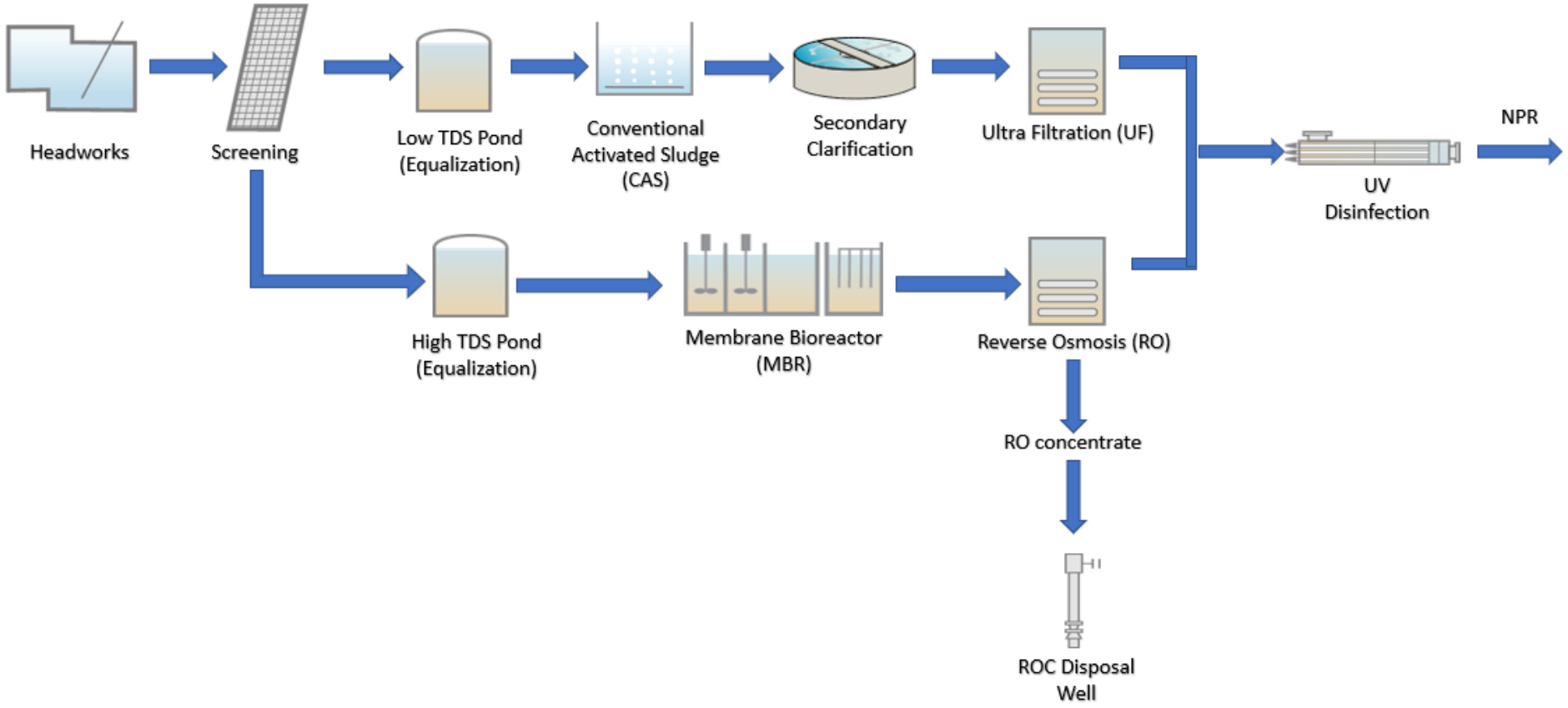
- Evaluate the potential to implement an IPR project.





LCSD Current Treatment Train

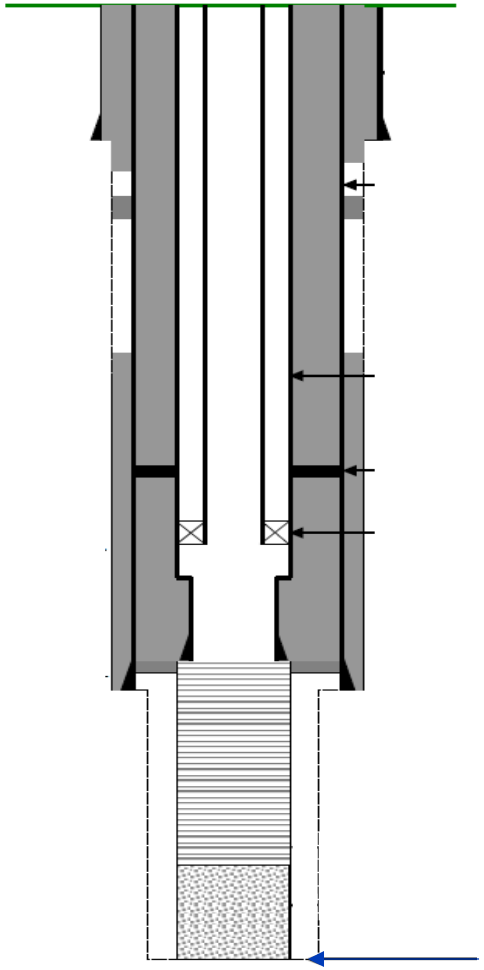
- Current treatment consists of two main trains.
- The driver for MBR/RO is high salt influent.
- All water treated to Title 22 standards and used for non-potable reuse (NPR).



LCSD's RO Concentrate Disposal

- Utilizes existing deep injection well for ROC disposal.
- Converted from oil-production well to Class I Nonhazardous injection well.

Union Sugar No. 13
Wellbore Diagram



Total Depth 5,336 feet
below ground surface

Typical IPR RO Concentrate Disposal

- Ocean outfalls often used for ROC disposal.
- Requires NPDES compliance and dilution.

Typical ROC disposal – Ventura Water Pure

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Project Components

IPR Project Drivers

Looking for long-term, reliable, drinking water supply.

Leverage use of existing treatment and infrastructure systems.

Determine feasibility of an IPR project.

Groundwater Recharge Key Requirements

	Requirement
Treatment Train	Reverse Osmosis (RO) + Ultraviolet Advanced Oxidation Process (UV/AOP)
Pathogen Control	Virus 12-log *Giardia* 10-log *Cryptosporidium* 10-log
Environmental Buffer	Minimum aquifer retention time of **2 months**.

Existing Treatment Components

MBR system

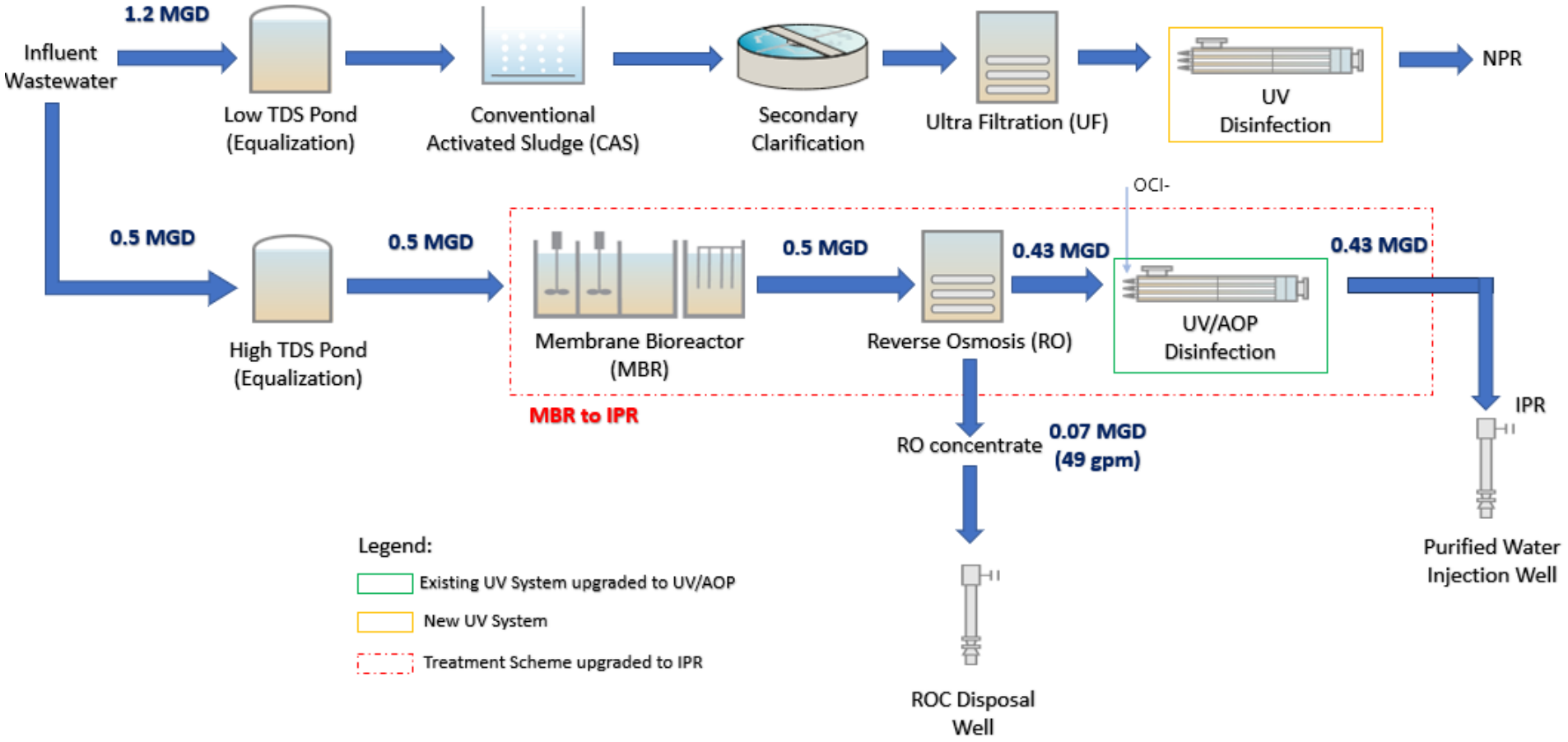
RO system

UF system

UV system

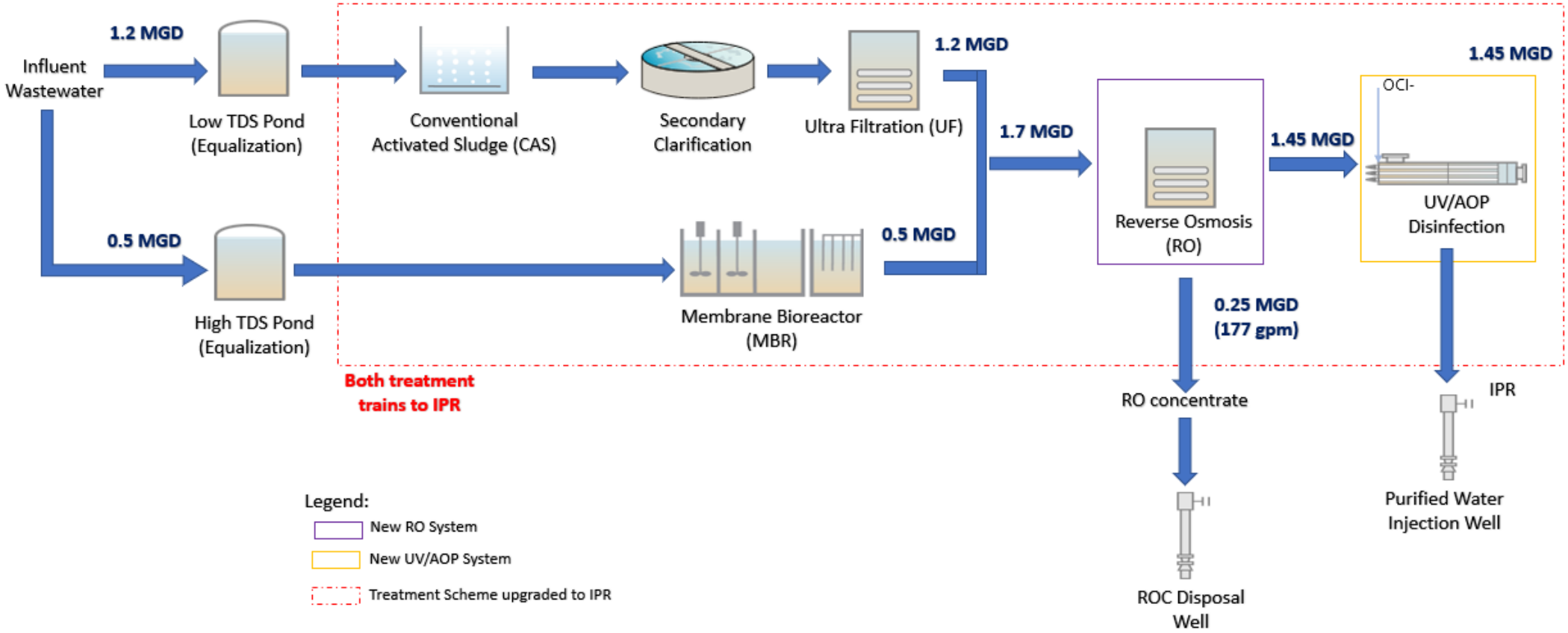
Potential Potable Reuse Treatment Configuration

Project 1: Fast Track Project



Potential Potable Reuse Treatment Configuration

Project 2: Full IPR Implementation Project



Pathogen Control

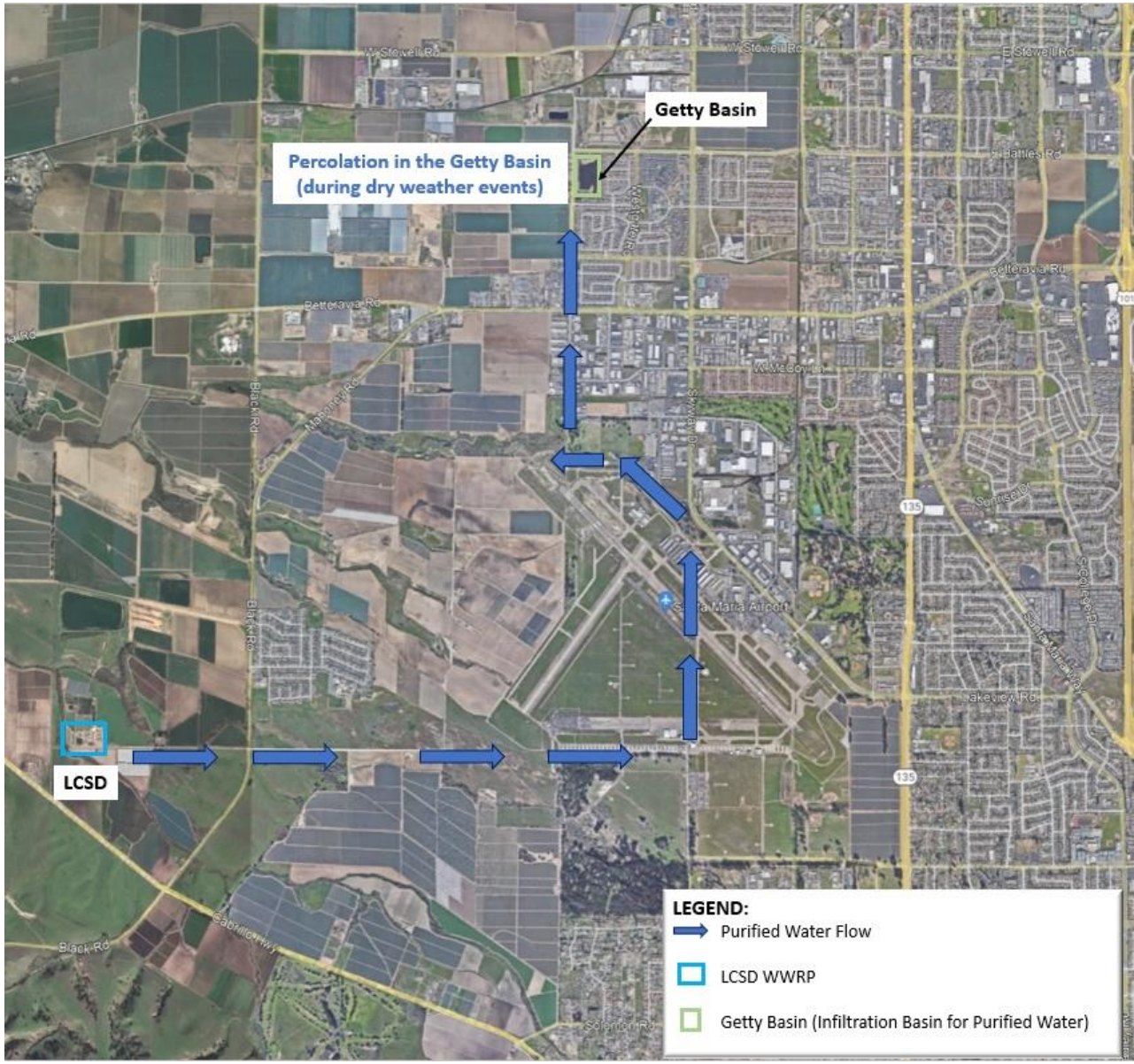
Process	Virus	*Giardia*	*Cryptosporidium*
(Project 1 & 2) MBR-Based Treatment			
MBR	1	2.5	2.5
RO	2	2	2
UV/AOP	6	6	6
Free Chlorine	0 to 6	--	--
Groundwater Retention Time	2+	0	0
Total	**12+**	**10.5**	**10.5**
Requirement	**12**	**10**	**10**
(Project 2) CAS + UF-Based Treatment			
UF	0	4	4
RO	2	2	2
UV/AOP	6	6	6
Free Chlorine	0 to 6	--	--
Groundwater Retention Time	2+	0	0
Total	**12+**	**12**	**12**
Requirement	**12**	**10**	**10**

03

Groundwater Basin Considerations

Purified Water Injection Strategy

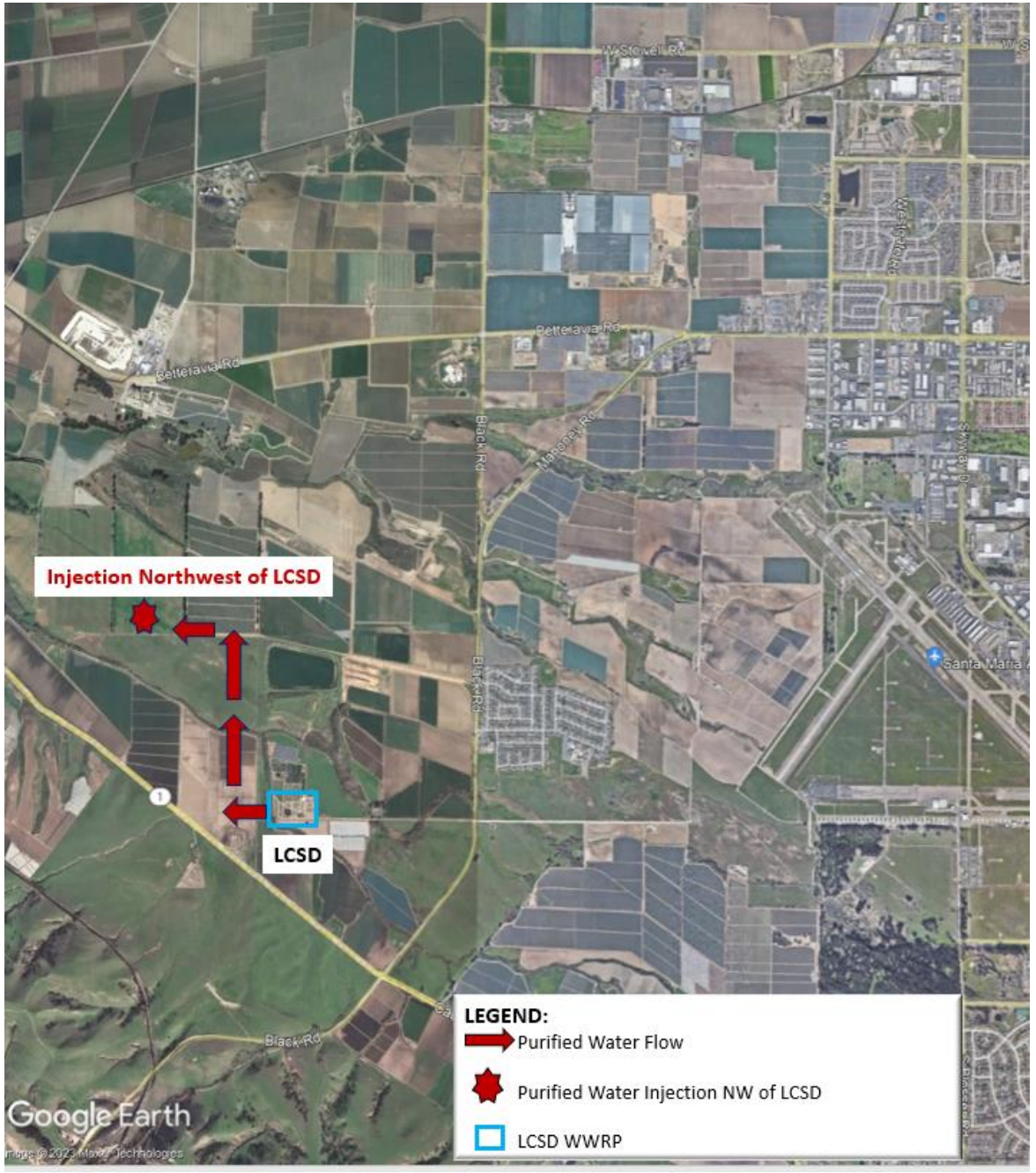
- **Option 1**: Inject purified water near the Getty Basin.
  - » Pros: Use of existing Flood Control District infrastructure.
  - » Cons: Complexity of coordinating with another District.



Purified Water Injection Strategy

- **Option 2**: Inject purified water northwest of the WRP.
  - » Pros: Not limited by Flood Control District.
    - Allows for year-round injection.
  - » Cons: Will require new infrastructure.

This is the preferred alternative.



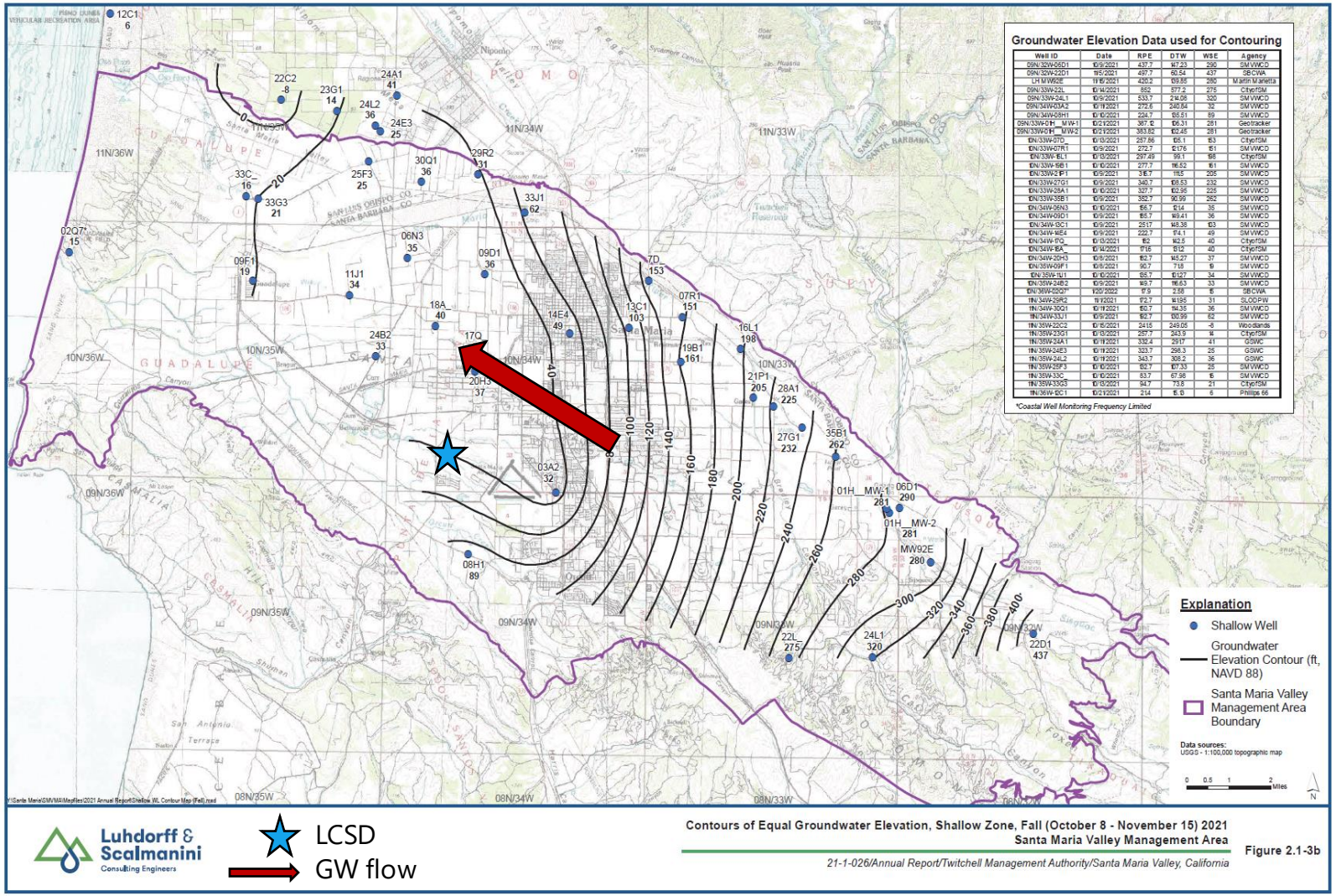
Groundwater Basin

Proposed Injection Location

- Sits within the Santa Maria Valley Groundwater Basin (SMVGB).
- Wells generally pull from deep aquifer (250 -2,200 feet below ground surface).

Groundwater Basin Directional Flow

- West-Northwest towards the ocean.



Groundwater Basin Analysis

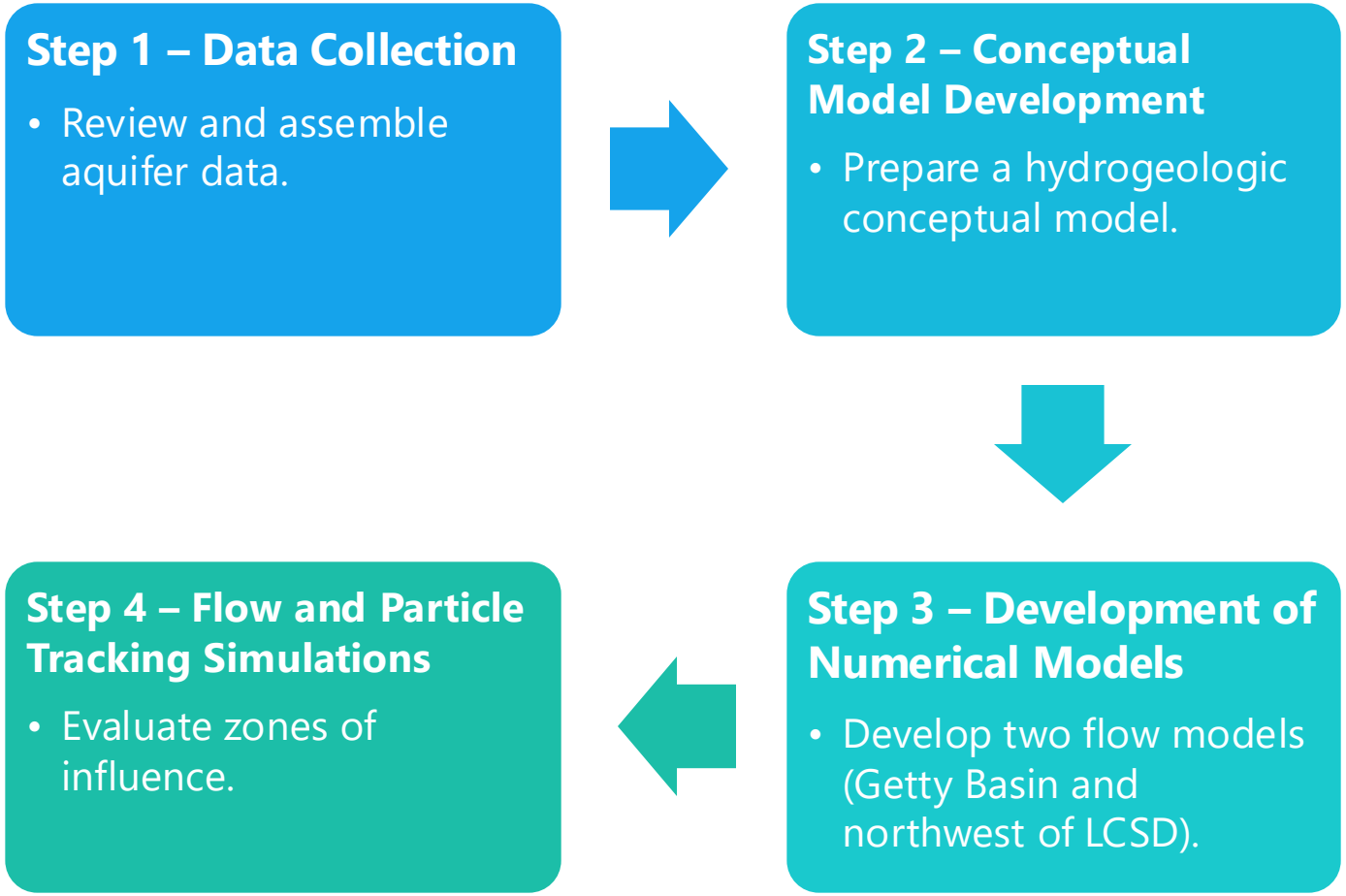
Groundwater Velocity

- Estimated travel time of injected water to nearby wells.
- Preliminary analysis indicates sufficient travel time for IPR regulations.
- Additional groundwater modeling currently underway.

Location	Groundwater Aquifer Zone	Velocity	Time Period	Travel Distance
Northwest of LCSD	Deep	0.5 ft/day	6 months	100 feet
			12 months	200 feet

Continued Groundwater Modeling

- Refine groundwater velocity and particle transport in the groundwater basin.



Additional Regulatory Considerations

- Basin plan requirements: Boron is a constituent of concern.

Current Boron Concentrations

Parameter	Basin Objective	Estimated Basin Concentration	Estimated Concentration in Purified Water
Boron, (mg/L)	**0.2**	**0.19**	**0.18-0.24**

- Proposed Regulatory Pathways:
  - **Source Control**: Managing boron from the source.
  - **Intake Credit**: Accounting for boron already present in drinking water.
  - **Assimilative Capacity**: Accounting for ability of groundwater basin to dilute boron.

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Project Costs

Project Cost Estimates

Class 5 Planning-Level Estimates
Expected Accuracy -50% to +100%

Project	Feed Flow	Treatment Costs	New Infrastructure Costs	Total Capital Costs	Annualized (1) Project Cost (Infrastructure & Treatment)	Annual Operations & Maintenance Costs	Total Cost per Acre-Foot
Project 1: Fast Track	0.5 mgd	$12.9 M	$8.4 M	$21.3 M	$1.1 M	$1.2 M	$4,950
Project 2: Full IPR Implementation	1.7 mgd	$46.6 M	$32 M	$78.6 M	$4.3 M	$2.4 M	$4,130

Notes:
(1) Annualized project costs assume a 30-year loan with a 3.5% interest rate.

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Ongoing Activities

Continued Project Work

- Identify regional partnerships.
- Position project for USBR Title XVI grant funding
- Continue feasibility analysis and groundwater modeling.
- Upcoming USBR Machine Learning R&D.

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Open Discussion/Questions