Santa Clara Valley Water District

COMMITTEE AGENDA MEMORANDUM

Water Conservation and Demand Management

SUBJECT:
Water Demand Forecasting

RECOMMENDATION:
 This is an information only item, no action is required.

SUMMARY:
In November 2019, the Santa Clara Valley Water District (Valley Water) Board of Directors (Board) adopted the Water Supply Master Plan 2040 (Master Plan), which sets a new level of service goal, defines an investment strategy, and recommends a suite of projects to achieve the investment strategy and level of service goal. To determine the level of new investments that may be needed to achieve our level of service goal through 2040, Valley Water uses a demand forecasting model. Valley Water developed the Master Plan demand forecasts in 2016 using the best available knowledge of how Santa Clara County would use water after the drought (i.e., drought rebound) and the best available housing and economic development data. Since 2016, significantly more is known about Santa Clara County's drought rebound, there is a longer water use dataset available, and new housing and economic development forecasts (e.g., Plan Bay Area). Through a competitive bid process, Valley Water contracted with Hazen and Sawyer (Consultant) to develop a new demand model that will provide new demand forecasts. The new demand model provides forecasted demands in 5-year increments out to 2045 to meet our current planning needs. Valley Water's recommended demand scenario forecasts 2040 demands to be approximately 335 thousand acre-feet (TAF). This memorandum summarizes the demand modeling purpose, results, and next steps.

Water Demand Model Development
The new demand model combines the latest science and data to forecast demands through 2045. A reliable water demand forecast helps determine what level of investment is necessary to meet Valley Water's level of service goal. The Master Plan defines Valley Water's level of service goal to be "to develop water supplies designed to meet at least 100 percent of average annual water demand during non-drought years and at least 80 percent of average annual water demand in drought years." The new demand forecasts will be used to complete the 2020 Urban Water Management Plan (UWMP) due in July 2021 and the Master Plan's Monitoring and Assessment Program (MAP) annual report that is provided to the Board each fall.

To develop the water demand model, Valley Water decided it would be best to use the expertise of a consultant that specializes on developing demand models. After a competitive bidding process, Valley Water contracted with Hazen and Sawyer (Consultant) to develop a new demand model. To

support the Consultant in developing the model, Valley Water collected monthly sectoral water use data from our retailers for 2000-2019 (although certain retailers only had data from 2011 or 2013) and groundwater pumping data for Valley Water's independent pumpers (i.e., non-retailer well owners). In addition, the Consultant collected historic data on temperature, precipitation, water rates, water shortage restrictions, economic information, and housing information. The consultant collected historic data primarily from Valley Water, the US Census, Federal Reservoir, and California Department of Finance. Demand forecasts were developed using several forecasting variables, including housing information, median income, economic information, water rates, drought restrictions and weather projections from the Association of Bay Area Governments (ABAG), California Department of Finance (CDOF), and Prism (provides data on climate projections).

Demand Forecasts
The Demand Model can be used to evaluate different potential future scenarios by adjusting the forecasting variables. This supports Valley Water's efforts in understanding the uncertainty related to water demand forecasts. Recommended demand forecasts for planning evaluations, such as the 2020 UWMP and the MAP, focus on using forecasting variable information from regional and state agencies, such as ABAG and CDOF (table 1). In addition, an important modeling assumption in forecasting water demand is related to defining a drought rebound. Currently, Valley Water experienced a small rebound in 2017 and then demands have remained relatively stable through 2018 and 2019. Therefore, the rebound has been relatively muted. Valley Water and the Consultant developed two demand scenarios to consider the range of drought rebounds that could be realistically achieved:

1) No further demand rebound beyond 2019
2) 50% rebound to pre-drought water use by 2025 and then no further rebound

**Table 1. Forecasting variables used in the demand model**

Forecasting Variable	Source
Water rates (by retailer and groundwater zone, inflation adjusted)	Valley Water
Drought Restrictions	Valley Water and retailers
Median income	US Census
Economic indices (e.g., unemployment)	Federal Reserve, Economic Cycle Research Institute (ECRI)
Housing density	Derived from US Census and CDOF
Persons per household	Derived from US Census and CDOF
Housing Units	ABAG
Sectoral employment	ABAG
Weather (temperature and precipitation	Prism

The new demand forecasts include planned conservation goals of 99 thousand acre-feet (TAF) by 2030 and an additional 11 TAF by 2040. Valley Water is currently on target for meeting our 99 TAF of

conservation by 2030, with a current savings of approximately 74 TAF (starting datum at zero in 1992).

Assuming no further drought rebound (scenario 1), planned conservation is forecasted to mitigate increases in growth on water demands with a forecasted 2040 demand of approximately 290 TAF (figure 1). A 50% drought rebound (scenario 2) by 2025 translates to a 13% increase in demands (approximately 40 TAF) by 2025 and results in a 2040 demand forecast of approximately 335 TAF (figure 1). The 50% drought rebound scenario is likely a conservative but realistic outlook for demand rebound. In comparison, the Master Plan 2040 demand forecast developed in 2016 was 389 TAF. Therefore, improving Valley Water's demand modeling to more accurately reflect expected drought rebound, integrating new water use data, and integrating new growth forecasts have reduced Valley Water's forecasted demands by approximately 55-100 TAF (table 2).

Figure 1: Historic and Projected Water Use including Planned Conservation (rounded to nearest 5 TAF)
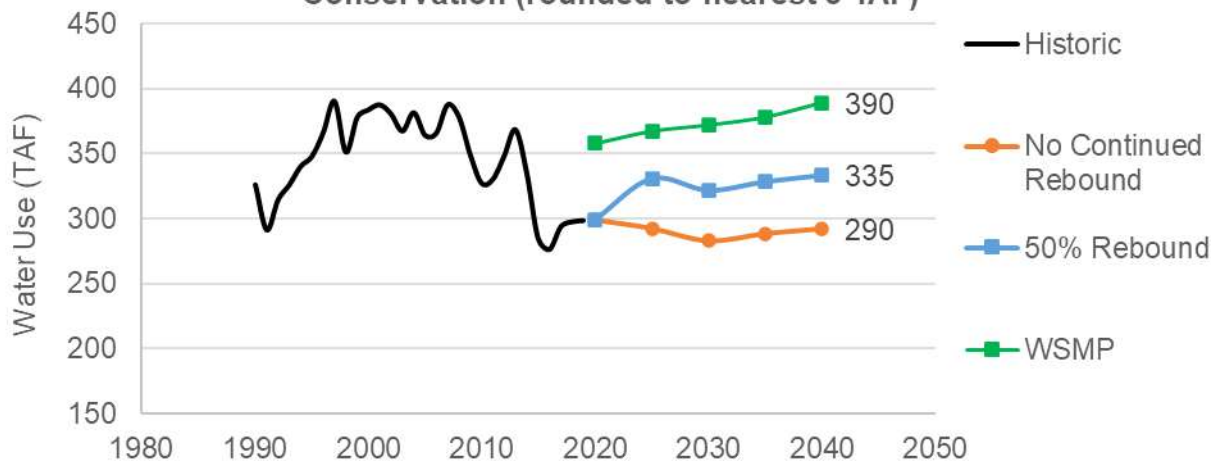
Table 2. Newly forecasted demands compared to the WSMP demands (rounded to the nearest 5 TAF), including planned conservation.

Demand Scenario	2020	2025	2030	2035	2040
50% Rebound	300	330	320	330	335
No Continued Rebound	300	295	285	290	290
WSMP	360	365	370	380	390
Difference[1]	60	35-70	50-85	50-90	55-100

[1]The low bookend is the difference between the 50% Rebound scenario and the WSMP scenario while the high bookend is the difference between the No Continued Rebound scenario and the WSMP scenario.

Next Steps
Valley Water will use the 50% rebound scenario for the MAP analysis that will be presented to the Board in fall 2020. In addition to MAP, this demand model will be used for developing the 2020 UWMP. Valley Water will use the demand model and forecast results for internal UWMP analyses and in discussions with retailers related to the UWMP.

ATTACHMENTS:
Attachment 1: Staff Presentation

UNCLASSIFIED MANAGER:
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