August 6, 2019 *submitted via e-mail*

TO: Johnson Yeh, Geoscience Support Services, Inc.
CC: Mark Norton, SAWPA
FROM: Tim Moore
RE: Comments on draft Technical Memorandum #5

1) Section 2.2, First Paragraph: The last sentence indicates that recharge from natural precipitation is calculated within the HSPF model. I believe it would be helpful to provide a bit more detail describing how this value is calculated. In addition to the actual amount of rainfall that occurs, what other key parameters influence this calculation (e.g. land cover, soil type, antecedent moisture)? In addition, I believe it is important to note that off-channel recharge of natural precipitation is something that must be calculated in order to derive an accurate estimate of stormwater runoff to the streams. So, if we have accepted that the stream flow calibrations are reasonably accurate, then we have also implicitly accepted that the estimates of off-channel percolation must be reasonably accurate as well. This updated WLAM, and the previous WLAMs, all calculate off-channel recharge. This is just the first time that we've asked for the calculated values to be reported out.

2) Section 2.2, Second Paragraph: The first sentence refers the reader to Figure 2. However, since the term "percolation" appears in three separate places within the diagram, readers may become somewhat confused. I think it would be helpful to highlight the key path of interest which tracks down the far left side of the flow schematic (e.g. Precipitation → Infiltration → Deep Percolation). Perhaps these specific lines and arrows can be colored red for emphasis. As I interpret this diagram, I am assuming that any percolation that occurs thru the "Potential Direct Runoff" path is already captured as streambed recharge, right?

3) Table 1 and Table 2-1: It appears that these tables are based on an initial assumption that the average concentration of TIN in natural rainfall is 2 mg/L. Please provide a reference citation to support this assumption. Is the nitrogen present in the natural rain as it falls from the sky or is the nitrogen leached from the soil as the precipitation percolates to groundwater?

4) Table 1 and Table 2-1: These tables show that natural precipitation percolating to groundwater has an average TDS concentration in the range of 219-224 mg/L. Please provide a reference citation to support this assumption. Is this the average TDS concentration in the actual rainfall or is it the salinity of the precipitation AFTER it percolates through the surface soils? I was under the impression that natural rain was extremely low in conductivity and had a TDS concentration near zero.

5) Table 1 and Table 2-1: Do the estimates of average TDS and TIN concentrations take into account variations in land use? For example, rain that falls on an acre of undeveloped natural landscape and percolates to groundwater will have a different TDS and TIN concentration than precipitation that falls onto and percolates below a dairy. Just need some additional clarification about what it is that is being reported here: the water quality at the moment the rain hits the ground or the water quality when that precipitation ultimately percolates to and reaches the underlying aquifer.

6) Table 1 and Table 2-1: Both tables are based on annual estimates for the period from 2007 thru 2016 (water years). I was expecting that Technical Memorandum #5 would provide annual estimates for the same hydrological period (e.g. 1959-2016) specified in Task 2a (as described in Task 5 of the RFP).

7) Table 1 and Table 2-1: I believe it would be useful to summarize the volume of deep percolation water from off-channel recharge in the same manner that we have done for the TIN & TDS concentrations in streambed recharge (e.g. 1, 5, 10, 20, 67-year average recharge volumes). This could be done using graphs similar to those shown in Appendix H. We would need two graphs for each of the five GMZ's; one representing the current land use condition and another representing recharge in the 2040 land use condition. There is no need to produce graphs for TDS and TIN concentrations in off-channel recharge because these values do not vary much from year to year.

8) It would be prudent to note, somewhere near the beginning of the report, that the WLAM only accounts for off-channel recharges to the extent necessary to calculate the volume of stormwater runoff likely to flow into the Santa Ana River and its major tributaries. These off-channel recharges are NOT part of the waste load allocation itself as the WLA applies only to streambed recharges.

9) The draft report covers the six GMZs specified in Task 5 of the RFP. How much would it cost to add the San Timoteo, Yucaipa and Beaumont GMZs to this report?