City of Santa Cruz Water Commission

Workshop: Aquifer Storage and Recovery

November 7, 2016

Agenda

- WSAC: Agreements and Recommendations (includes ASR)
- ASR Update for City of Santa Cruz
- Legal Framework
- First hand experience

Agreements

WSAC members agreed on the following

- Demand
- Fish Flows
- Climate Change
- Demand Management
- Alternatives
- Problem statement
- The Plan: What, why, when, how.

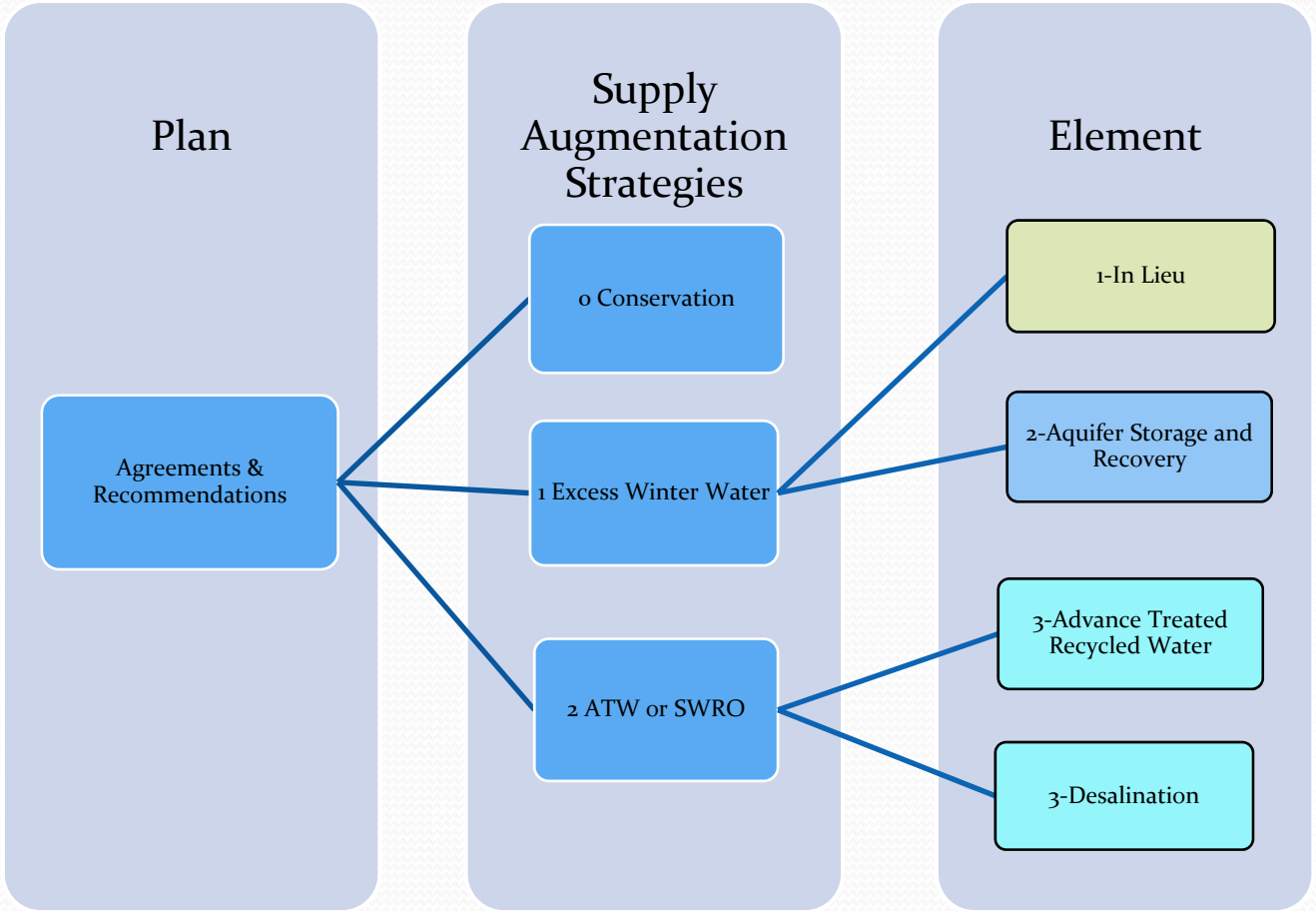
WSAC Recommendations

The Plan

- A **specific goal for Yield**, 1.2bgy worst year peak season shortage ("why")
- A **Timeframe, end of 2025** ("when")
- **Supply Augmentation Strategies** ("what")
- **Adaptive Pathway/Change Management** ("how")
  - Tools to implement recommendations and manage change

Supply Augmentation Strategy

The What



Recommendations

Still The What

- **Strategy 0:** Continued and increased conservation with a goal of achieving an additional 200 to 250 million gallons of demand reduction by 2035 by expanding water conservation programs;
- **Strategy 1/Element 1:** Passive recharge of regional aquifers by working to develop agreements for delivering surface water as an in lieu supply to the Soquel Creek Water District and/or the Scotts Valley Water Districts so they can rest their wells, help the aquifers recover, and effectively store water for use by SCWD in drought years;
- **Strategy 1/Element 2:** Active recharge of regional aquifers by using existing infrastructure (wells, pipelines, and treatment capacity) and potential new infrastructure (wells, pipelines and treatment capacity) in the regionally shared Purisima aquifer in the Soquel-Aptos basin and/or in the Santa Margarita/Lompico/Butano aquifers in the Scotts Valley area to store water that can be available for use by Santa Cruz in drought years;
- **Strategy 2/Elements 3 & 4:** A potable water supply using advanced treated recycled water as its source, as a supplemental or replacement supply in the event the groundwater storage strategies described above prove insufficient to meet the Plan's goals of cost effectiveness, timeliness or yield. In the event advanced treated recycled water does not meet the needs, desalination would then become Element 3.

Excess Winter Water: Strategy 1/Elements 1 and 2

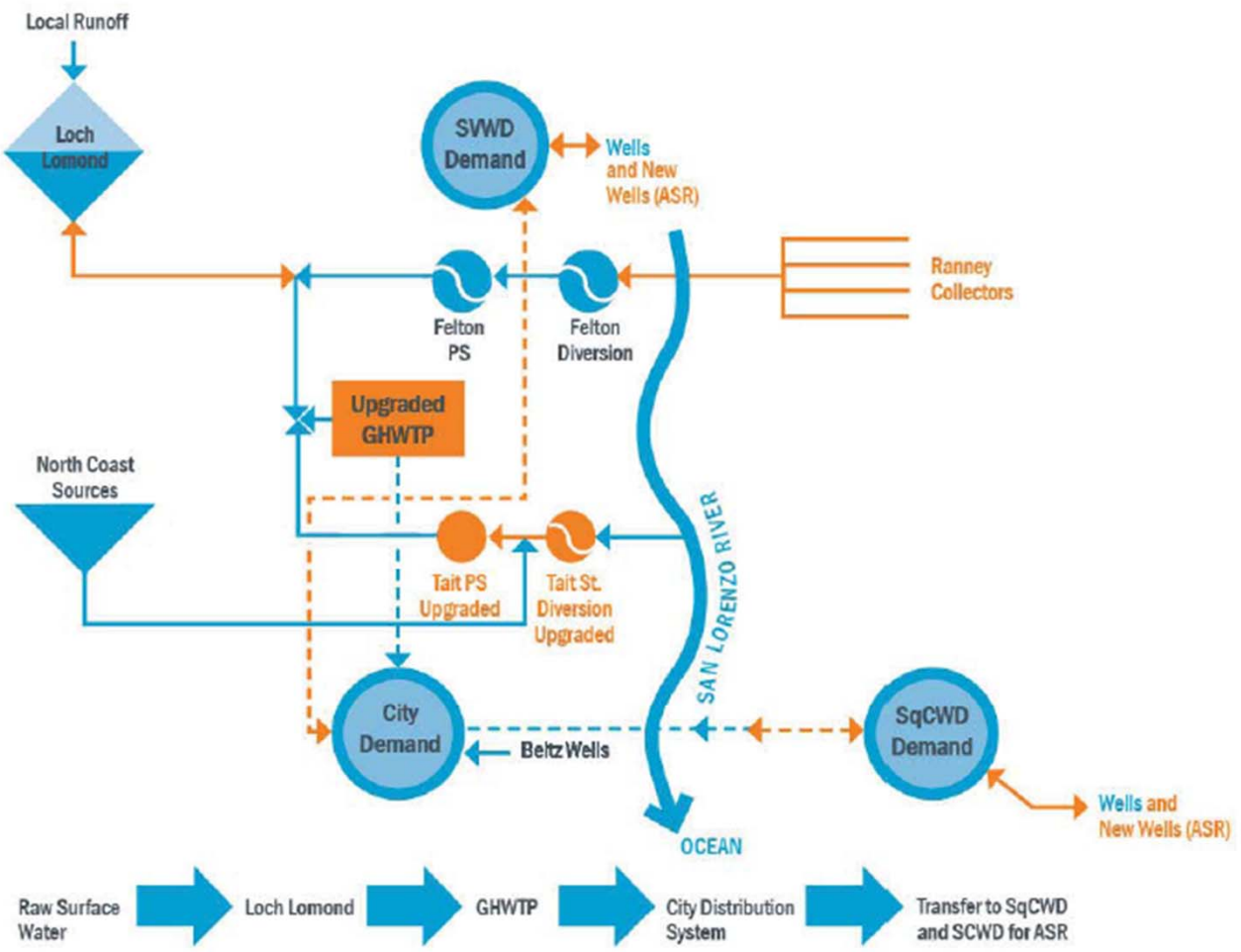


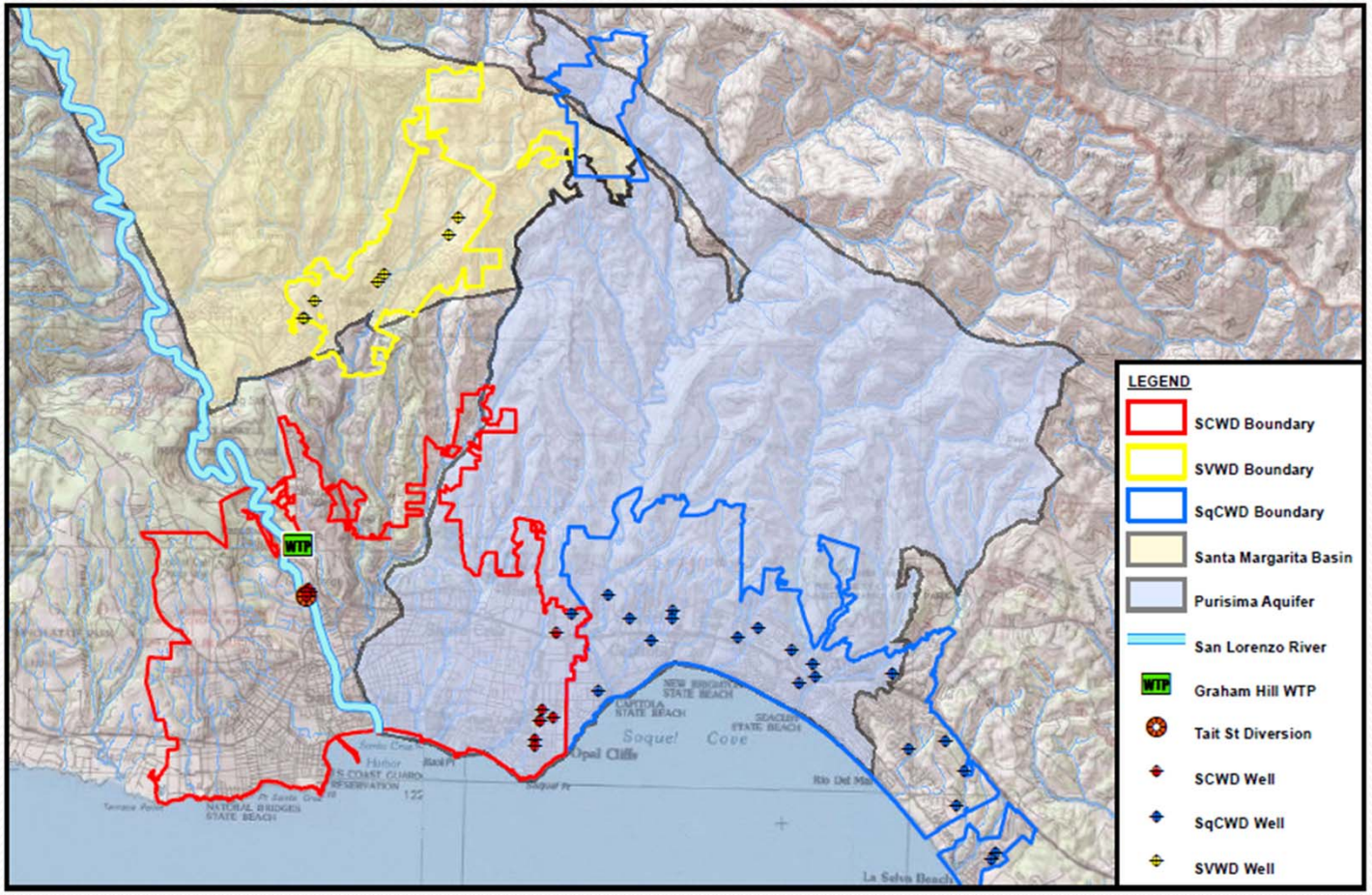
Figure A8-3. Illustration of the Conceptual Approach for Element 2, ASR.

WSAC Strategy 1, Elements 1 & 2

(source WSAC final report, App 8)

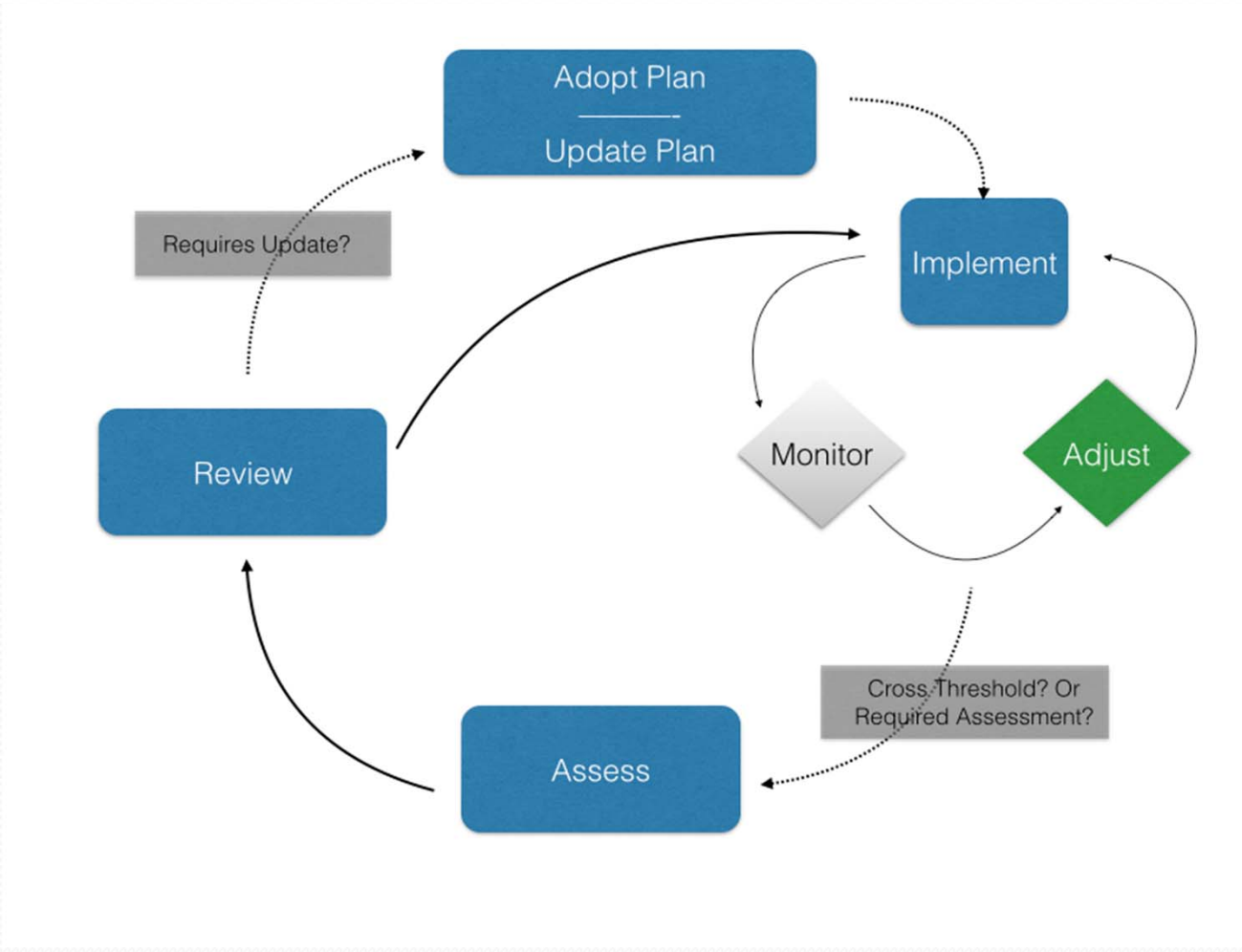
Element Number/Type	Capital Cost Components	Basis for Assumptions
1 – In lieu	Existing Infrastructure Improvements • Tait Street Diversion Improvements • Graham Hill WTP Improvements Pumps and Pipelines • 3,600 gpm Pump Station (City to Scotts Valley)at Intertie No. 1 • 16-inch Intertie 1 Pipeline (City to Scotts Valley), 3,600 linear feet (LF) • 3,600 gpm Pump Station (Soquel to City) at SqCWD Intertie • 16-inch Intertie Pipeline (City to Soquel Creek), 25,000 LF Wells • 4 350-gpm extraction wells in SVWD • 4 350-gpm extraction wells in SqCWD • Iron & manganese treatment, 8 wells • Land acquisition for wells, 4 sites in SqCWD and 4 sites in SVWD	• In lieu is based on winter demands for SqCWD and SVWD. • Water could be transferred to wells within the City, to SqCWD, and to SVWD. • Infrastructure is sized to accommodate 2.5-mgd (million gallons per day) peak flow between the City and SVWD and between the City and SqCWD. This sizing is to allow inclusion additional flows for ASR in the future. • The ultimate number and distribution of wells between agencies will be determined during project development. • The Tait Street and GHWTP improvements are based on current information that indicates that these facility upgrades are needed to treat a larger volume of higher turbidity water. This will be better defined moving forward. • It is assumed that the wells will all have a peak extraction flow rate of 350 gpm. • It is assumed that on-site iron and manganese treatment will be needed at each well. • Well footprints are estimated at 0.1 acre each. •
2 – ASR	Pumps and Pipelines • In-City pipeline to Beltz Wells, 4,000 LF Wells • 2 350-gpm Wells in SVWD) • 2 350-gpm Wells in SqCWD • 4 350-gpm Wells in Santa Cruz • Iron & manganese treatment, 4 wells • Land acquisition, 0.1 ac. each in SVWD and SqCWD	• ASR is based on the assumption that there is adequate capacity in the basin to store and produce water as supplied from available winter flows. It is also assumed that early project activities will include field work to evaluate the validity of these initial assumptions (i.e., how well ASR is likely to work in terms of both storage capacity and future yield). • The project elements for the ASR program build on the project elements already developed in Element 1. • Water could be transferred to wells within the City, to SqCWD, and to SVWD. • Infrastructure is sized to accommodate 2.5-mgd peak flow between the City and SVWD and between the City and SqCWD. • The ultimate number and distribution of wells between agencies will be determined during project development. • It is assumed that the wells will all have a peak injection flow rate of 250 gpm and a peak extraction flow rate of 350 gpm. • It is assumed that on-site iron and manganese treatment will be needed at each well. • Well footprints are estimated at 0.1 acre each.

ASR Study Area



WSAC Recommended Change Management Strategy

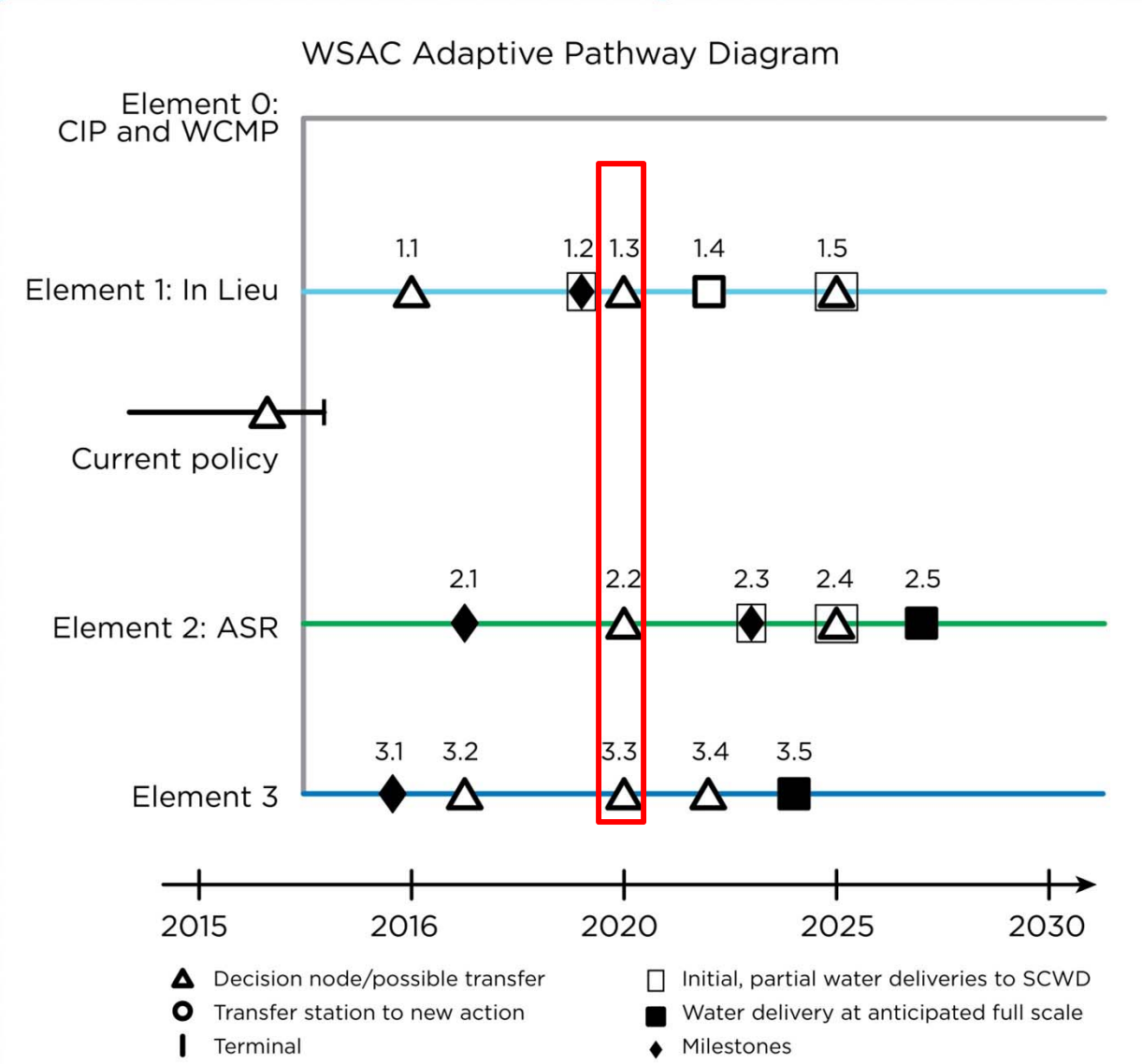
The How



Staggered Implementation Adaptive Pathway The How

Implementation of the Water Supply Augmentation Plan should use a staggered approach that would include active pursuit of Strategy One at the same time as initial project planning and development work is occurring on Strategy Two. This approach is designed to ensure that should Strategy Two be needed as a water supply, enough work would have been done so that it will be feasible to achieve the yield goal [1.2bgy] within the original 10 to 12 year timeframe.

Adaptive Pathway Still the How



Where are we now?

Figure 12 Gantt Chart
Implementation Plan and Timeline

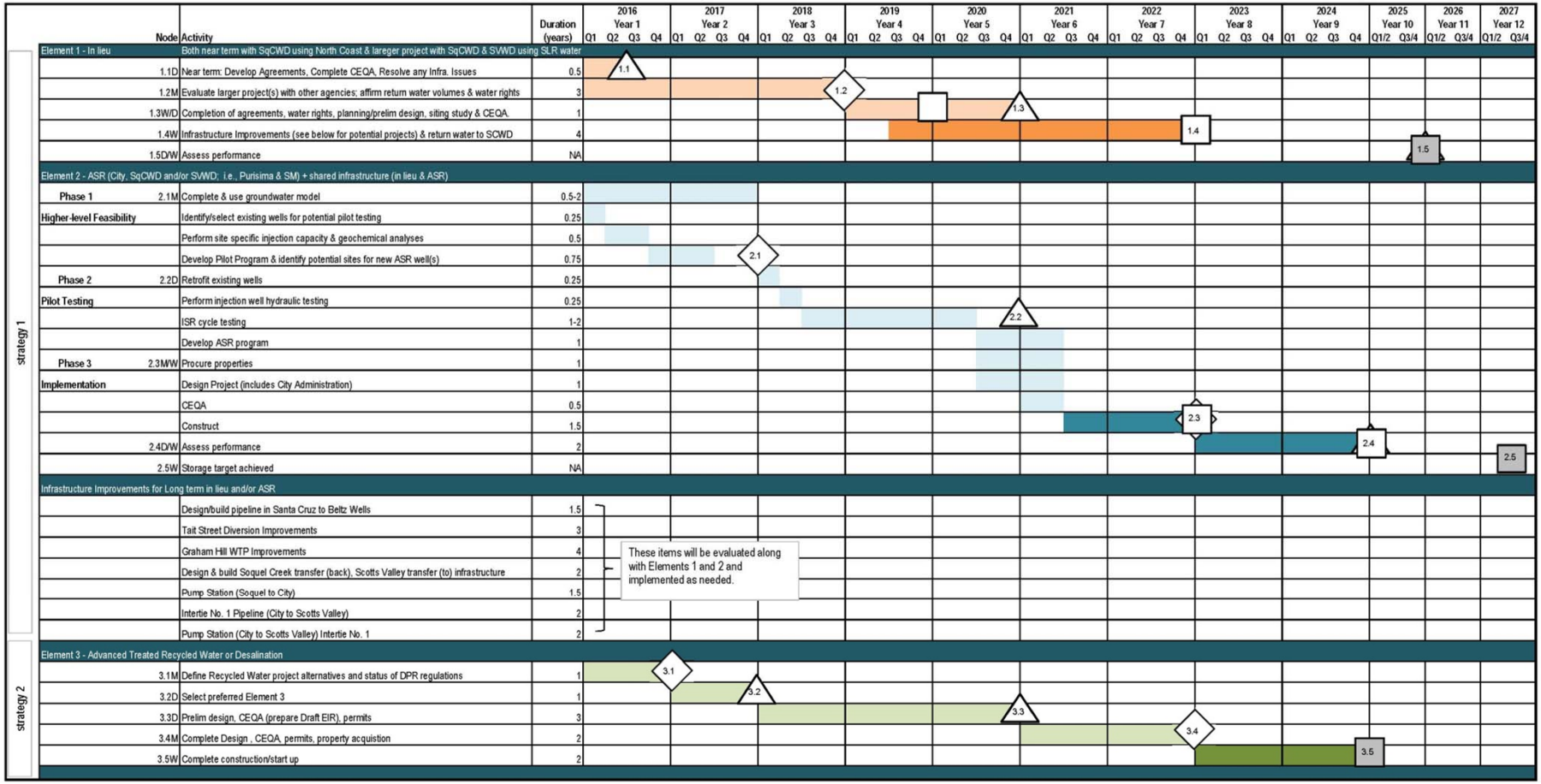


Table Notes & Select Assumptions

This table approximates activities, costs, durations and sequencing of each element, all of which are subject to change.
Elements are shown to start in Q1 - 2016. This may or may not occur depending upon agreements, contracts, etc.
Rehab/replacement of the Newell Creek Pipeline is part of the existing CIP and not shown here.
Some infrastructure improvements may not be required if other pursuits are successful. E.g., evaluation of Ranney collectors may substitute GHWTP Improvements.
CEQA is used generically; implies compliance with Califorina Environmental Quality Act.
Pilot ASR work assumes major infrastructure not required. E.g., intertie to Scotts Valley or new well(s).
Element 2 includes 8 wells for in lieu plus 8 additional wells for ASR.

Legend

ASR = Aquifer Storage and Recovery
CEQA = California Environmental Quality Act
DDW = Division of Drinking Water
DPR = Direct Potable Reuse
EIR = Environmental Impact Report
GHWTP = Graham Hill Water Treatment Plant
IPR = Indirect Potable Reuse
ISR = Injection, Storage, Recovery
SCWD = Santa Cruz Water Department
SqCWD = Soquel Creek Water District
SVWD = Scotts Valley Water District

Decision Node
Milestone Node
Some amount of water returned to SCWD
Full required amount of water returned to SCWD