Memorandum

To:	The Water Supply Advisory Committee (WSAC)
From:	Bob Raucher, Stratus Consulting Inc., Bill Faisst, Brown and Caldwell; Gary Fiske, Gary Fiske and Associates
Date:	20 July 2015
Subject:	Update on Various Potential Changes to Existing System Infrastructure and Operations

In this memorandum, we provide a brief overview of insights from on-going investigations of the anticipated impact of several potential changes to the existing SCWD system. These potential changes include infrastructure modifications (e.g., replacing/upgrading the existing pipeline from Felton to Loch Lomond, or adding a second pipe to the Loch), and several potential operational changes (e.g., first flush practices). Additional details will be forthcoming in the coming weeks; in the meantime, the technical team is continuing to vet the technical information related to each change and compile a more in depth memorandum with supporting documentation.

1. Improving the Existing Felton to Loch Lomond Pipe, and/or Adding a Second Pipe

Confluence-based evaluations indicate that the primary infrastructure-related constraint to diverting water from Felton is the hydraulic limitations of the current pipe. The modeling shows that improvements to the existing pipeline would provide considerable supply reliability benefits (yields). Further, an upgraded pipeline provides much the same supply benefit as adding a second pipeline. Gary Fiske has developed projections of the value of the improved existing pipe, and of adding a second pipeline, (both in terms of yield) and these results will be summarized into a more in depth piece for the Committee's August meeting.

2. Raising Newell Creek Dam

Based on a previous study, raising the dam 5' could add roughly 260 MG of storage to Loch Lomond. However, the added storage would not provide significant water supply reliability benefits, especially relative to the anticipated costs (as evident from some of the results developed for the recent rounds of portfolio exercises). [1]

[1] For example, in the June 25 portfolio updates, raising the dam added about $40 million to the capital costs of portfolio 1.1A (compared to portfolio 1.2A) in order to gain about 260 MG of added storage. When coupled with reducing the Loch Lomond reserve volume to 500 MG, this improved worst year yields by 240 MG, but left the City with 500 MG less reserve in the reservoir.

3. Investing in Ranney Collectors

As noted in materials provided for the recent portfolio exercises, Ranney Collectors at Felton provide very limited water supply enhancement benefits. They have thus been removed from the infrastructure requirements and cost estimates for all the recent portfolios and building blocks. Our analyses indicate they provide little additional value (in terms of adding to supplies and yields) because turbidity-related constraints on the overall system are relatively small (e.g., turbidity issues generally arise in wet years when the added water is not needed, and not in dry years when there is little additional water available to extract).

However, Ranney Collectors may still be worth considering as a potential mechanism to enhance water quality and increase operational flexibility (and/or reduce treatment costs) at the Graham Hill Water Treatment Plant (GHWTP). These potential water quality-related benefits may warrant continued exploration of the feasibility and potential performance value of Ranney Collectors at Felton.

4. Using Hansen Quarry to Enhance Water Storage

Numerous suggestions have been offered about various ways in which Hansen Quarry could be a valuable asset to provide some form of water storage. Our initial investigations indicate that the most promising alternative may be using the quarry as the location for injection wells – to enable deep aquifer recharge and storage of winter flows from the San Lorenzo River treated to potable quality at GHWTP.

Our work to date also indicates that there are various geotechnical and other factors that preclude or significantly limit the ability to implement several of the potential approaches that have been suggested. Among the options that appear to be infeasible and/or impractical are using the quarry as a surface water reservoir, or as a spreading basin to recharge the underlying aquifer.

Kennedy/Jenks Consultants has recently completed a groundwater model for the Scotts Valley Water District and work is ongoing to better understand recharge to the aquifer(s), recharge to Bean Creek, and aquifer leakage.

5. Potentially Modifying the First Flush Operational Practice

In the course of reviewing various aspects of how the water system is operated, Gary Fiske observed that the "first flush" practice -- requiring that SCWD not divert at Felton until there have been 2 days of at least 100 cfs flows at Big Trees – had a significant impact on possible extractions from the river under projected climate change flows. Initial investigation suggests that water supply reliability and yields may be significantly improved if this constraint can be relaxed. Accordingly, we are now exploring what the implications of modifying this operational

constraint would be on source water quality, the potential need to upgrade treatment, and associated costs.

The first flush practice is a SCWD operational guideline intended to improve water quality by allowing the first relatively large wet season flows to flush sediment, debris, etc. from the river before extractions are made for potable supply. This first flush (or flush flow) operational practice has been in place for many years. Under climate change it becomes a large constraint since, in the driest years, there are few if any days with flows of at least 100 cfs. Modeling will continue and additional information about the tradeoffs that may be necessary to relax this operation practice in order to improve extractable supplies will be better understood.

6. Modifying the Loch Lomond Operational Rule on Reserves

As shown in recent analyses developed to support WSAC portfolio exercises, changing the operating rule for Loch Lomond reserves (e.g., from its current level of 1000 mg of reserve left in the reservoir down to 500mg) provides some modest water supply benefits, but does so by increasing the risks borne by SCWD. This risk tradeoff from reducing storage volumes varies according to whether there are supplemental supplies that may be tapped to reliably offset the risk (e.g., climate-independent options, and/or assured storage and return water in regional aquifers). This risk and the potential for lowering the end-of-season volume in Loch Lomond, have been captured in the various building block descriptions.