City of Ventura **July 18, 2012**

Santa Clara River Estuary Special Studies

Draft Alternatives Development

Potential Alternatives		**Attributes**							
Description	**Additional Treatment**	**Better Quality in Estuary**	**Lower Volume in Estuary**	**Habitat Creation**	**Financial Return (e.g. Sale of RW)**	**Water Supply**	**Regional**	**Funding Potential**	**Technically Issues/ Feasible**
Wetlands									
Wetlands on TNC Property	N	Y	N	Y	N	N	N	Y	Floodplain
Wetlands at Wildlife Ponds	N	Y	N	N	N	N		Y	Limited Space, convert habitat
Wetlands on City Property	N	Y	N	Y	N	N	N	Y	Limited Space
Wetlands on Upland	N	Y	N	Y	N	N	N	Y	Land purchase No river access
Wetland with Perched Recharge									
East of 101	RO?	N	Y	Y	N	Y	Y	Y	Land availability Brine?
West of 101	N	N	N	Y	N	N	N	Y	Land availability
Wetlands for Brine treatment/disposal		N	N	Y	N	N	N	?	Regulations?
Reuse									
Expand Urban Reuse	N	N	2.2 mgd (1)(2)	N	Y	Y	N	Y	Extensive piping
Agricultural Reuse from VWRF – no blending	RO	N	4.6 mgd(1)	N	Y	N	Y	Y	Brine disposal
Agricultural Reuse from VWRF – with blending	N	N	4.6 mgd(1)(3)	N	Y	N	Y	Y	Lower WQ than currently use
Scalping Plant to North -Ag and Urban Reuse	New Plant, RO?	N	2.2 mgd(1)	N	Y	Y	Y	Y	Brine disposal
Scalping Plant to East /Saticoy – Ag and Urban Reuse and Recharge	New Plant, RO?	N	3.7 mgd(1)	N	Y	Y	Y	Y	Brine disposal
Direct Potable Reuse	RO	N	Y	N	Y	Y	N	Y	Regulations Brine disposal
Recharge									
Recharge Mound Groundwater Basin	RO	N	Y	N	?	Y	Y	Y	Injection, Brine
Recharge Oxnard Forebay Basin	N	N	Y	N	?	?	Y	Y	Limited locations
Recharge with United	RO?	N	Y	N	?	?	Y	Y	Brine disposal
Recharge at United with blended waters from Oxnard Plain	N	N	Y	N	?	?	Y	Y	Extensive pumping/piping
Oxnard WWTP	N	N	13 mgd	N	?	?	Y	Y	Pumping/piping

1. Approximate maximum month demands
2. Does not include Oxnard Golf Course
3. Demand will depend on an acceptable blended water quality

WETLANDS ALTERNATIVES

Wetlands on TNC Property

Description:

- VWRF effluent routed to treatment wetlands on one of the TNC parcels located east of the golf course. This alternative would potentially provide effluent with reduced nutrient concentrations. The wetlands would discharge to the Santa Clara River.

Challenges:

- TNC has plans to purchase the 5 parcels east of the golf course.
- These parcels are in the 100 year floodplain and TNC plans to remove levees and let the parcels flood.
- Constructing wetlands in the floodplain would not be a technically sound decision for the City.

Discussion/Comments:

Wetlands at Wildlife Ponds

Description:

- VWRF effluent routed to treatment wetlands located on the existing site of the Wildlife Ponds. In this scenario, the Wildlife Ponds would be reconfigured to enhance treatment. This alternative would potentially provide effluent with reduced nutrient concentrations. The Wetlands would discharge to the Estuary via the existing discharge channel.

Challenges:

- Limited area available.
- Lower treatment ability due to short detention time (limited area)
- Loss of open water habitat in existing wildlife ponds due to vegetation required for treatment.

Discussion/Comments:

Wetlands on Other City Property

Description:

- VWRF effluent routed to treatment wetlands on existing City property near VWRF. This alternative would potentially provide effluent with reduced nutrient concentrations. The wetlands would discharge to the Santa Clara River.

Challenges:

- Adequate area for a treatment wetlands
- Potentially limited treatment ability due to short detention time

Discussion/Comments:

Wetlands on Uplands

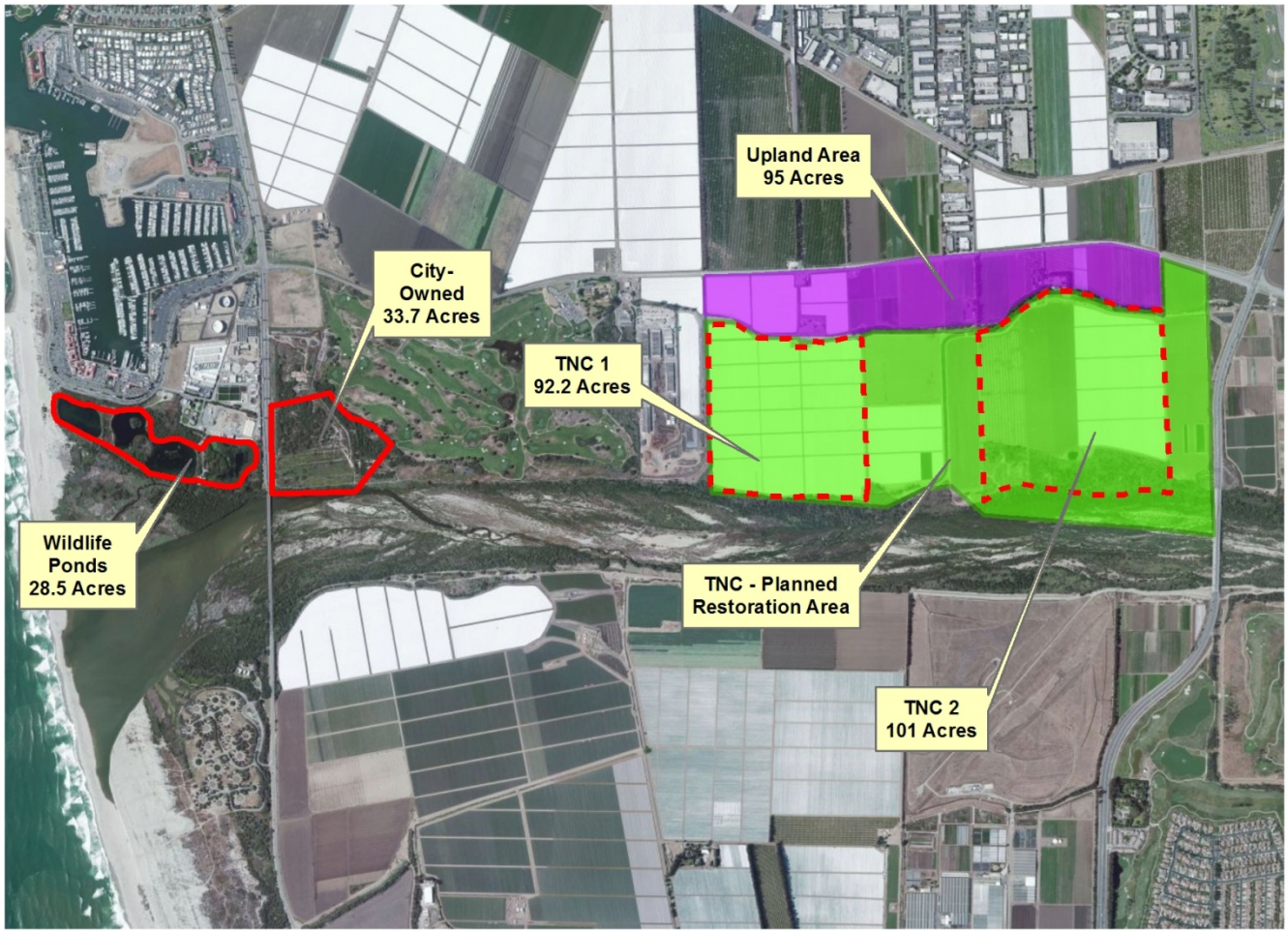
Description:

- VWRF effluent routed to treatment wetlands on upland area on the north side of the parcels to be purchased by TNC. The wetlands would likely be constructed to discharge to the lower elevation TNC parcels via overland flow, with ultimate discharge to the Santa Clara River.

Challenges:

- Adequate area for a treatment wetlands
- Land acquisition (>$80k/acre)
- Coordination with TNC on overflow onto TNC land or outfall to the river
- Availability of land for purchase

Discussion/Comments:


Upland Area
95 Acres
City-
Owned
33.7 Acres
TNC 1
92.2 Acres
Wildlife
Ponds
28.5 Acres
TNC - Planned
Restoration Area
TNC 2
101 Acres

Wetlands with Perched Recharge to River – East of 101

Description:

- VWRF effluent routed to treatment wetlands located east of 101 along the river. The wetlands will likely recharge the Mound Basin.

Challenges:

- Land acquisition given TNC plans for purchases along the river corridor
- This area readily percolates. Potential issues with antidegradation.
- Availability of land for purchase.

Discussion/Comments:

Wetlands with Perched Recharge to River – West of 101

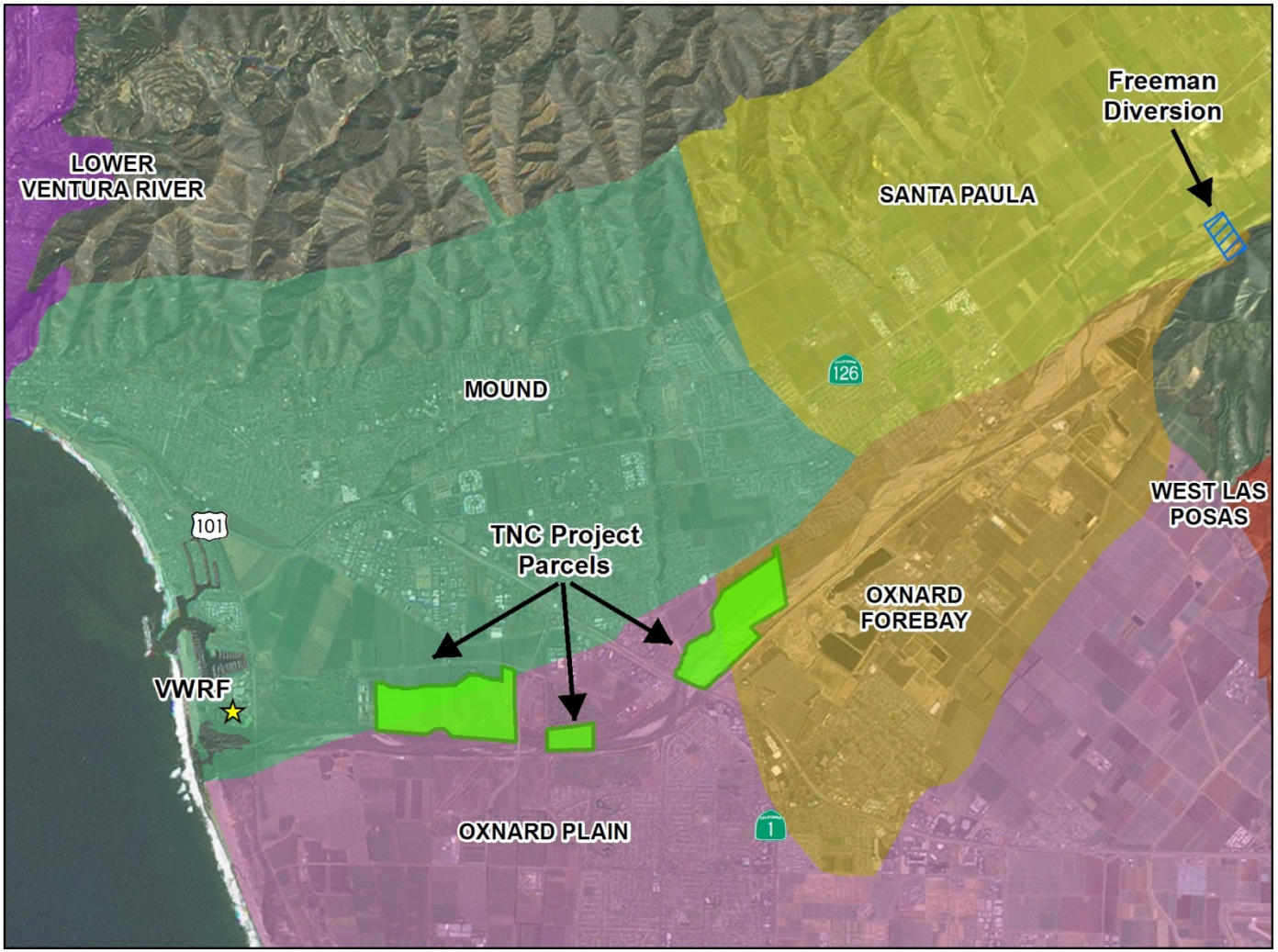
Description:

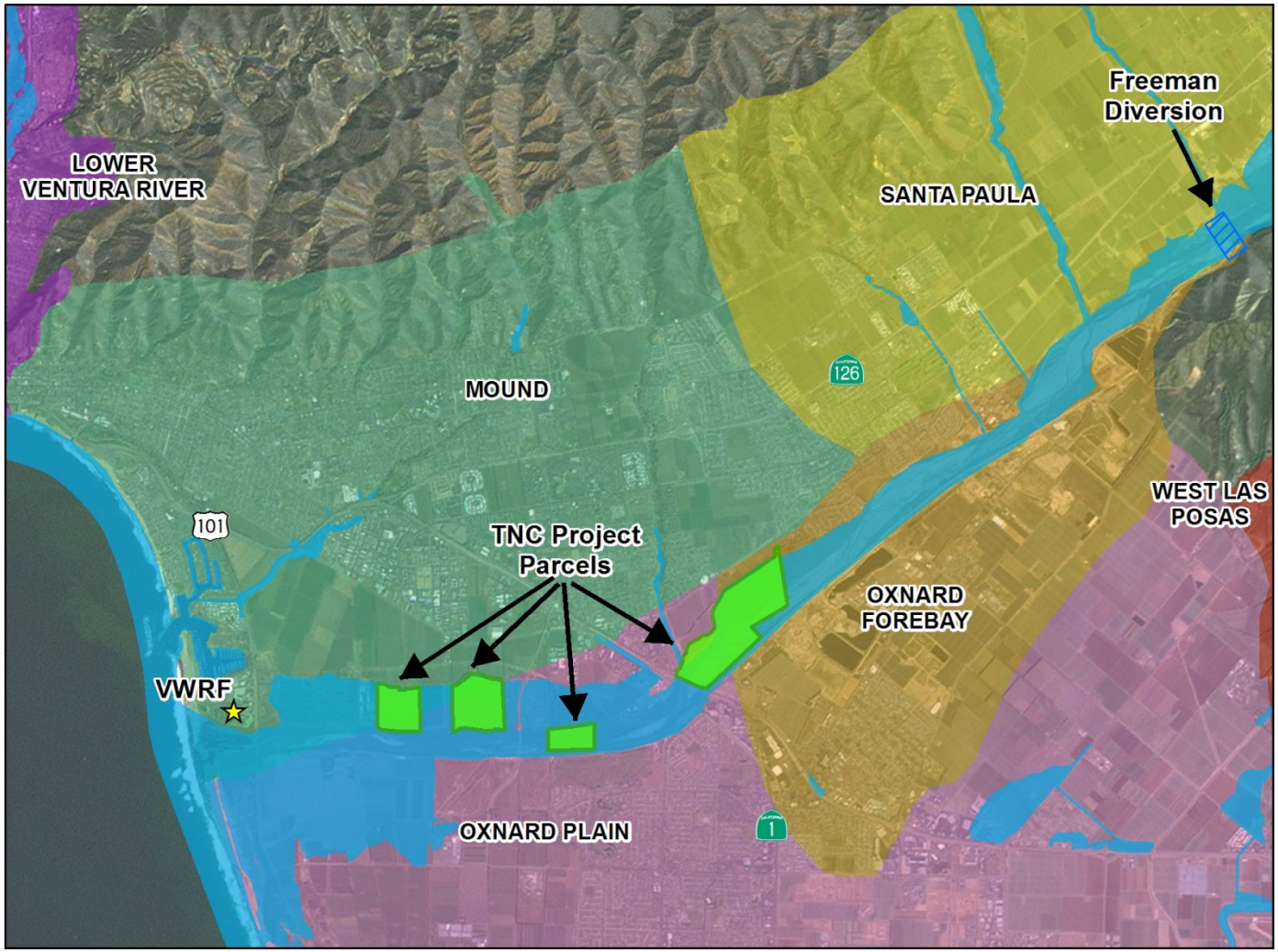
- VWRF effluent routed to treatment wetlands located west of 101 along the river. Depending on the exact location, the wetlands will contribute to shallow subsurface recharge and in-stream flow into the Santa Clara River.

Challenges:

- Land acquisition given TNC plans for purchases along the river corridor
- Availability of land for purchase
- Characterizing subsurface hydrogeology and assessing feasibility of shallow subsurface recharge and recharge to the river.
- Issues with antidegradation of shallow groundwater.

Discussion/Comments:


Freeman
Diversion
LOWER
VENTURA RIVER
SANTA PAULA
126
MOUND
WEST LAS
POSAS
101
TNC Project
Parcels
OXNARD
FOREBAY
VWRF
OXNARD PLAIN
1


Freeman
Diversion
LOWER
VENTURA RIVER
SANTA PAULA
126
MOUND
WEST LAS
POSAS
101
TNC Project
Parcels
OXNARD
FOREBAY
VWRF
OXNARD PLAIN
1

Brine Wetlands

Description:

- Brine generated from RO (various alternatives) would be routed to wetlands for treatment and discharge.

Challenges:

- Location of brine wetlands. City owned parcels near the VWRF or other sites?
- Regulatory and public perception issues with discharge from wetlands to estuary

Discussion/Comments:

REUSE

Expand Urban Reuse

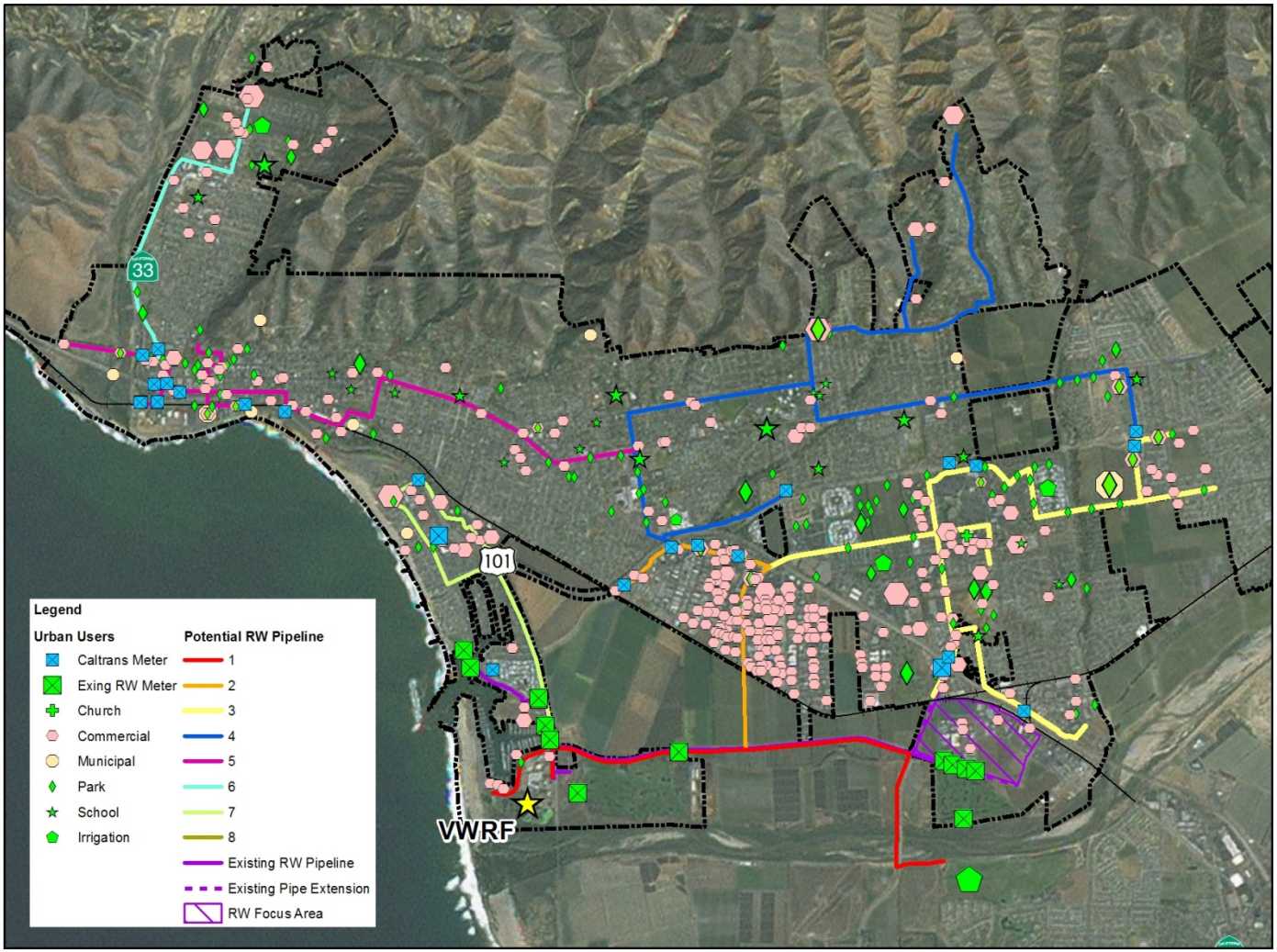
Description:

- VWRF effluent would be routed to various reuse customers in the City (primarily for irrigation purposes)

Challenges:

- Average and max month demands are approximately 1.3 mgd and 2.2 mgd, respectively.
- The total potential demand is low and would require an extensive pipe network
- There are few “significant” individual users

Discussion/Comments:


33
101
VWRF
Legend
Urban Users
Caltrans Meter
Exing RW Meter
Church
Commercial
Municipal
Park
School
Irrigation
Potential RW Pipeline
1
2
3
4
5
6
7
8
Existing RW Pipeline
Existing Pipe Extension
RW Focus Area

Agricultural Reuse from VWRF – No blending

Description:

- VWRF effluent would be routed to growers in the vicinity of the VWRF. Effluent would be treated for TDS and chloride removal (e.g. RO).

Challenges:

- Acceptance and agreement with growers to take recycled water
- Developing infrastructure that is simple and reliable
- Agreement on crop specific water quality requirements
- Treatment for TDS and chloride
- Brine treatment/disposal
- Demand for agricultural reuse ranges from an average of 2.5 mgd to 2.8 mgd, depending on areas served. Maximum monthly demands range from 4.1 to 4.6 mgd, depending on areas served.

Discussion/Comments:

Agricultural Reuse from VWRF – With blending

Description:

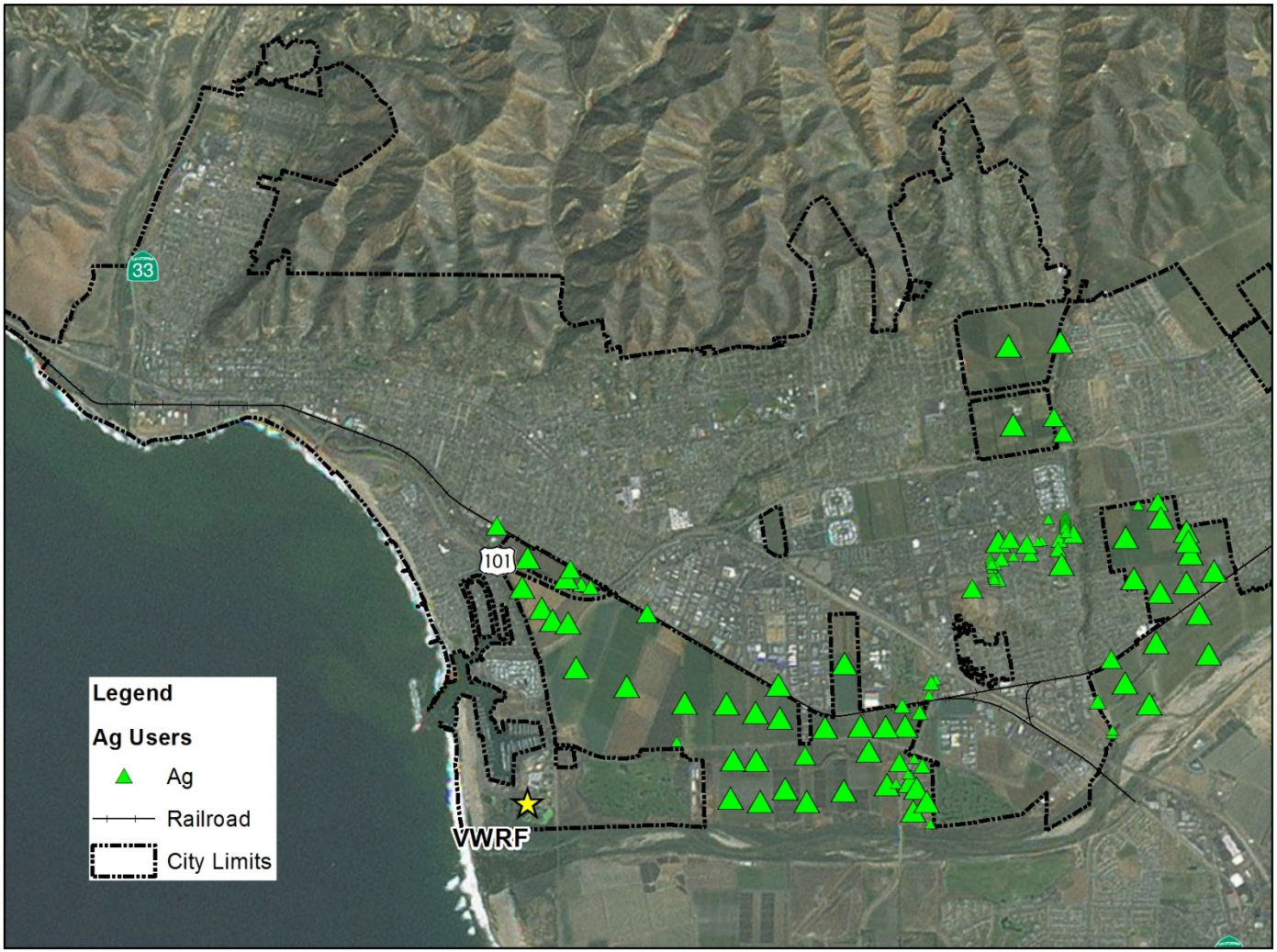
- VWRF effluent would be routed to growers in the vicinity of the VWRF. Wastewater effluent would be blended with groundwater supplies for irrigation

Challenges:

- Acceptance and agreement with growers to take water that is a blend of groundwater and effluent
- Acceptance of a lower quality groundwater (i.e. water quality that meets crop specific limits but is of lesser quality than is currently used).
- Developing infrastructure that is simple and reliable
- Issues with blending waters due to differences in chemical characteristics
- Water quality requirements:

Constituent	VWRF Effluent, mg/l	Agricultural Water Quality Target, mg/l
TDS	1,498	1,000
Sodium	258	100
Chloride	290	100

Discussion/Comments:


33
101
VWRF
Legend
Ag Users
Ag
Railroad
City Limits

Scalping Plant to North with Ag and Urban Reuse

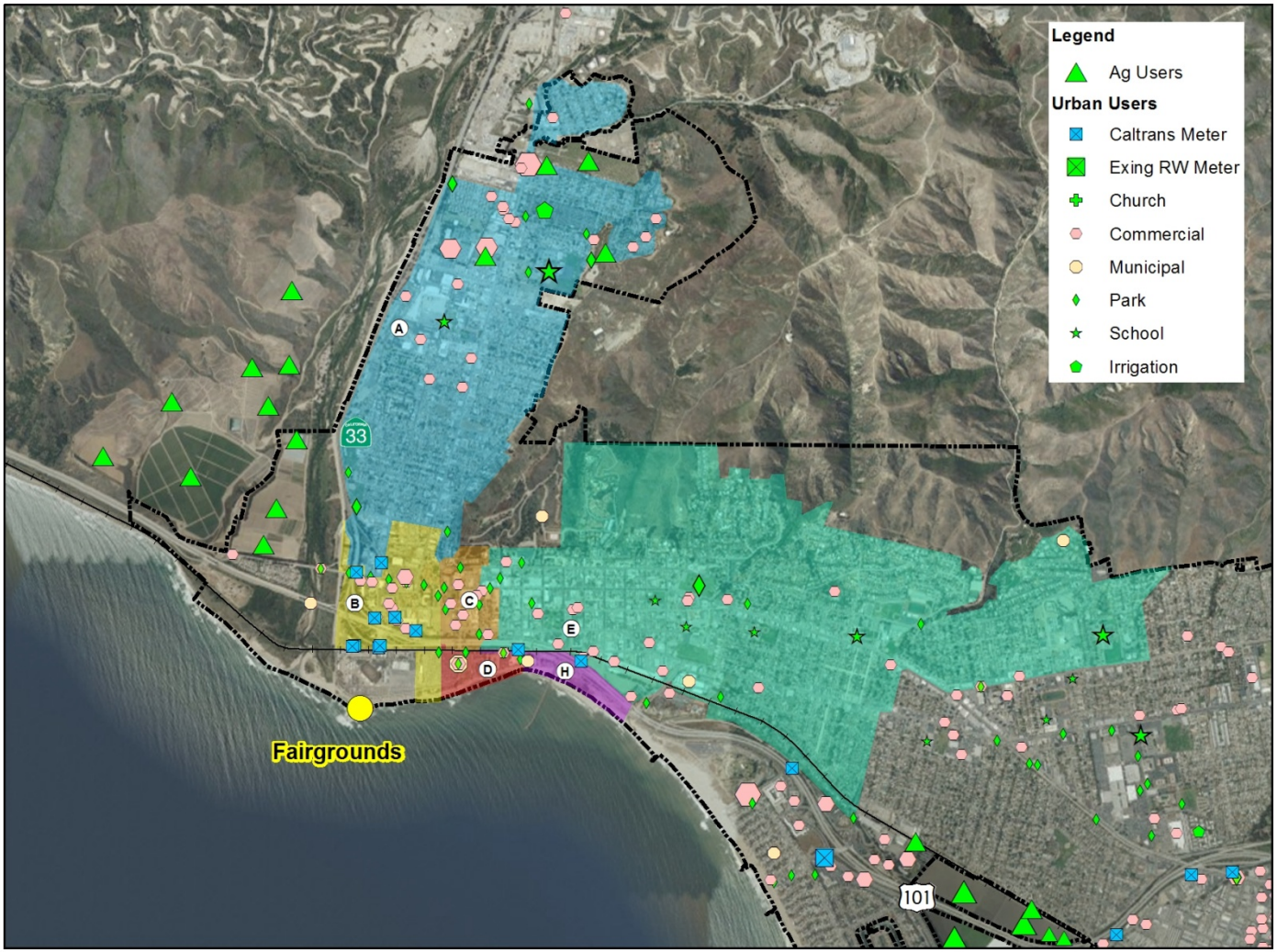
Description:

- Raw wastewater would be diverted from the collection system for treatment and reuse. This diversion would occur on the north side of the city.

Challenges:

- Construction and operation of a remote treatment facility
- Flow volume available for diversion. Seaside pump station flows ~2.6 mgd.
- Water quality requirements and the need for TDS/chloride removal if use for agricultural irrigation
- Urban irrigation market in the vicinity of the scalping plant. Average demands range from 0.23 mgd to 0.28 mgd depending on extent of piping network. Max month demands range from 0.33 mgd to 0.39 mgd depending on extent of piping network.
- Agricultural irrigation market in the vicinity of the scalping plant. Average and max month demands are approximately 1.1 mgd and 1.8 mgd, respectively.

Discussion/Comments:


Legend
Ag Users
Urban Users
Caltrans Meter
Exing RW Meter
Church
Commercial
Municipal
Park
School
Irrigation
A
B
C
D
E
H
33
101
Fairgrounds

Scalping Plant to the East with Ag and Urban Reuse

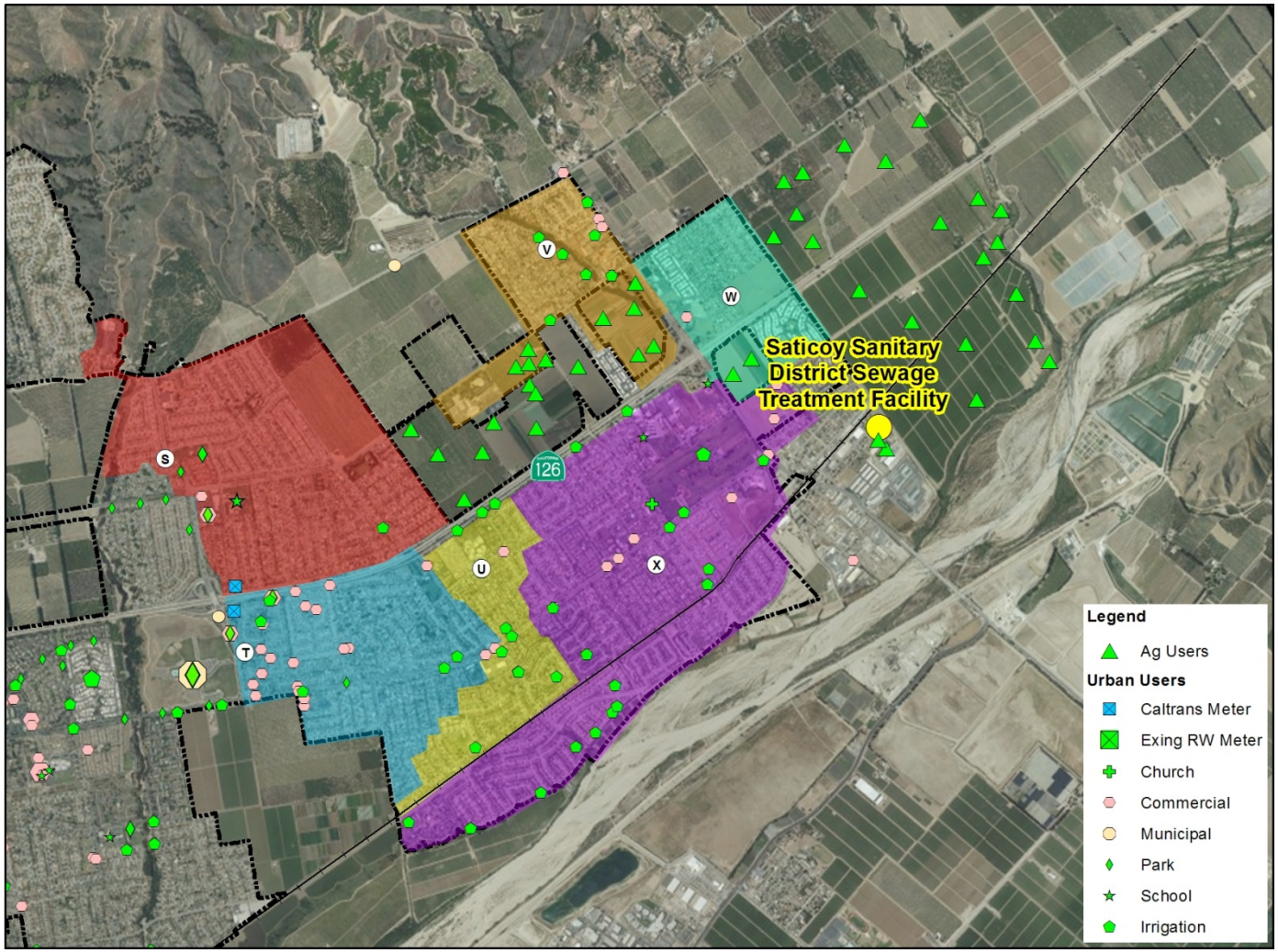
Description:

- Raw wastewater would be diverted from the collection system for treatment and reuse. This diversion would occur on the east side of the city.

Challenges:

- Construction and operation of a remote treatment facility
- Flow volume available for diversion. Flows depend on location and range from ~0.3 mgd to ~1.4 mgd, plus potential flows, ~0.5 mgd, from Saticoy Sanitary District
- Water quality requirements and the need for TDS/chloride removal if use for agricultural irrigation
- Urban irrigation market in the vicinity of the scalping plant. Average and max month demands are approximately 0.24 mgd and 0.44 mgd, respectively.
- Agricultural irrigation market in the vicinity of the scalping plant. Average and max month demands are approximately 2.0 mgd and 3.3 mgd, respectively.
- Issues with diverting flow from the Saticoy system (volume, timing, political/institutional issues)

Discussion/Comments:


Saticoy Sanitary
District Sewage
Treatment Facility
126
S
T
U
V
W
X
Legend
Ag Users
Urban Users
Caltrans Meter
Exing RW Meter
Church
Commercial
Municipal
Park
School
Irrigation

Direct Potable Reuse

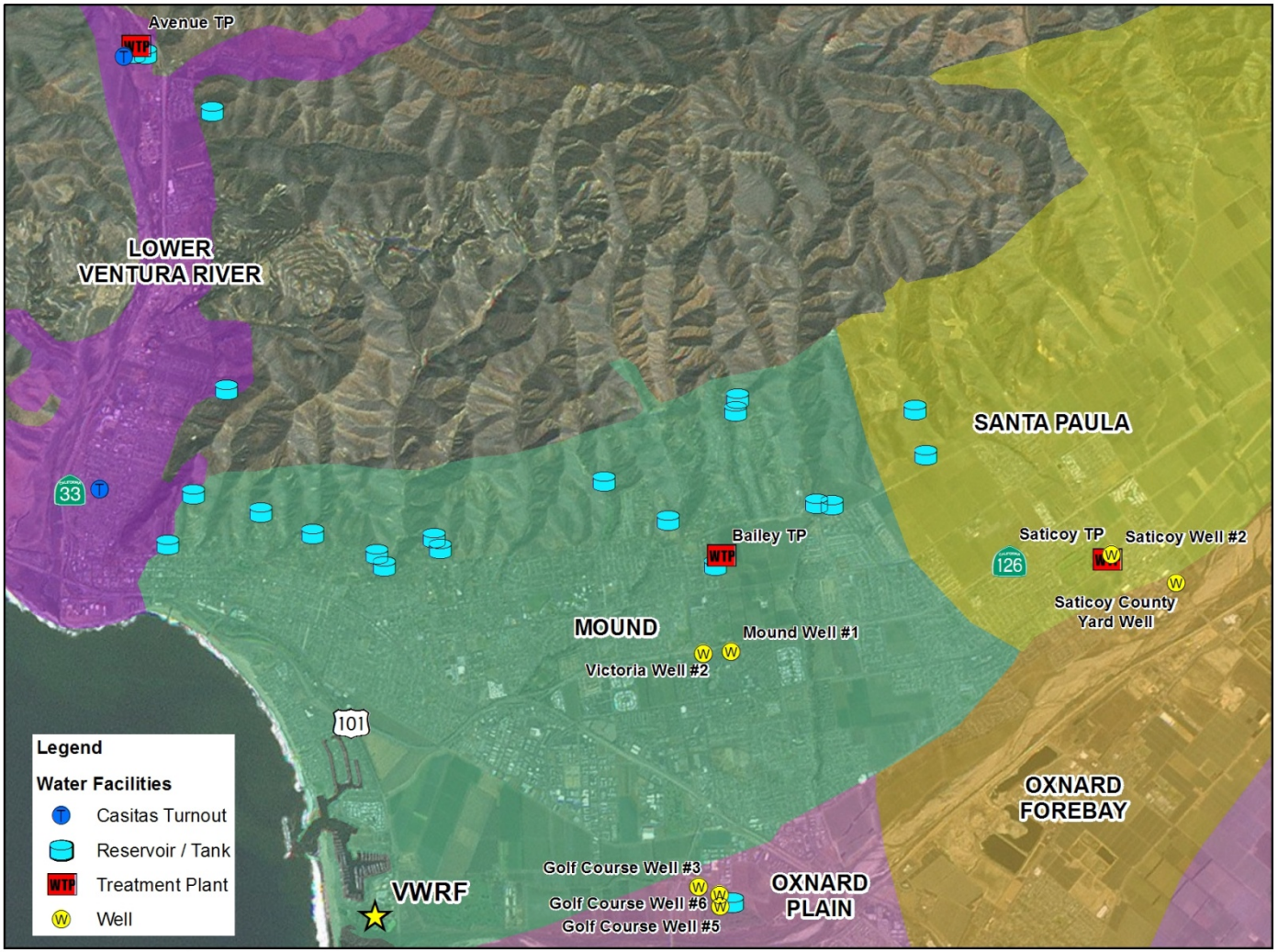
Description:

- VWRF effluent would be treated to a higher level (RO) then conveyed to drinking water treatment facilities where additional advanced treatment and blending with other water supplies would occur.

Challenges:

- Would require advanced treatment on effluent including for salt removal (RO)
- Would require advanced treatment at water treatment facilities including advanced oxidation
- Brine Treatment/Disposal
- Regulatory uncertainty and treatment requirements

Discussion/Comments:


Avenue TP
LOWER
VENTURA RIVER
33
SANTA PAULA
Bailey TP
Saticoy TP
Saticoy Well #2
126
Saticoy County
Yard Well
MOUND
Mound Well #1
Victoria Well #2
101
OXNARD
FOREBAY
Golf Course Well #3
Golf Course Well #6
Golf Course Well #5
VWRF
OXNARD
PLAIN
Legend
Water Facilities
Casitas Turnout
Reservoir / Tank
Treatment Plant
Well

RECHARGE

Recharge Mound Groundwater Basin (IPR)

Description:

- VWRF effluent would be routed to injection wells for recharge to the Mound Basin. This alternative would reduce the discharge, augment the City's water supply, and potentially improve groundwater quality (salts and hardness).

Challenges:

- Injection wells are necessary due to limited percolation capacity in Mound Basin
- Would require advanced treatment for salt removal (RO) to for the purposes of IPR and antidegradation
- Brine Treatment/Disposal
- Potential injection well sites (parcels available, groundwater aquifer capacity, proximity/travel time to wells)

Discussion/Comments:

Recharge Oxnard Forebay Basin (IPR)

Description:

- VWRF effluent would be routed to a location to recharge the Oxnard Forebay via spreading basins. This alternative would reduce the discharge and augment the City's water supply.

Challenges:

- Determining the best approach to recharge and recharge sites
- Capacity of forebay
- Target water quality
- Coordination/involvement with UWCD
- Antidegradation issues

Discussion/Comments:

Recharge at UWCD Facilities (IPR)

Description:

- VWRF effluent would be routed to UWCD facilities (spreading grounds) for groundwater recharge

Challenges:

- Target water quality
- Likely additional treatment to remove TDS and chloride
- Available capacity on a monthly basis.
- Coordination/involvement with UWCD
- Brine Treatment/Disposal

Discussion/Comments:

Recharge at United with Blended Water from Oxnard Plain (IPR)

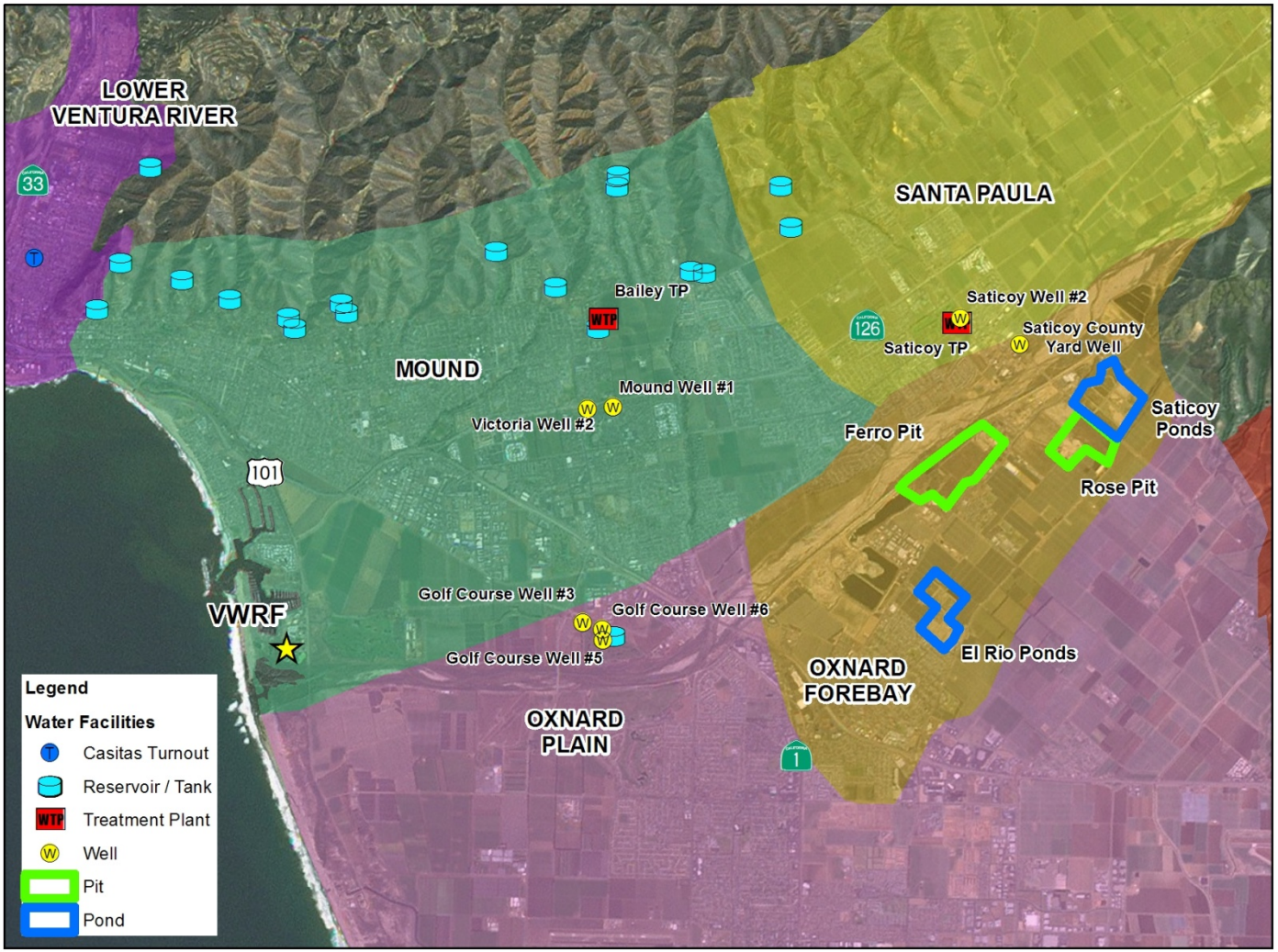
Description:

- VWRF effluent would be blended with groundwater extracted from the Oxnard Plain in order to meet quality requirements for recharge at UWCD facilities without additional RO treatment of the VWRF effluent.

Challenges:

- Coordination/involvement with UWCD
- Extensive pipeline and pumping from both the VWRF and extraction sites in the Oxnard Plain to UWCD facilities.
- Issues with blending wastewater and groundwater
- Quality and quantity of water available for extraction on Oxnard Plain

Discussion/Comments:


LOWER
VENTURA RIVER
33
SANTA PAULA
Bailey TP
WTP
Saticoy Well #2
126
Saticoy TP
Saticoy County
Yard Well
MOUND
Mound Well #1
Victoria Well #2
Saticoy
Ponds
Ferro Pit
101
Rose Pit
VWRF
Golf Course Well #3
Golf Course Well #6
Golf Course Well #5
El Rio Ponds
OXNARD
FOREBAY
OXNARD
PLAIN
1
Legend
Water Facilities
Casitas Turnout
Reservoir / Tank
Treatment Plant
Well
Pit
Pond

Oxnard WWTP

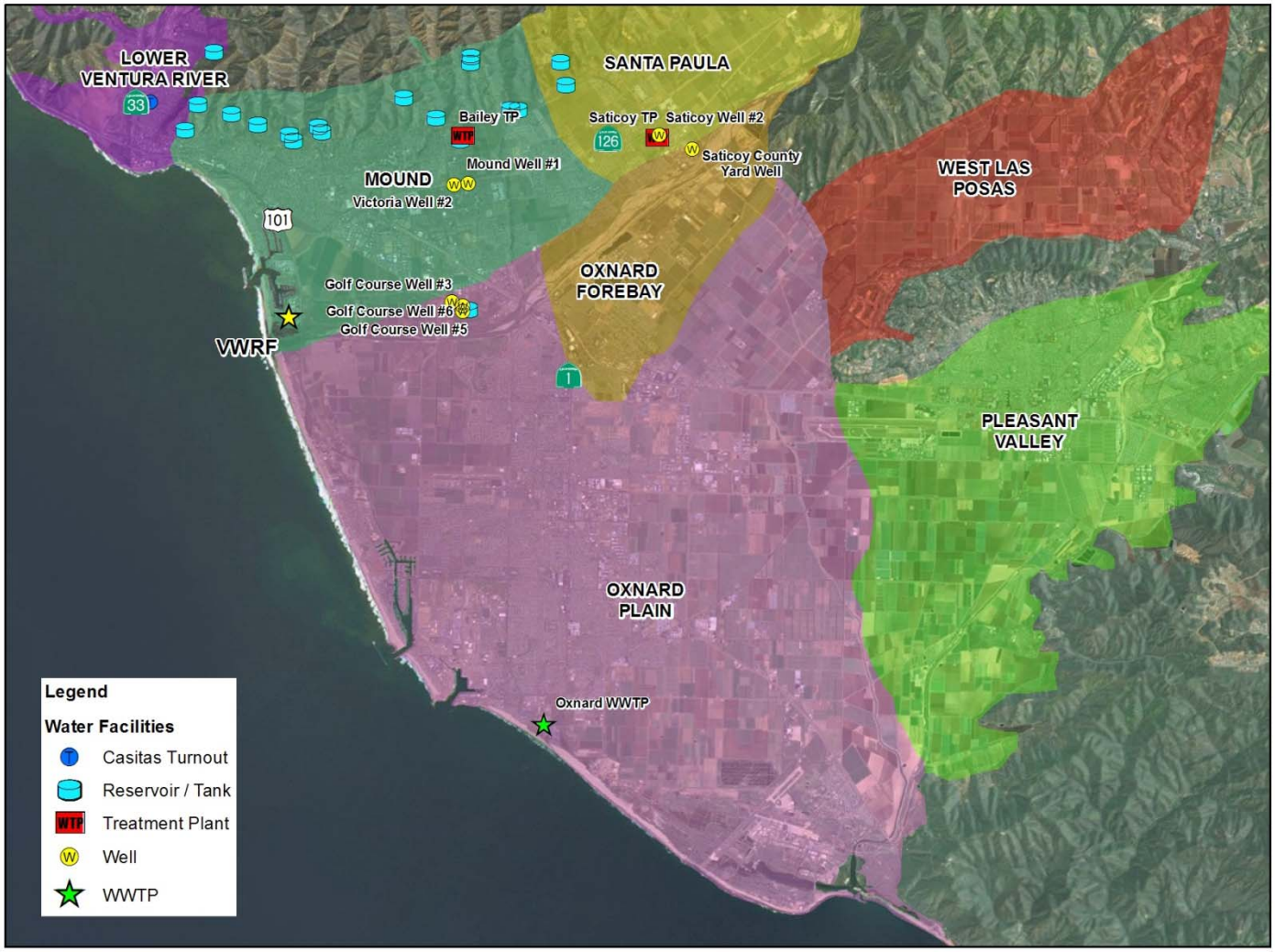
Description:

- VWRF effluent would be routed to Oxnard for advanced treatment and subsequent reuse and recharge

Challenges:

- Coordination/involvement with Oxnard and possibly UWCD
- Extensive pipeline to treatment plant
- Available capacity for VWRF effluent
- Costs for buying into Oxnard facilities

Discussion/Comments:


LOWER VENTURA RIVER
33
SANTA PAULA
Bailey TP
WTP
Saticoy TP
Saticoy Well #2
126
Saticoy County Yard Well
Mound Well #1
MOUND
Victoria Well #2
WEST LAS POSAS
101
OXNARD FOREBAY
Golf Course Well #3
Golf Course Well #6
Golf Course Well #5
VWRF
1
PLEASANT VALLEY
OXNARD PLAIN
Oxnard WWTP
Legend
Water Facilities
Casitas Turnout
Reservoir / Tank
Treatment Plant
Well
WWTP