



PURE WATER PROJECT
LAS VIRGENES-TRIUNFO

Bringing Our Water Full Circle

Water Augmentation Study Preliminary Screening

February 22, 2021

Agenda

- Introductions
- Program Status
- Purpose
- Study Approach
- Water Augmentation Types – JPA Input
- Draft Initial Screening
- Next Steps



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Program Status

Setting the Program Foundation...the First 6 Months

Program Implementation Plan

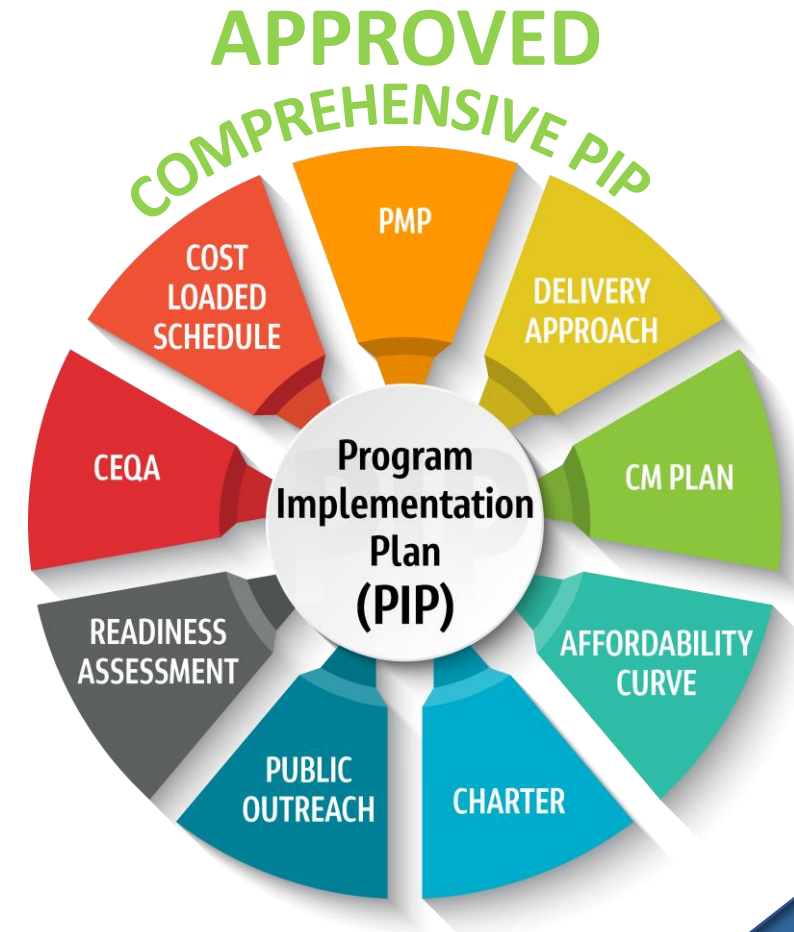
- Establish the program foundation with processes and tools, final projects, baseline cost-loaded master schedule, proposed delivery methods, environmental/regulatory strategies, and public outreach approach

JPA Board Special Sessions for Input

- No. 1: Introduce Water Augmentation Study (February)
- No. 2: Introduce Collaborative Delivery Methods (March)
- No. 3: Present Draft Program Implementation Plan (April)

JPA Board Meeting for Adoption

- Board adoption of Final Program Implementation Plan (June)



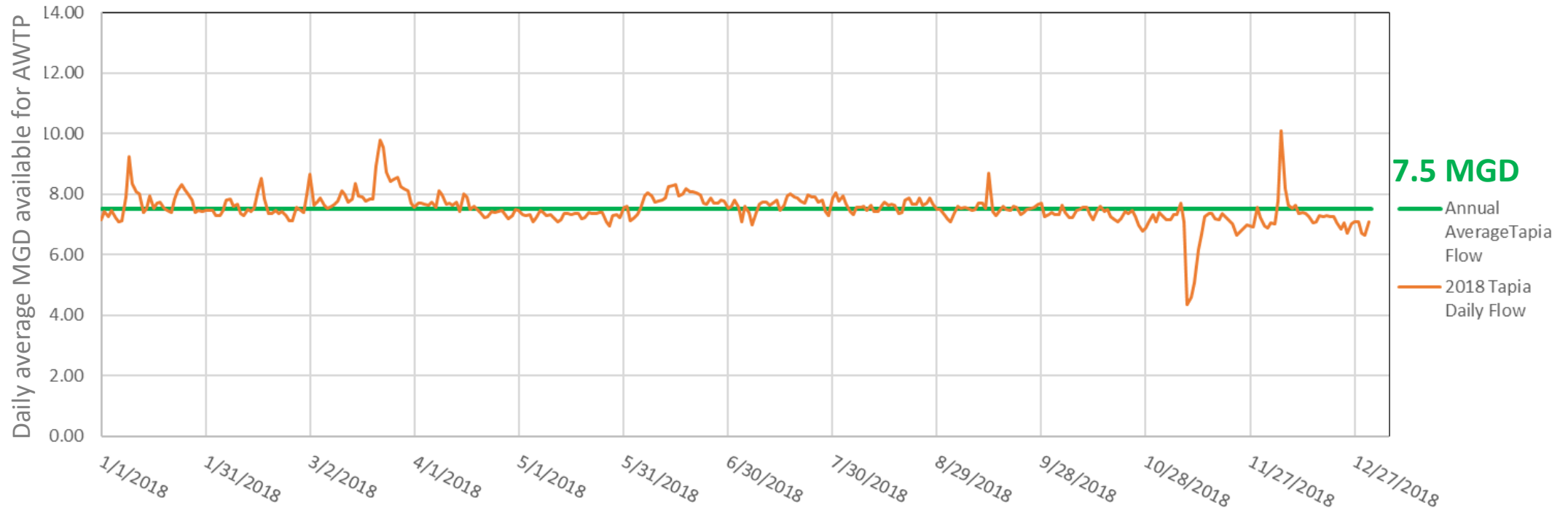


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Purpose

2018 Tapia WRF Flows

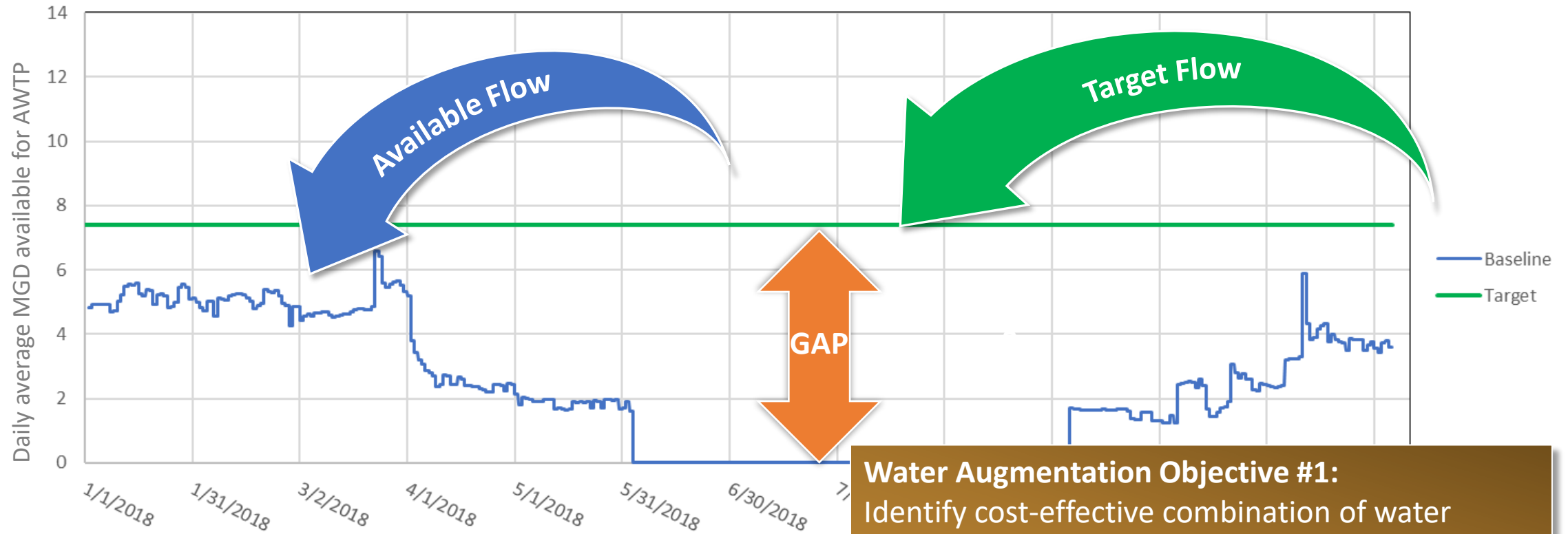


DATA SOURCE: Flow: LVMWD Daily Flow Data (2002-2018); Water Quality: Pepperdine University Reclaimed Water Usage 2019 annual Report.

Flow Source	Average Flow (MGD)	Type
Tapia WRF	7.5 MGD (2018)	Tertiary Effluent

Existing baseline Tapia WRF flow to feed AWTP – minus the recycled water demand

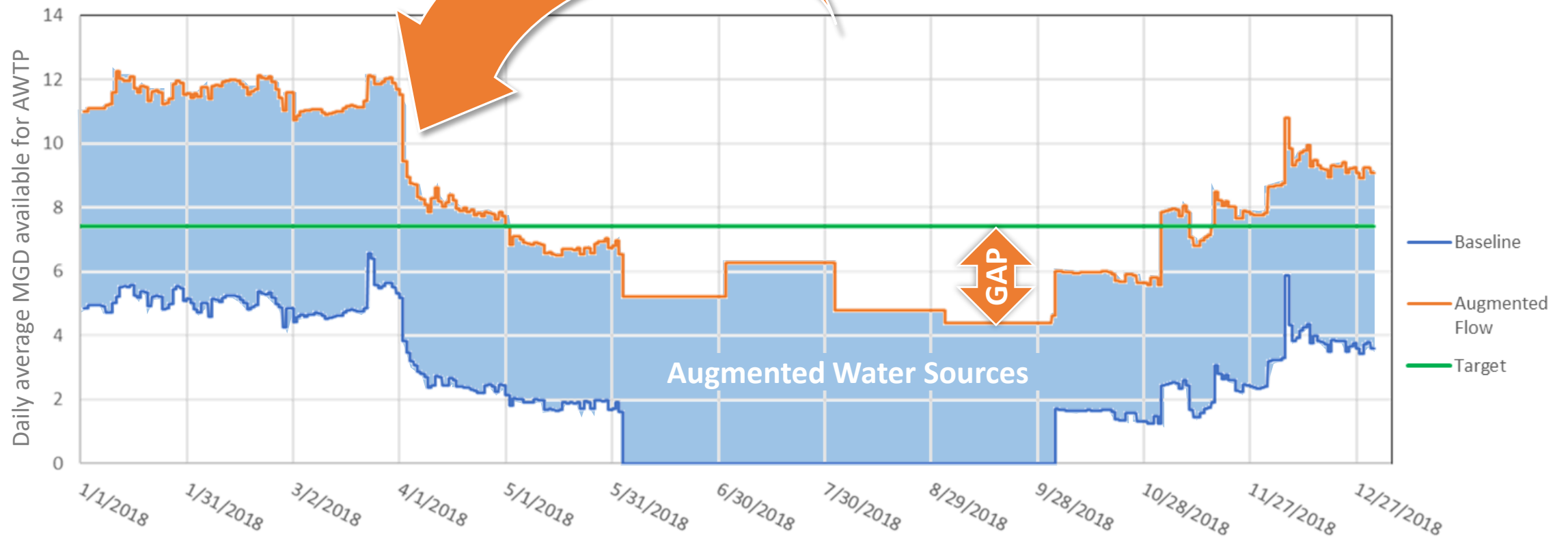
This is the **CURRENT** Baseline Flow Available for the AWTP



Water Augmentation Objective #1:
Identify cost-effective combination of water augmentation sources to achieve a steady-state flow of 7.5 MGD (feed water) to the AWTP year-round.

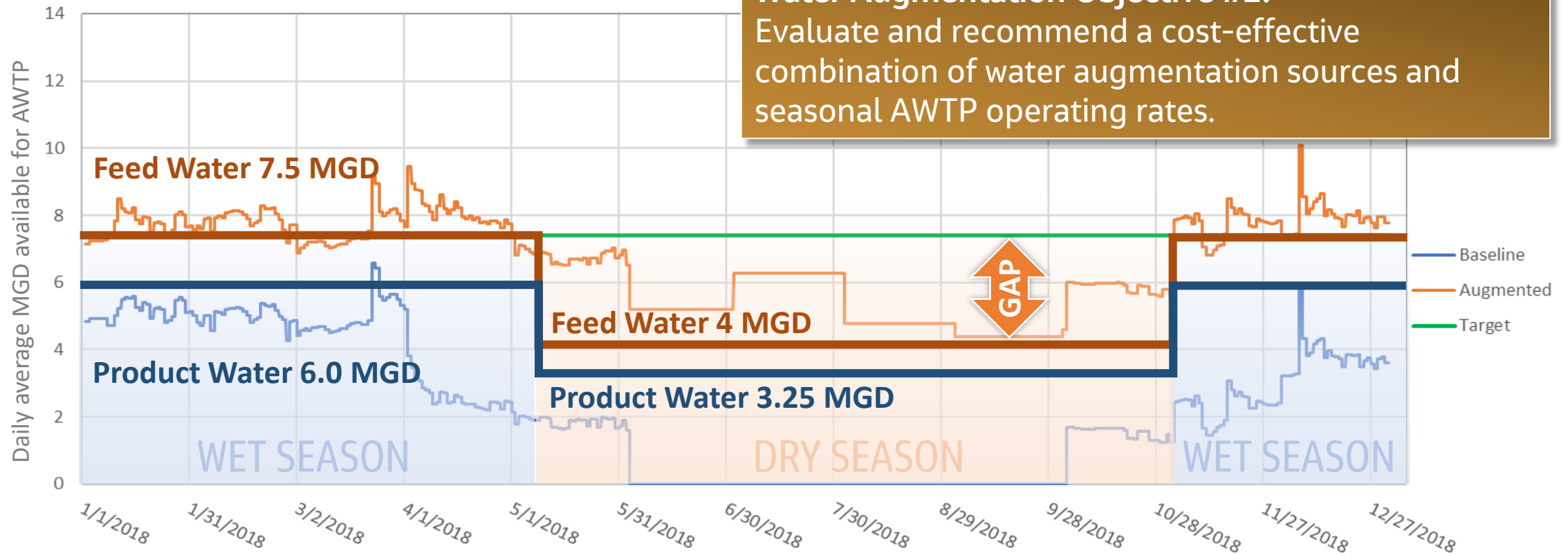
Considering other options increases potential flows available for the AWTP

On a preliminary basis, adding potential flows from multiple augmentation sources.



Approximate flows available for the AWTP

Water Augmentation Objective #2:
Evaluate and recommend a cost-effective combination of water augmentation sources and seasonal AWTP operating rates.





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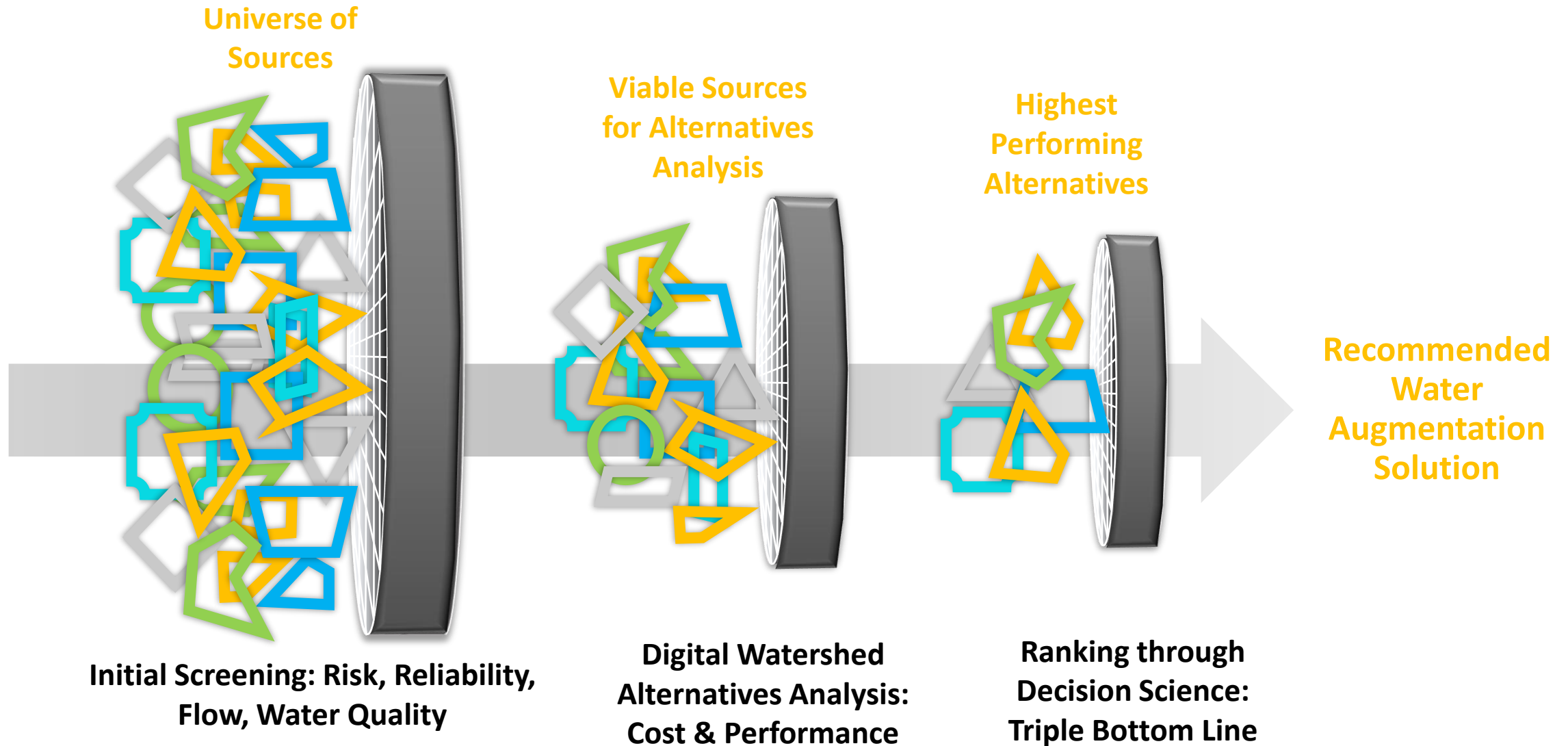
Study Approach

Water Augmentation Study Guiding Principles

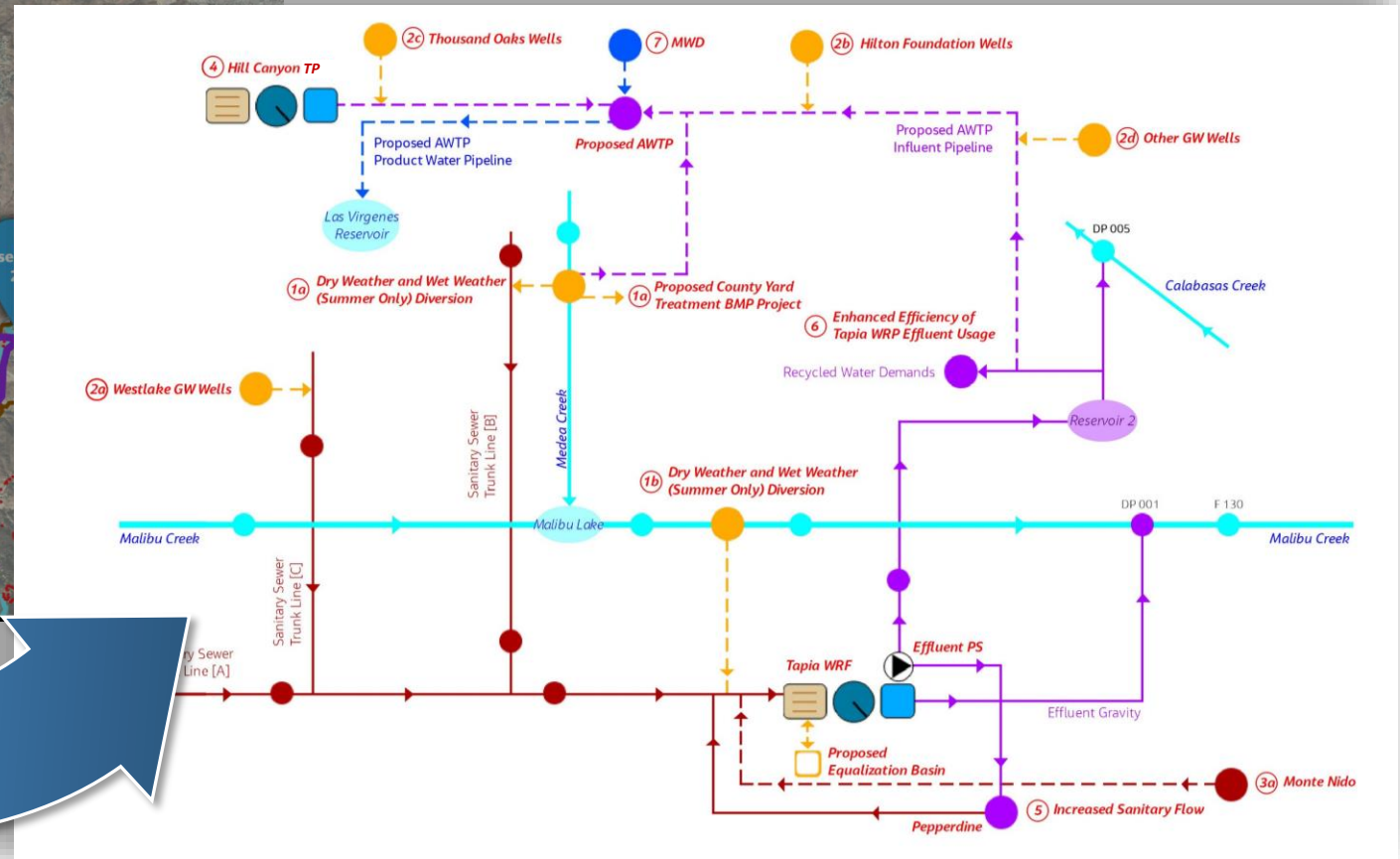
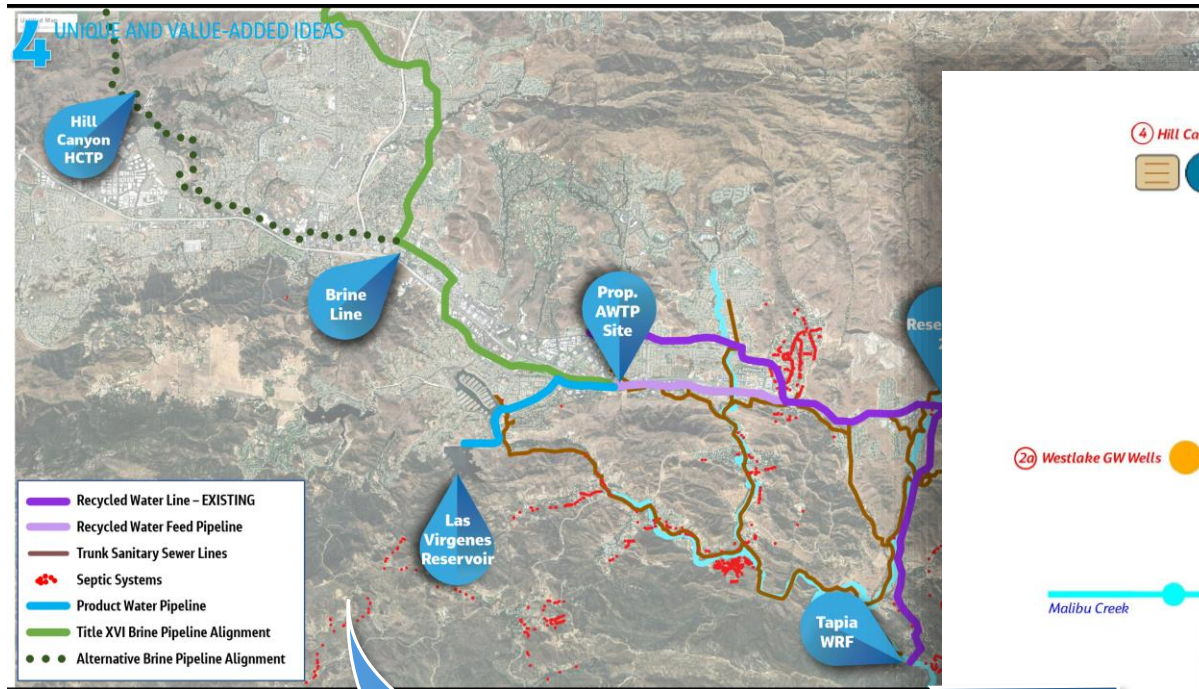
Water Augmentation Study will focus on augmentation sources that meet the following criteria:

- Source can be implemented within the Pure Water Project timeline to feed the AWTP.
- Flows will be reliable and controllable towards operation of the AWTP.
- Interception and conveyance of flow are cost-effective.

Screening, Analysis, and Ranking Approach



The Las Virgenes-Triunfo Digital Watershed System Framework models your existing and proposed infrastructure.



Augmentation Sources

Delivery Points

- AWTP/Recycled Water System
- Tapia WRF / Sanitary Sewer System



Augmentation Source Types

- Raw Wastewater (4)
- Septic-to-Sewer Conversion (3)
- Treated Wastewater Effluent (1)
- Groundwater (14)
- Flow Diversions: Stream and Urban Runoff (10)
- Recycled Water Demand Reduction (3)
- Potable Water Supplementation (1)

Overview of Initial Screening

- Performed using readily available data; does not represent complete vetting of source.
- Purpose is to further narrow analysis to the most viable set of water augmentation sources likely to meet selected criteria.
- Augmentation sources are screened into three categories:
 1. **High Priority:** Source will be included in Digital Watershed for alternatives analysis. These sources represent the focus of the augmentation study.
 2. **Medium Priority:** Source will not be modeled, but presents opportunity for additional augmentation in future.
 3. **Low Priority:** Source will not be further analyzed in the context of this study, unless conditions change.

Initial Screening Approach

Score	Implementation Risk	Reliability	Estimated Available Flow	Estimated Water Quality
✓	No disqualifying technical, regulatory, or jurisdictional risks were identified based on readily available data.	Augmentation source is anticipated to deliver predictable and regular flow to the AWTP during augmentation period and into the future. Source flow can be controlled by JPA.	Anticipated flows provide significant contribution to feedwater to the AWTP.	Quality of flow is anticipated to be acceptable for direction to the AWTP and/or Tapia WRF.
-	No information available.	No information available.	No information available.	No information available.
X	Augmentation source is not within the control of JPA to implement or otherwise has a technical, regulatory or jurisdictional risk that exceeds the project value based on available data.	Augmentation source is anticipated to provide irregular or unpredictable flow to the AWTP.	Anticipated flow is very low compared to other augmentation solutions.	Flow contains known unacceptable levels of a key constituent.



High Priority

Medium Priority

Low Priority

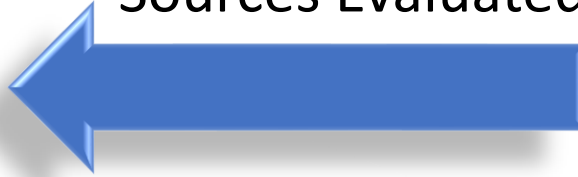
Draft Initial Screening Results

18
High Priority

11
Medium Priority

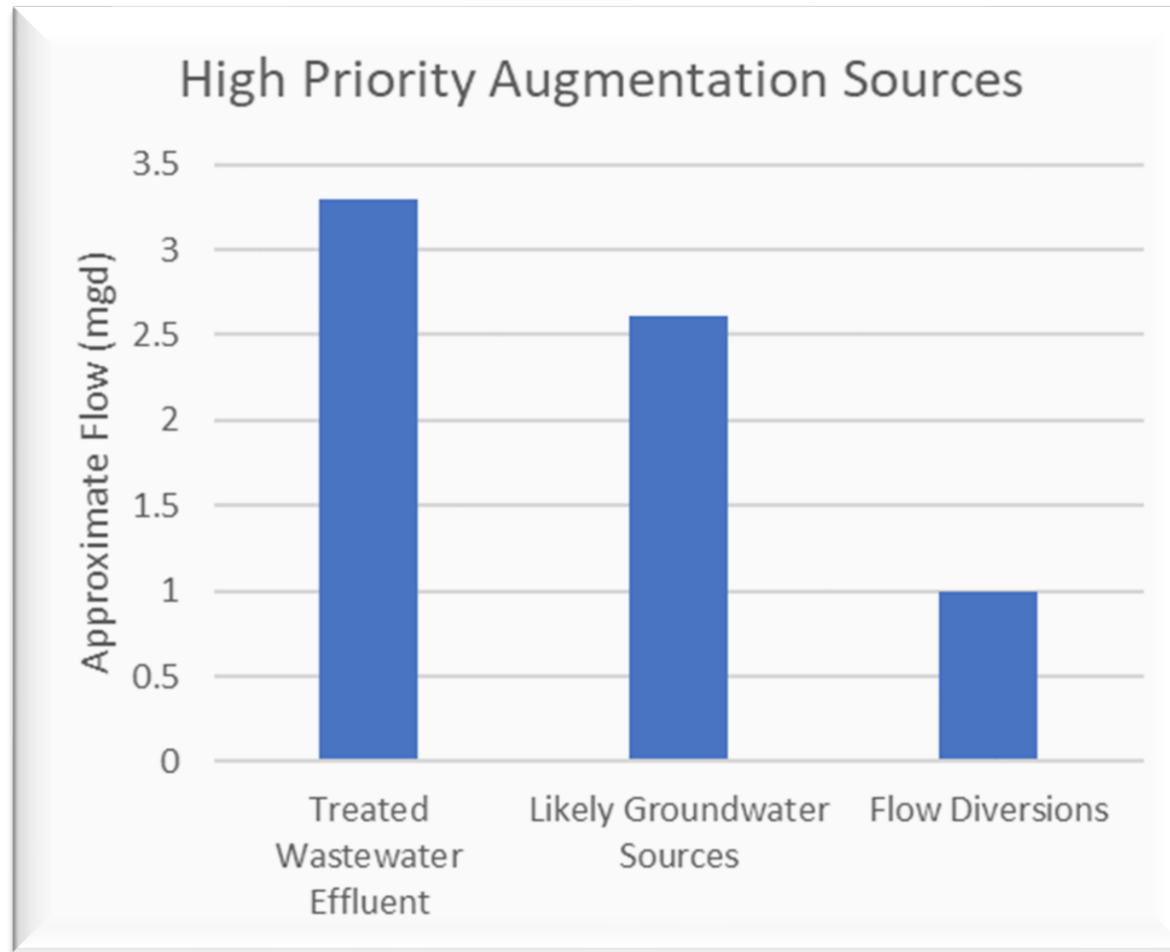
7
Low Priority

36 Total
Augmentation
Sources Evaluated



Project	Source	Source Type	Delivery Point	Initial Screening				Initial Screening Recommendation
				Implementation Risk	Reliability	Estimated Available Flow	Estimated Water Quality	
GW-1	Westlake Wells	Production Groundwater - Existing	Sanitary Sewer to Tapia WRF or Direct to AWTP	✓	✓	✓	✓	High Priority
GW-2	Los Robles Golf Course Wells (Thousand Oaks)	Production Groundwater - Existing	AWTP	✓	✓	✓	✓	High Priority
GW-3	Library Well (Thousand Oaks)	Production Groundwater - Existing	AWTP	✓	✓	✓	✓	High Priority
GW-10	Additional Thousand Oaks (TO) Groundwater Wells	Groundwater - Existing and Proposed Wells per CDM Smith 2016 Study	AWTP	✓	✓	✓	✓	High Priority
GW-4	Four Seasons Well	Dewatering Groundwater - Existing	Sanitary Sewer to Tapia WRF or Direct to AWTP	✓	✓	✗	✓	Medium Priority
GW-5	Hilton Foundation Dole Building Wells	Dewatering Groundwater - Proposed	Sanitary Sewer to Tapia WRF or Direct to AWTP	✓	-	✗	-	Medium Priority
GW-6	LA County Fire Department Well (Fire Station #89)	Dewatering Groundwater - Existing	Sanitary Sewer to Tapia WRF	✓	-	✗	-	Medium Priority
GW-7	Tapia WRF Balancing Pond Well	Dewatering Groundwater - Existing	Tapia WRF	✓	✓	✓	✓	High Priority
GW-8	Rancho Las Virgenes Farm Wells	Monitoring Wells	AWTP	✓	✗	✗	✗	Low Priority
GW-9	Westlake Seepage	Dewatering Groundwater - Existing	Sanitary Sewer to Tapia WRF or Direct to AWTP	✗	✓	✗	-	Low Priority
GW-10	Old Hilton Foundation Wells	Dewatering Groundwater - Existing	Sanitary Sewer to Tapia WRF or AWTP	✓	-	✗	-	Medium Priority

Draft Initial Screening Results



Approximately 7 MGD in total available from the most likely High Priority sources.

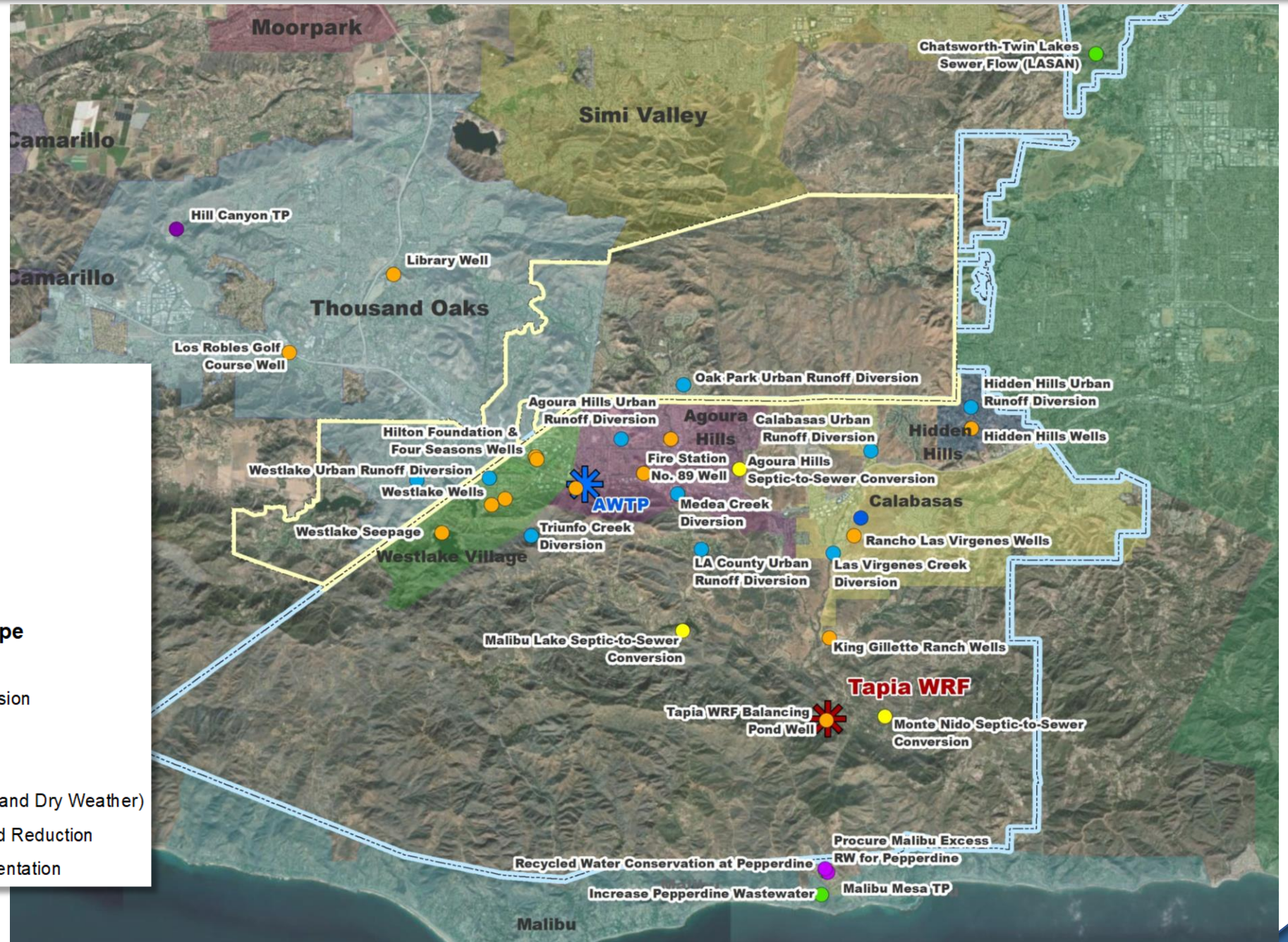


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Water Augmentation Types and Initial Screening


Augmentation Sources




Legend








 Proposed AWTP

 Tapia WRF

 LVMWD Boundary

 Triunfo Boundary

Augmentation Source Type

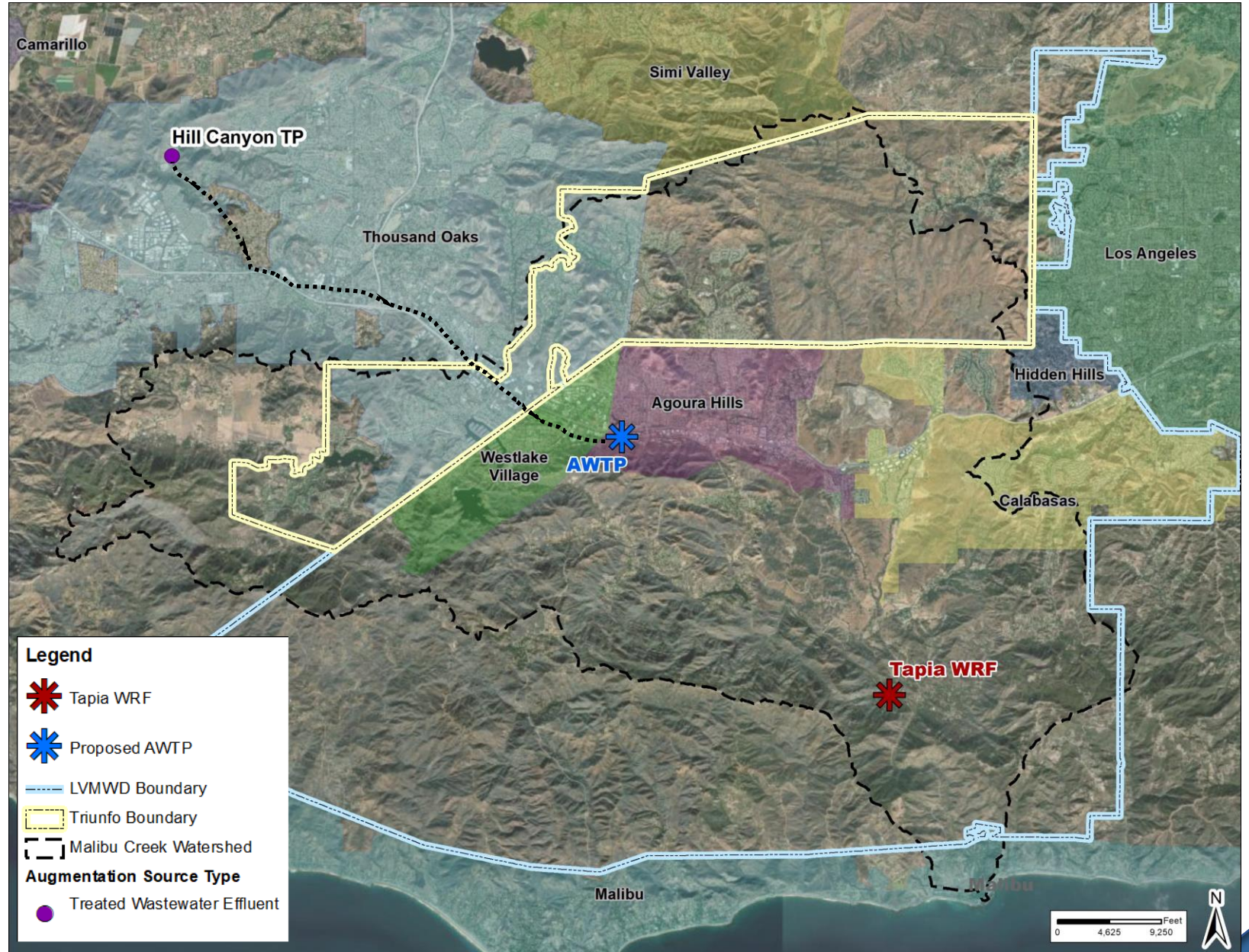
-  Raw Wastewater
-  Septic-to-Sewer Conversion
-  Wastewater Effluent
-  Groundwater Well
-  Flow Diversion (Stream and Dry Weather)
-  Recycled Water Demand Reduction
-  Potable Water Supplementation

Treated Wastewater Effluent

WE-1: Hill Canyon Treatment Plant

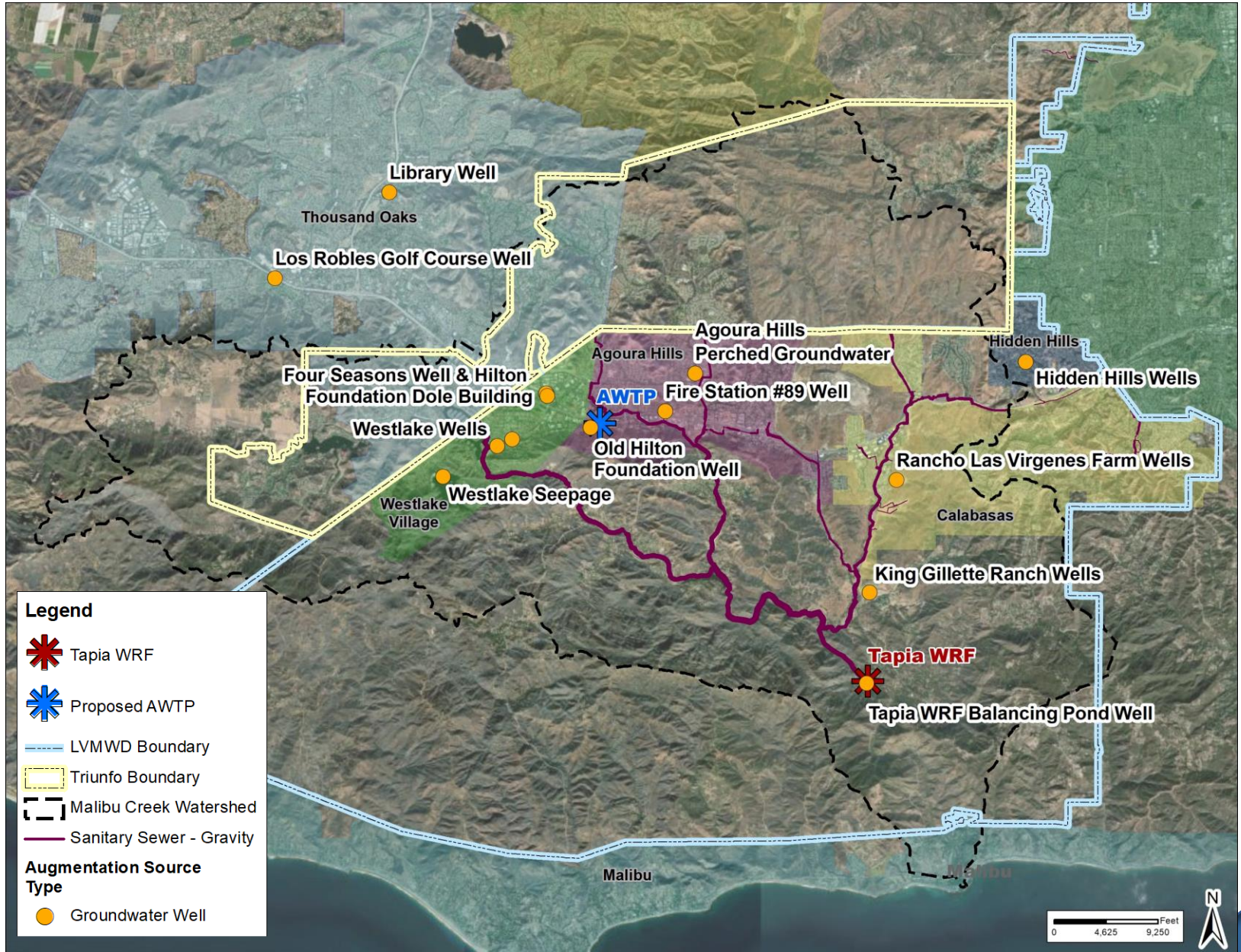
- 3.3 mgd of treated effluent from Hill Canyon TP directed to AWTP via new pipeline
- Provides reliable source from neighboring agency
- Pipeline from HCTP to AWTP may be shared with flow from Thousand Oaks wells and may be constructed with planned brine line.
- Hill Canyon Treatment Plant Master Plan (2021) highly ranks this approach under its analysis of future water resource alternatives

High Priority



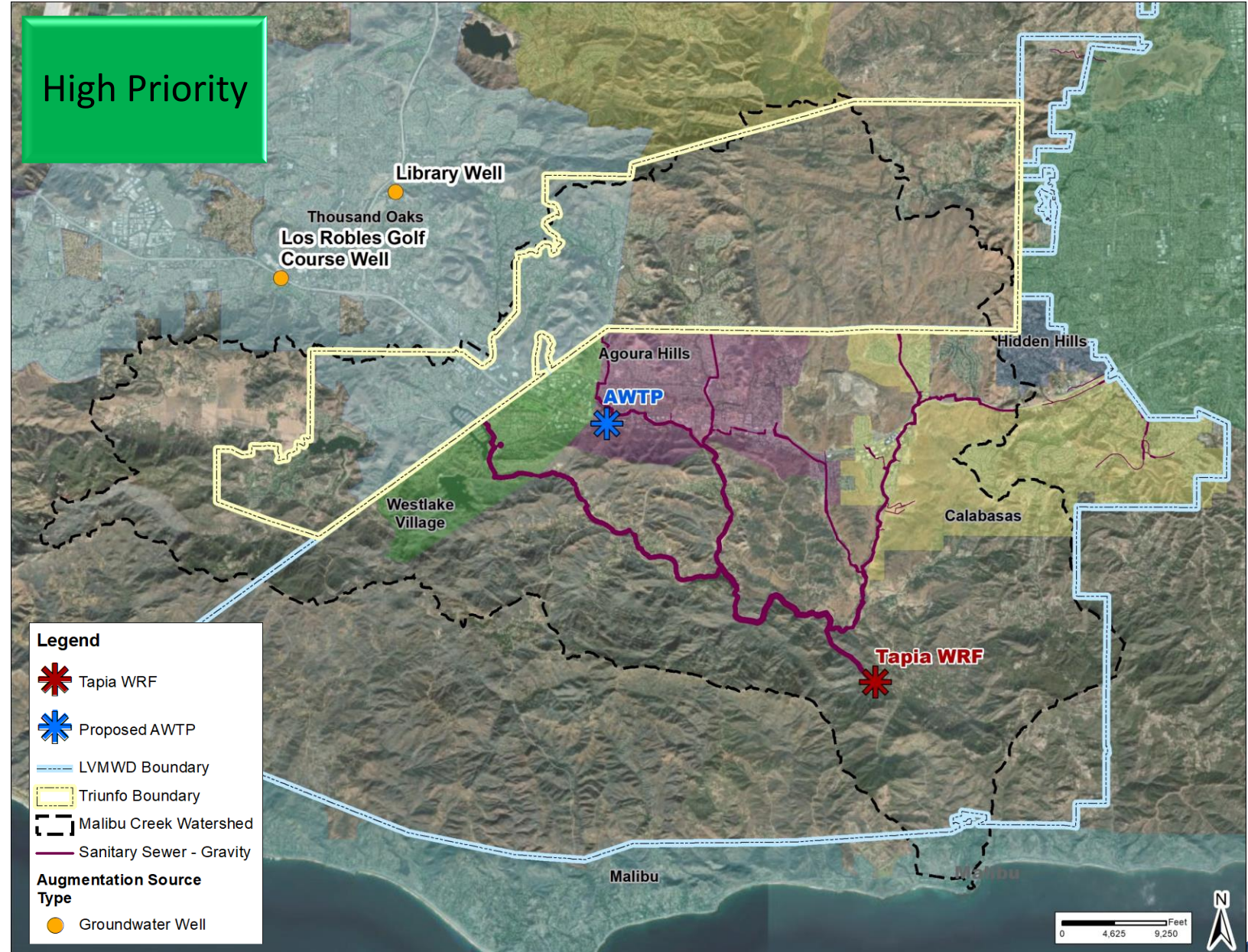
Groundwater

- Thousand Oaks Wells
 - GW-2: Los Robles Golf Course Wells
 - GW-3: Library Well
 - GW-TO: Additional TO Wells
- Other Production Wells
 - GW-1: Westlake Wells,
 - GW-13: King Gillette Ranch Well
- Dewatering:
 - GW-4: Four Seasons Well
 - GW-5: Hilton Foundation Dole Building
 - GW-6: Fire Station #89 Well
 - GW-7: Tapia Balancing Pond
 - GW-8: Rancho Las Virgenes Farm wells
 - GW-9: Westlake Seepage
 - GW-10: Old Hilton Foundation Well
 - GW-11: Perched groundwater in Agoura Hills
 - GW-12: Hidden Hills Wells



Groundwater – Thousand Oaks Wells

- GW-2: Los Robles Golf Course Wells (1.1 mgd)
 - Significant, reliable source of flow
 - Due to high TDS, source cannot be used directly for irrigation
- GW-3: Library Well (0.7 mgd)
 - Significant, reliable source of flow.
 - Due to high TDS, source cannot be used directly for irrigation
- GW-TO: Additional TO Wells (up to 3 mgd)
 - Additional existing and proposed wells have been identified by 2016 TO Groundwater and Reclaimed Water Study
 - Identified for local use due to low TDS



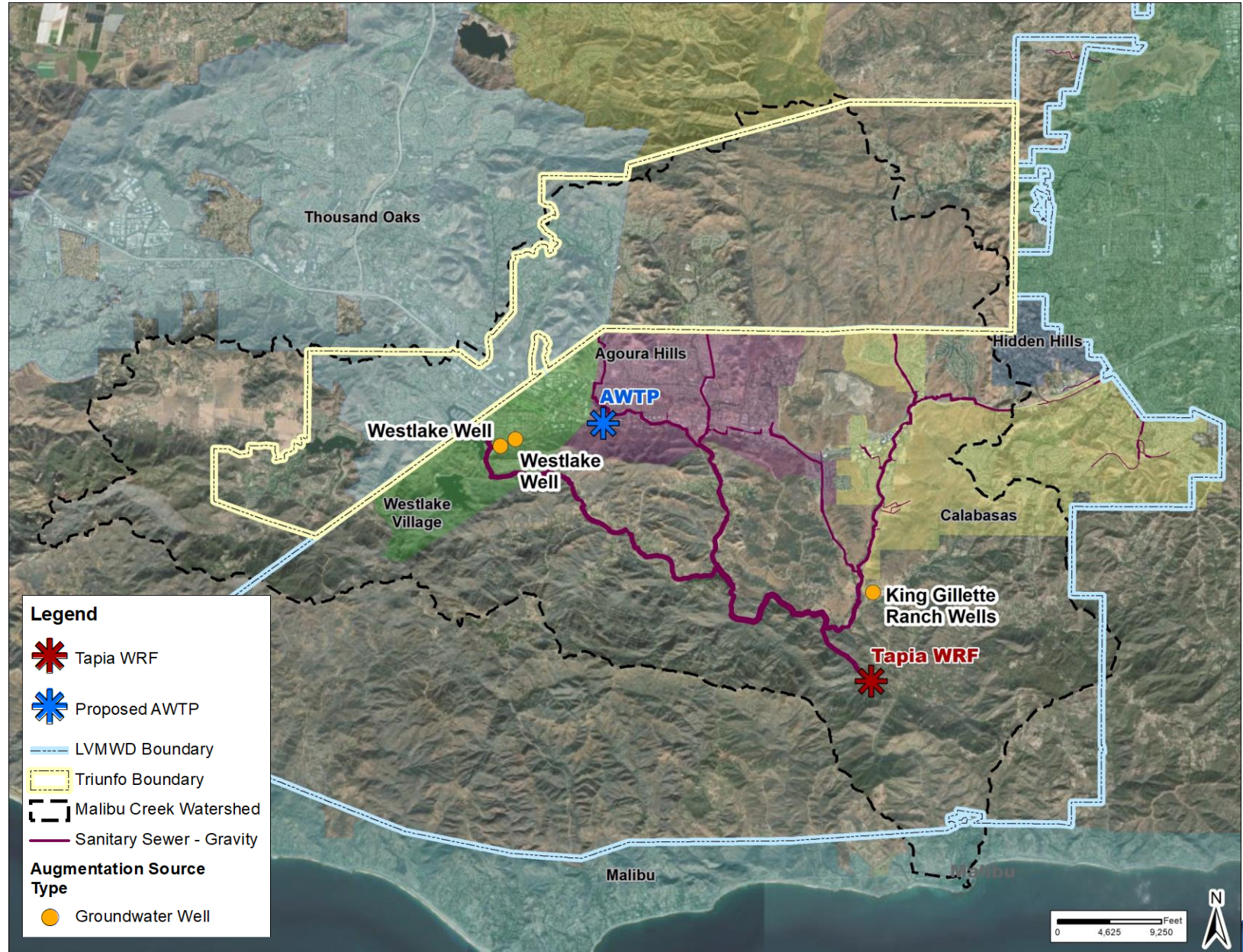
Groundwater – Other Production Wells

- GW-1: Westlake Wells (0.6 mgd)
 - Currently accepts this flow into sanitary system to supplement recycled water demand in summer months
 - Anticipated to reliably provide augmentation in winter months as well

High Priority

- GW-13: King Gillette Ranch Well (0.03 mgd)
 - Low estimated flow
 - May already be in use by Ranch

Medium Priority



Groundwater – Dewatering

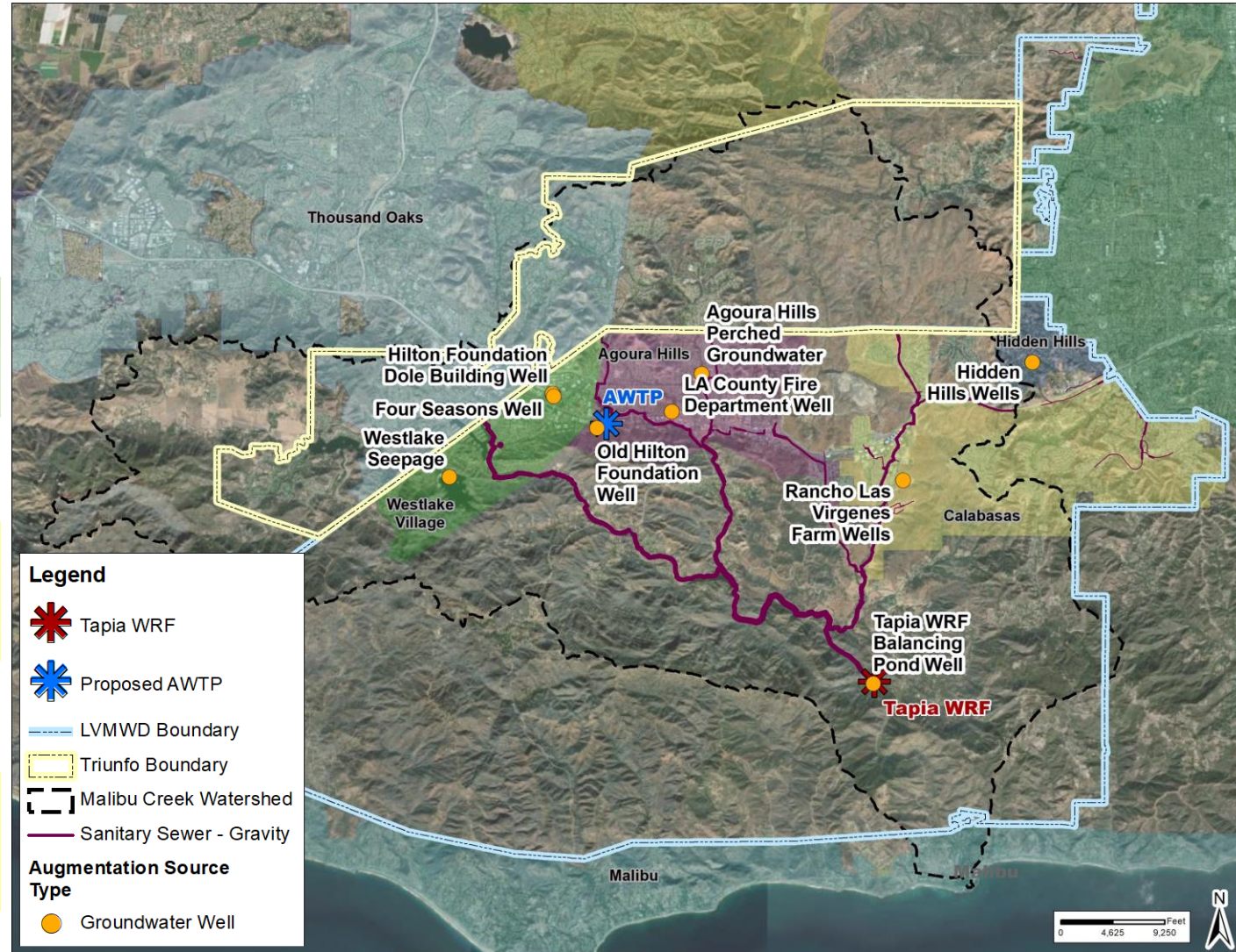
- **GW-7: Tapia Balancing Pond**
 - *Reliable source at Tapia WRF, currently managed by LV*
 - *Average summer flow ~0.26 mgd*
- **Dewatering Wells with low estimated flow (~0.005 mgd)**
 - *GW-4: Four Seasons Well*
 - *GW-5: Hilton Foundation Dole Building*
 - *GW-6: Fire Station #89 Well*
 - *GW-10: Old Hilton Foundation Well*
 - *GW-12: Hidden Hills Wells*
- **GW-9: Westlake Seepage**
 - *Seepage from Las Virgenes Reservoir Dam: Average flow ~0.01 mgd*
 - *Current flow contributes to minimum flow obligation for creek discharge*
- **Other Sources Considered**
 - *GW-8: Rancho Las Virgenes Farm wells*
 - *GW-11: Perched groundwater in Agoura Hills*

High Priority

Medium Priority

Low Priority

Low Priority



Flow Diversions: Stream Diversions and Urban Runoff Diversions

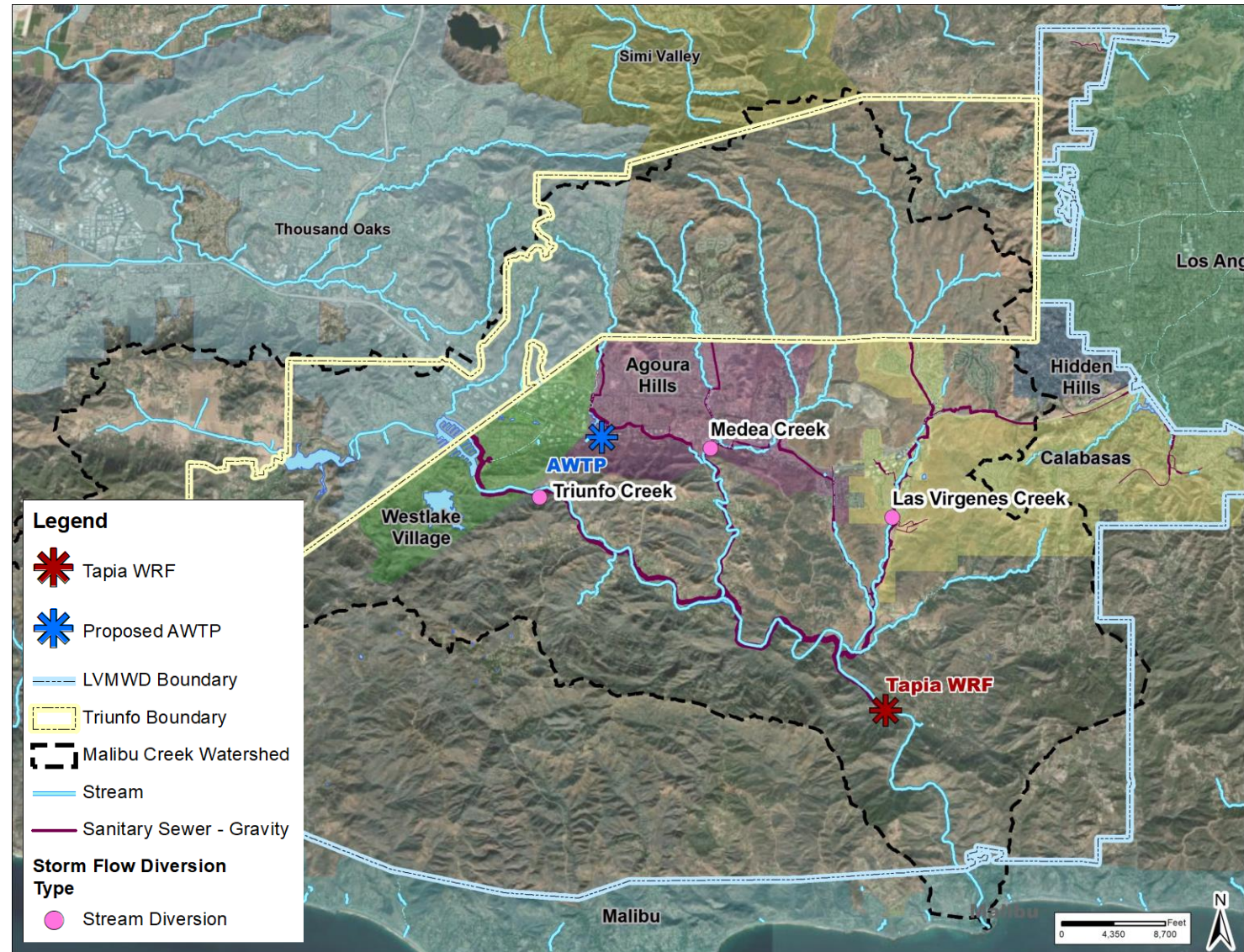
- Both are approaches to capturing dry weather and some wet weather urban runoff
- Both lend themselves to meeting MS4 requirements of NPDES permit
- Both have potential for cost-sharing from affected MS4s

Stream Diversions	Urban Runoff Diversions
Targeted diversion of flow from streams, downstream of storm outfalls from urbanized areas.	Decentralized diversion of urban runoff directly from storm sewer outfalls.
Higher TDS due to natural stream flow and therefore must be diverted to AWTP rather than Tapia WRF.	Lower TDS and therefore can likely be diverted to sanitary sewer or to AWTP.
Benefit: Centralized diversion may be more cost-effective and capture more flow.	Benefits: Diversion to sanitary sewer is convenient due to typical proximity of storm to sanitary. Sewer and Tapia WRF likely have capacity to accept flow.
Challenge: Natural flow must remain in stream, which may be difficult to quantify and may add cost to control.	Challenge: Diversions required in many locations to achieve capture of flow.

Stream Diversions to AWTP

- Sources:
 - FD-1: Medea Creek Diversion: 0.7 MGD
 - FD-2: Triunfo Creek Diversion: 0.2 MGD
 - FD-3: Las Virgenes Creek Diversion: 0.1 MGD
- Amount of flow available for diversion will vary seasonally
- Potential cost sharing with affected MS4 permittees
- Regulatory challenges relative to stream flow modifications may affect project schedule
- High TDS (~2,500 mg/L), no disqualifying water quality concerns identified

High Priority



Urban Runoff Diversions

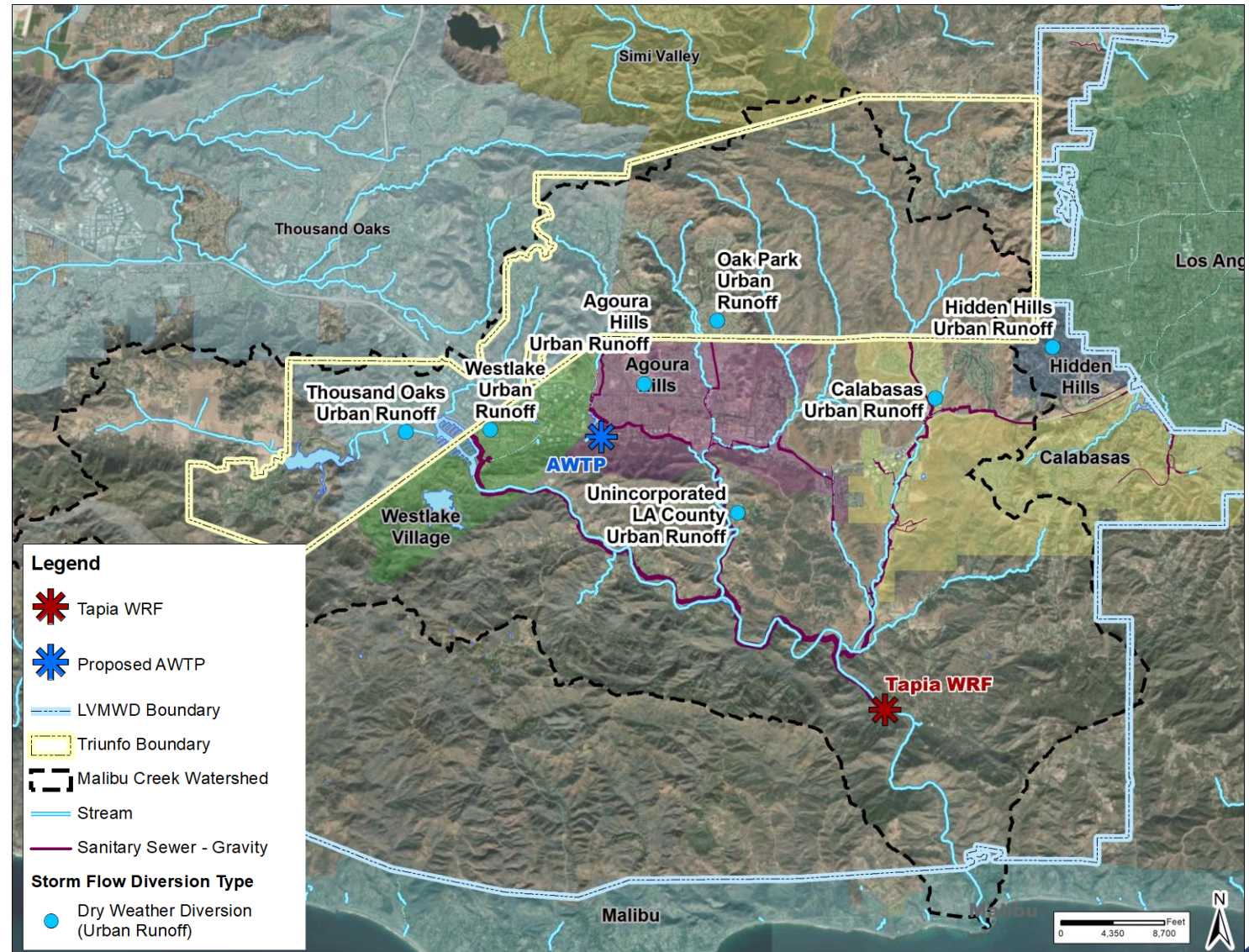
- Urban Runoff Diversion Sources organized by municipality:

- FD-4: Agoura Hills (~0.3 mgd)
- FD-5: Calabasas (~0.3 mgd)
- FD-6 Oak Park (~0.1 mgd)
- FD-7: Hidden Hills (~0.1 mgd)
- FD-8 Unincorporated LA County (~0.03 mgd)
- FD-9: Thousand Oaks (~0.3 mgd)
- FD-10: Westlake (~0.2 mgd)

- Screening Considerations

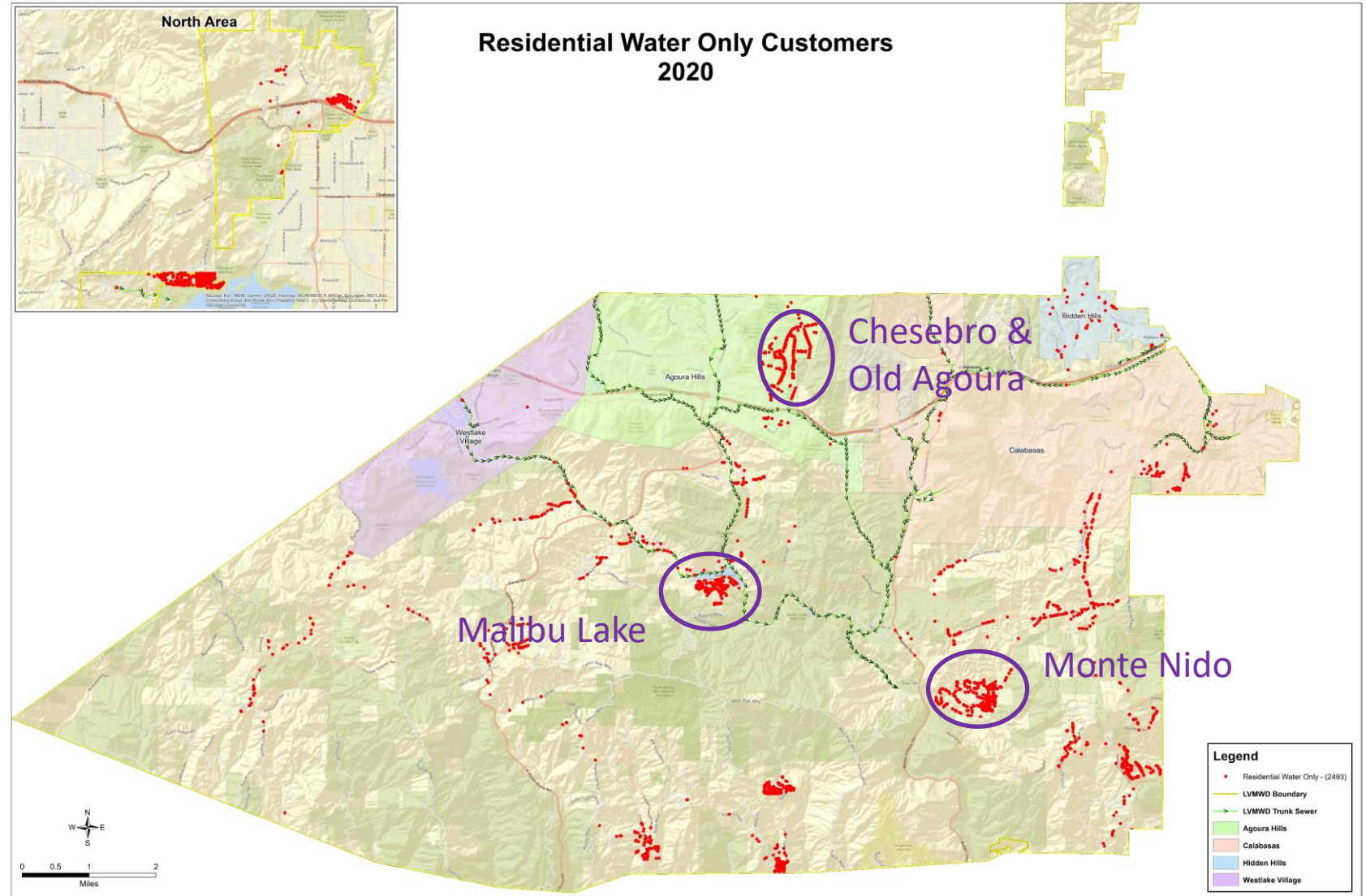
- Can construct diversions from storm sewer to sanitary sewer or to the AWTP
- Potential cost sharing with affected MS4 permittees.
- Dry weather flow anticipated to vary seasonally.
- Water Quality not anticipated to limit feasibility

High Priority



Septic-to-Sewer Conversion

- Concentrations of septic systems offer opportunity for conversion to sewer



Septic-to-Sewer Conversion

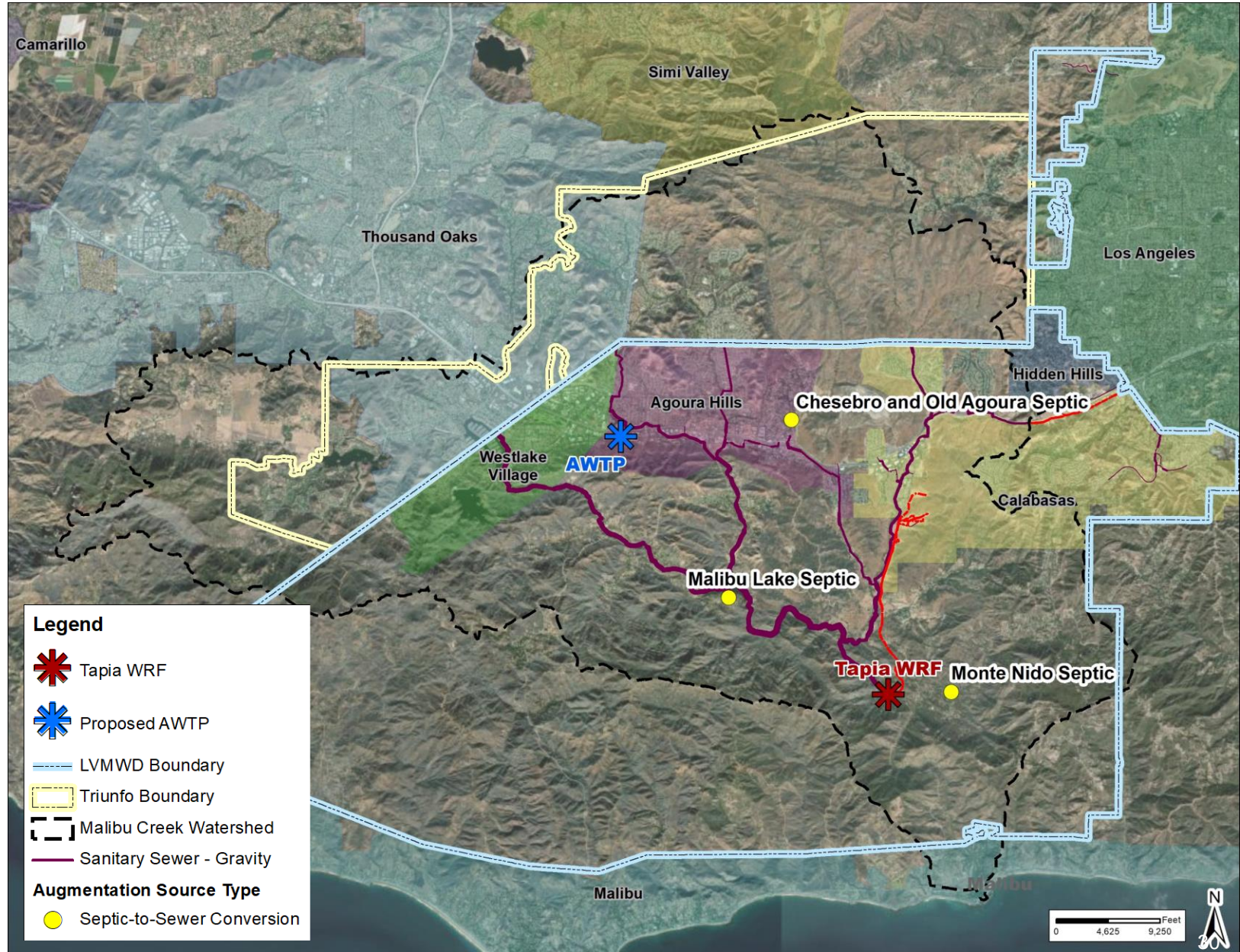
- Sources:

- SS-1: Malibu Lake Septic
- SS-2: Chesebro & Old Agoura Septic
- SS-3: Monte Nido Septic

- Screening Considerations:

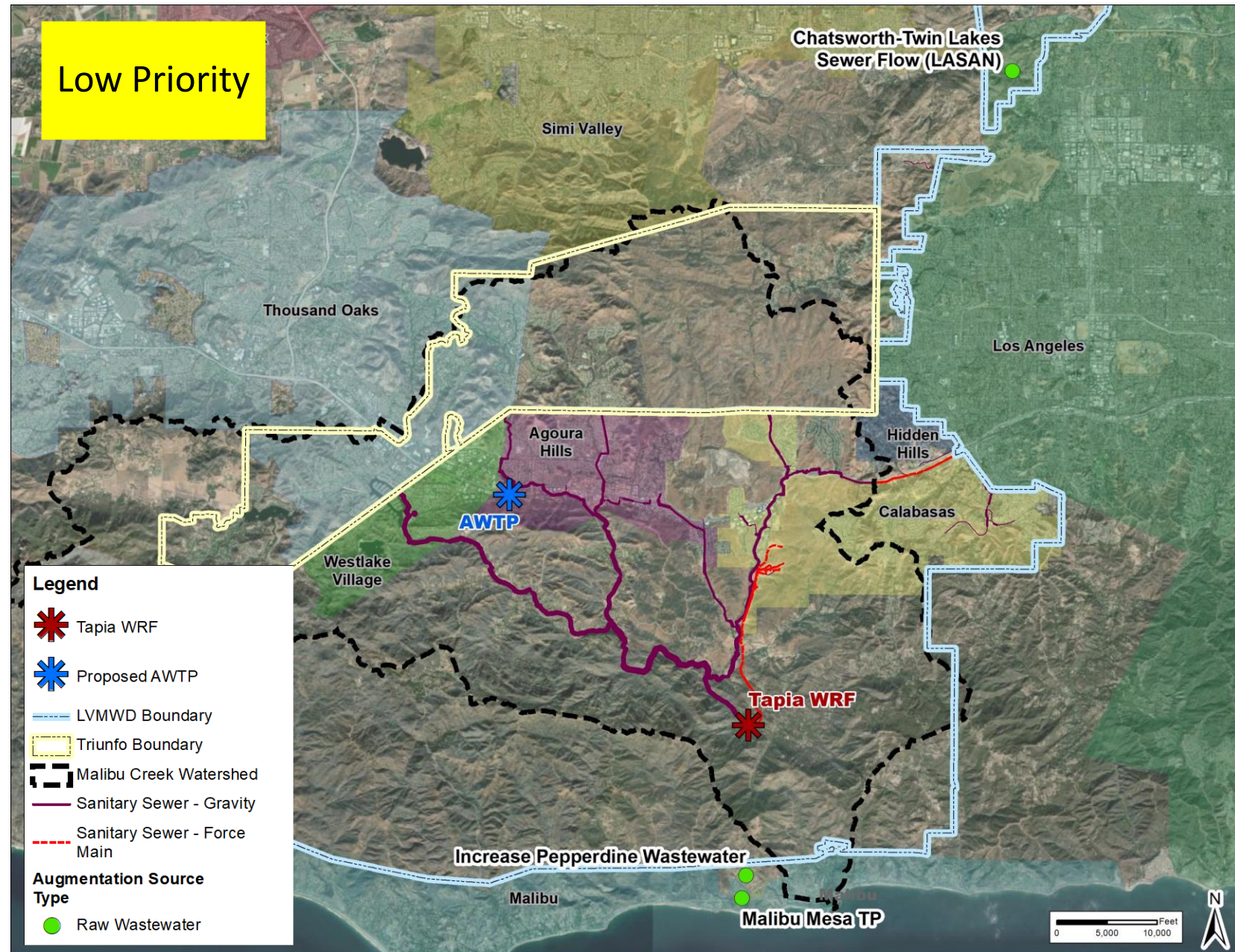
- Requires construction of new local sewers and possible extension of trunk sewers
- Connection to sewer will likely be voluntary with an uncertain implementation period
- Flow rate from this source within project timeline cannot be accurately estimated

Medium Priority



Raw Wastewater Sources

- RW-1: Increase in Pepperdine wastewater flows
 - Increased flows from campus expansion. Timeline unknown.
- RW-2: Chatsworth-Twin Lakes Sewer Flow to LASAN
 - Redirect flow to Tapia WRF that currently discharges to LASAN system
 - Requires coordination with LASAN
 - Requires significant new infrastructure
- RW-3: Swimming Pool Maintenance Flows
 - Discharge swimming pool dewatering to sanitary sewer system
 - Requires regulatory changes and relies on individual behavior
- RW-4: Malibu Mesa TP
 - Direct raw wastewater from Malibu Mesa TP to Tapia WRF for treatment
 - Requires new force main from Malibu to Tapia WRF – existing force main does not have the capacity



Recycled Water Conservation Sources

- RWD-1: LV Recycled Water Conservation Program

- LV plans to implement rate structure to encourage further conservation of recycled water
- Timeline of implementation is unknown
- Flow reduction cannot be accurately estimated at this time because it relies on behavior

High Priority

- RWD-2: Procure Malibu Excess Tertiary Flow for Pepperdine

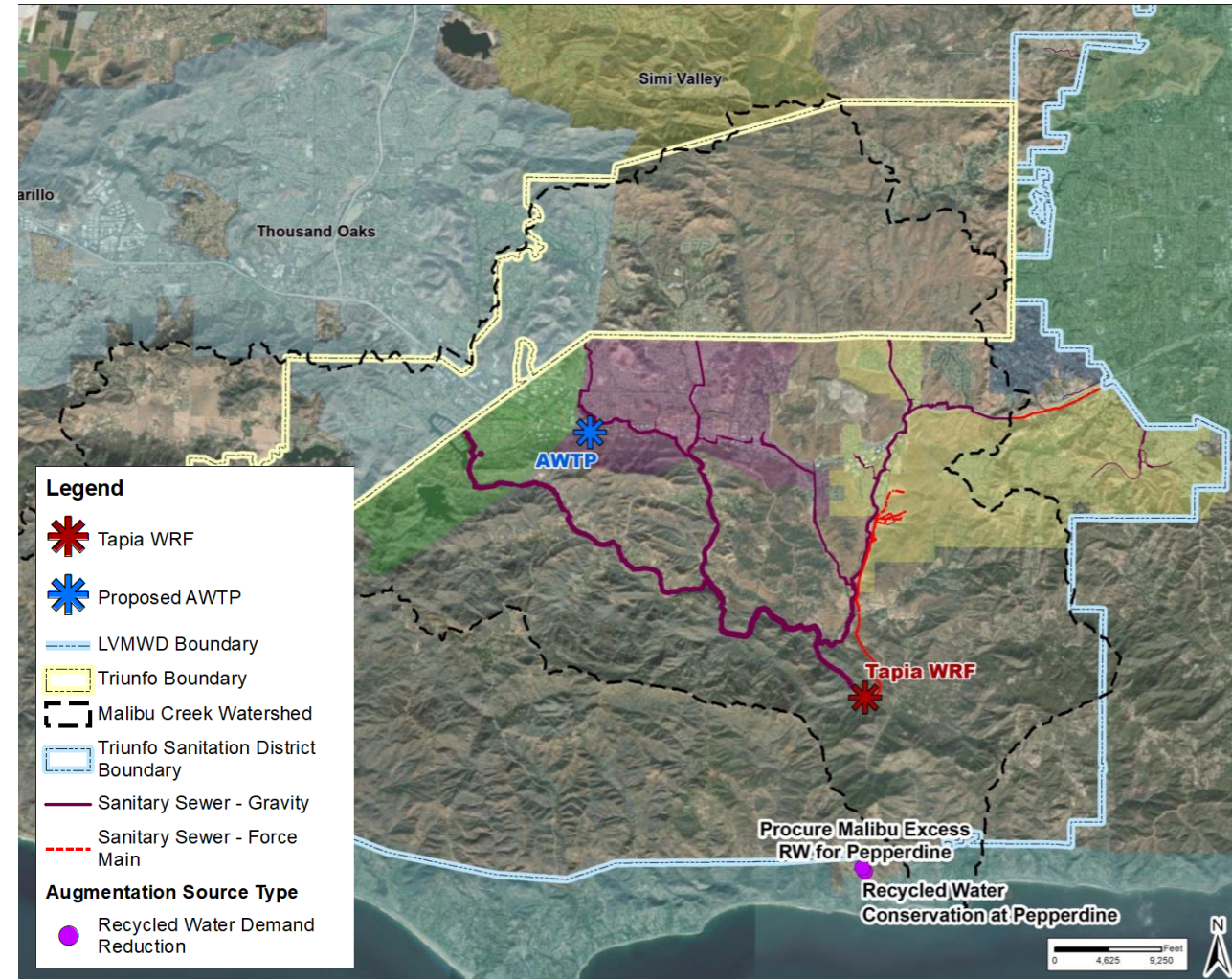
- Purchase of excess tertiary flow from Civic Center Treatment Plant to meet Pepperdine's full recycled water demand, freeing up flow for AWTP
- Likely will encounter institutional barriers
- May also require significant new infrastructure

Medium Priority

- RWD-3: Recycled Water Conservation at Pepperdine

- Encourage further conservation of recycled water at Pepperdine

Low Priority



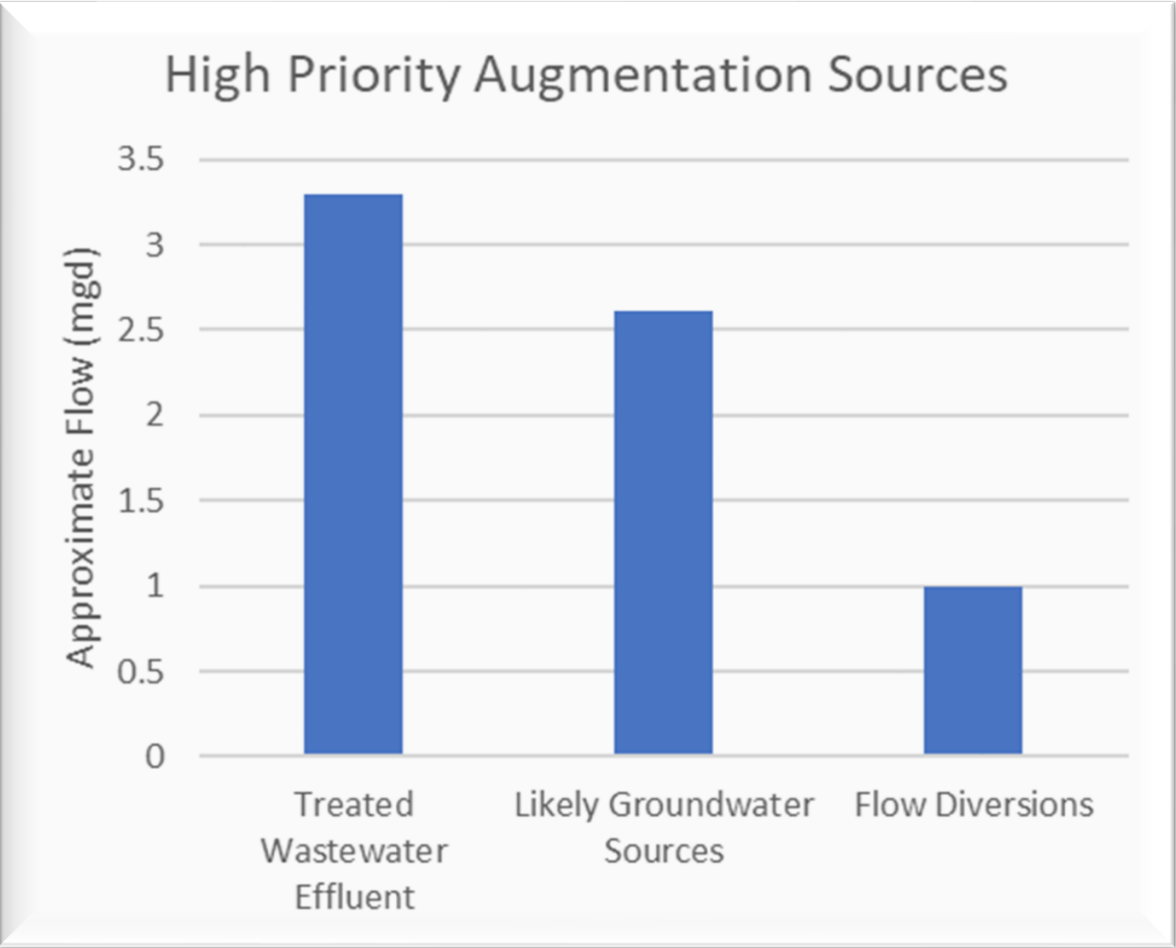
Draft Initial Screening Results

High Priority Sources	
GW-1	Westlake Wells
GW-2	Los Robles Golf Course Wells (TO)
GW-3	Library Well (TO)
GW-TO	Additional Thousand Oaks (TO) Groundwater Wells
GW-7	Tapia WRF Balancing Pond Well
WE-1	Hill Canyon TP
FD-1	Medea Creek
FD-2	Triunfo Creek
FD-3	Las Virgenes Creek
FD-4	Agoura Hills Urban Runoff
FD-5	Calabasas Urban Runoff
FD-6	Oak Park Urban Runoff
FD-7	Hidden Hills Runoff
FD-8	Unincorporated LA County Runoff
FD-9	Thousand Oaks Urban Runoff
FD-10	Westlake Urban Runoff Diversion
RWD-1	Recycle Water Conservation Programs
PO-1	Potable Water Supplementation

Medium Priority Sources	
GW-4	Four Seasons Well
GW-5	Hilton Foundation Dole Building Wells
GW-6	LA County Fire Department Well (Fire Station #89)
GW-10	Old Hilton Foundation Wells
GW-11	Agoura Hills Perched Groundwater
GW-12	Hidden Hills Wells
GW-13	King Gillette Ranch Wells
SS-1	Malibu Lake Septic
SS-2	Chesebro & Old Agoura Septic
SS-3	Monte Nido Septic
RWD-2	Procure Malibu Excess Tertiary Flow for Pepperdine

Low Priority Sources	
GW-8	Rancho Las Virgenes Farm Wells
GW-9	Westlake Seepage
RW-1	Increase Pepperdine Wastewater
RW-2	Chatsworth-Twin Lakes Sewer Flow (LASAN)
RW-3	Swimming Pool Maintenance Flows
RW-4	Malibu Mesa TP
RWD-3	Recycled Water Conservation at Pepperdine

Draft Initial Screening Results



Approximately 7 MGD in total available from the most likely High Priority sources.



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Next Steps

Target Milestones

- Update Digital Watershed with Water Augmentation Sources (March)
- Perform Alternatives Analysis and Identify Cost-effective Augmentation Solutions (April)
- Rank Solutions and Identify Recommendation (April)
- Draft Documentation (May)



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Thank You