Luhdorff & Scalmanini
Consulting Engineers

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File No. 18-1-021

Sent via e-mail: SteveJ@stetsonengineers.com

Mr. Steve Johnson, P.E.
Indian Wells Valley Groundwater Authority Water Resources Manager
Stetson Engineers Inc.
861 S. Village Oaks Drive, Suite 100
Covina, CA 91724

SUBJECT: INDIAN WELLS VALLEY GROUNDWATER AUTHORITY TECHNICAL ADVISORY COMMITTEE MEMBER COMMENTS ON PUBLIC REVIEW DRAFT GROUNDWATER SUSTAINABILITY PLAN

Dear Mr. Johnson:

This letter is being written on behalf of our client, Meadowbrook Dairy ("Meadowbrook"). This letter is submitted in response to the Indian Wells Valley Groundwater Authority (GA) Water Resources Manager's request for input from members of the public (which includes Technical Advisory Committee (TAC) members) on the following items:

1. Public Review of the Draft Groundwater Sustainability Plan Documentation Text
2. Public Review of the Draft Groundwater Sustainability Plan Figures
3. Public Review of the Draft Groundwater Sustainability Plan Appendices

During the review of this public review draft (referenced as the December 2019 draft), we were very disappointed to find that most of the specific comments provide to your office in our November 15, 2019 comment letter (review of the TAC_PAC draft GSP, referenced as the November 2019 draft) were ignored and not addressed at all. We have attached this specific comment letter along with all of our comment letters as attachments (referenced as Attachment 1 through Attachment 5). Please reference Attachment 5 specifically for November 2019 TAC comments.

As mentioned, several times during past TAC discussions and throughout the development of specific sections of the GSP (i.e. Sections 3, 4, 5, 6 and the groundwater modeling efforts), the lack of transparency that has occurred is very disappointing and will become obvious during DWR review, we do however appreciate the opportunity to provide additional comments on these items and as always we look forward to developing a process to reach technical consensus as we move forward through the GSP process.

Our comments are provided below and follow the specific layout of the GSP. Specific comments from review of the November 2019 draft that were not addressed are also included again (referenced as **November 2019 Comments**) in the review of this December 2019 draft.

SIGNATURE PAGE

General Comments:

- Please provide the names of all individuals and their State of California license information (i.e. Stetson, DRI and contractor for responsible for GDE survey work) that will authorize this document.

EXECUTIVE SUMMARY

General Comments:

- **November 2019 Comment** – As requested, why did the TAC not have a chance to review the ES prior to issuing the Public Review Draft?
- ES 1.1 Purpose of Groundwater Sustainability Plan, page ES-1 – Please provide technical references for the statement regarding the overdraft statement.
- ES 1.2 Agency Information, page ES-1, first sentence. Text states basin as a critically overdraft basin of medium priority, but reference 1 states high priority. Please resolve this discrepancy.
- ES 1.2 Agency Information, page ES-2, second paragraph. Please include a statement to explain why other beneficial users (domestic, small and large agricultural interests) were excluded from being involved with the formation of the IWVGA.
- ES 1.2 Agency Information, page ES-3, last paragraph. The TAC was established for the express purpose of giving interested parties a reasonable opportunity to review and conduct a thorough evaluation of each technical element of the GSP did not occur as stated. Examples of these inputs would be the lack of input given to TAC to review specific sections of the GSP, the short-notice given to review critical key documents (sometime the TAC were given no time to review WRM materials ahead of the TAC meetings), the failure of the GA to respond to specific technical comment letters provided during the development of the GSP (**reference Attachment 1 and 4**), the development of a groundwater funded model by the Navy that occurred prior to the formation of the TAC, and unfortunately although known to have several flaws is being used as a tool to develop the future of groundwater use in this basin.
- ES 2.1 General Description and Setting, ES-4, first paragraph, 5th sentence. Please provide a technical reference to support the statement concerning 50 years of overdraft.
- ES 2.3 Water Supply Source, page ES-5, first paragraph. Please include a summary table for all of the water supply users and include a percentage of their use in the basin.
- ES 2.5 Regional Water Management Agencies, page ES-5, first sentence. Why is the text in this sentence bold?
- ES 2.6 Land Use, page ES-6, first paragraph. Why are small and large agriculture not included in the list of lands overlying the basin?

- ES 2.7 Existing Water Resource Monitoring Programs, page ES-6, second paragraph. Please include a list of all entities that helped implement the Indian Wells Valley Cooperative Groundwater Management Group.
- ES 2.7 Existing Water Resource Monitoring Programs, page ES-6, third paragraph. There are other entities that are also conducting groundwater monitoring (i.e. Large Agriculture), and those entities have offered to share that information with other monitoring entities (i.e. IWVGA). Unfortunately, this data exchange has not been a transparent process (i.e. groundwater level data is cherry-picked to align with the non-agricultural interests).
- ES 2.8 Existing Water Resourced Management Programs, page ES-7, first paragraph. Please provide a reference to overdraft statement. In addition, please provide additional information on where the overdraft within the basin is occurring and provide additional details as to why groundwater management specific areas (**reference Attachment 1**) were not implemented to address the basin wide overdraft condition. In addition, please include an additional bullet to highlight the conservation measures agriculture have implemented to reduce groundwater usage.
- ES 3.1.1 Geology and Hydrogeology, page ES-9, first paragraph, third sentence. Please provide evidence to support the statement that there is a strong connection between the shallow aquifer and the deeper aquifer.
- ES-3.1.2 Soils, page ES-9, first paragraph, last sentence. If the additional preliminary soil surveys were conducted, how were they reviewed by the author if they are not digitally available?
- ES 3.1.4 Water Budget and Overdraft Conditions, ES-10, Table ES-1. Please provide additional details as to why IWV defined the 2011 to 2015 time frame to develop the water budget and who determined this was an appropriate methodology given this does not meet the minimum 10 years suggested by DWR and the 2011 to 2015 time frame represents very dry climatic conditions (**reference Attachment 5**).
- ES 3.1.5 Sustainable Yield, page ES-11, first paragraph, third paragraph. DRI was contracted by NAWS to develop the model without direct input from the TAC; therefore, the statement regarding coordination is not correct. Revise sentence to state that DRI, through a sub-contract with NAWS developed the initial estimated long-term natural recharge. As noted by several TAC members, the DRI model conceptually has architectural and structural errors, which will impact the estimates of overdraft. As noted, several times throughout this GSP development process, overdraft should not be quantified as a single value, and will fluctuate based on hydrologic conditions.
- ES 3.2 Reduction of Groundwater Storage, page ES-11, first paragraph. The statement, significant reduction in storage, should be quantified. Please discuss and identify where chronic lowering of groundwater levels and supposed water quality degradation is occurring. Also, regarding land subsidence, the only documented case of any land subsidence is occurring on NAWS property and has become evident throughout the development of the GSP. NAWS has not committed to reduce pumping and instead projects increased pumping, so please explain how subsidence will be addressed?
- ES 3.2.2 Chronic Lowering of Groundwater Levels, page ES-12, second sentence. As stated, groundwater levels remain stable in other locations, please provide additional geographic details to where this is located (i.e. in proximity to North Brown Road).

- ES 3.2.2 Chronic Lowering of Groundwater Levels, page ES-12, third sentence. Please provide reference to how shallow production wells have been impacted. In addition, please provide geographic details to where this is occurring.
- ES 3.2.4 Groundwater Quality Conditions, ES-12, first paragraph. Please include additional details on impacts to groundwater quality from anthropogenic activities.
- ES 3.2.5 Land Subsidence, ES-13, first paragraph. Please clarify if land subsidence is occurring and identify where this is occurring.
- ES 3.2.7 Groundwater Dependent Ecosystems, page ES-13, first paragraph. If GDE's are confined to NAWS property, please provide further details on how GDE's will be addressed, if NAWS is not required to reduce pumping. Should GDE's and land subsidence not be included as a sustainable management criteria, given the IWVGA has no authority to control the entity who is causing these issues?
- ES 3.3 Numerical Model, page ES-14, first paragraph. Please include a statement further defining how the DRI model was peer reviewed. As this author was part of the TAC model ad-hoc group, I would disagree with the statement peer review. Prior to the formation of the TAC, the DRI model was developed without any input from anyone other than NAWS staff. The TAC only reviewed the model documentation after insisting (**reference Attachment 2**) and we were informed from the beginning that there would be no structural changes to the model, which is unfortunate since there are known structural issues with the model (i.e. given current pumping distribution, pumping volumes are overestimated in Layer 1, anisotropy values are not realistic, etc.).
- ES 3.3 Numerical Model, page ES-14, second paragraph. Please include a statement that the solute and transport model was developed but has not been calibrated again observed data and was not reviewed by the TAC model-ad hoc group.
- ES 3.3 Numerical Model, page ES-14, last paragraph. As stated, and documented several times (**see Attachment 3**), Scenario 6.2 should be considered a management action only and is not the only management action that could be implemented to address declining groundwater levels in specific areas of the basin.
- ES 3.4 Existing Monitoring Network and Data Gap Evaluation, page ES-15, first paragraph, second sentence. Please check formatting.
- ES 3.4 Existing Monitoring Network and Data Gap Evaluation, page ES-15, first paragraph, fourth sentence. Please explain why small and large agricultural wells are not part of the current monitoring program.
- ES 3.4 Existing Monitoring Network and Data Gap Evaluation, page ES-15, first paragraph, sixth sentence. Please specify how many monitoring wells are in the El Paso area, and provide a brief synopsis of the general trend of groundwater levels in this area.
- ES 3.4 Existing Monitoring Network and Data Gap Evaluation, page ES-15, second paragraph, fourth sentence. Regarding Sand Canyon, prior to 2019 minimal maintenance occurred until Meadowbrook Dairy assisted in implementing a maintenance program. Please include a sentence to reflect that Meadowbrook Dairy is collaborating on maintaining and participating in the collection of critical surface water data as an in-kind service.

- ES 3.4 Existing Monitoring Network and Data Gap Evaluation, page ES-15, third paragraph, last sentence. In addition to quantifying domestic well water use, domestic well information and water levels should also be included in the data gap analysis.
- ES 3.4 Existing Monitoring Network and Data Gap Evaluation, page ES-16, first paragraph. Are the Seabees licensed by the State of California to design, drill, install and test monitoring wells? What licensed professional provided oversight of the Seabees work?
- ES 3.4 Existing Monitoring Network and Data Gap Evaluation, page ES-16, fourth paragraph, first sentence. Please explain how using limited aquifer property data could impact the predictive quality of the current groundwater model, and also how these uncertainties will influence both the current baseline model and any predictive future scenarios (**reference Attachment 2**).
- ES 3.4 Existing Monitoring Network and Data Gap Evaluation, page ES-16, fourth paragraph. Please check formatting.
- ES 4.1 Sustainability Goal, page ES-16, first paragraph. Please explain why agricultural interests are excluded from the list.
- ES 4.2 Undesirable Results, page ES-17, third paragraph. Other than on NAWS property, where else is land subsidence an issue? Also, given the geographic specific SMCs (i.e. land subsidence within NAWS property, declining groundwater levels within the City of Ridgecrest), why was the concept of Management areas not implemented (**reference Attachment 2**)?
- ES 4.3 Minimum Thresholds, Measurable Objectives and Interim Milestones, ES-9, third paragraph. Table references are incorrect, they are mislabeled and there are 5 tables not 4, please revise accordingly.
- ES 4.3 Minimum Thresholds, Measurable Objective and Interim Milestones, ES-19, Table ES-2. Please provide additional details as to who decided on the minimum threshold and interim milestones for groundwater removed from storage as this was not vetted by TAC.
- ES 4.3 Minimum Thresholds, Measurable Objective and Interim Milestones, ES-20, Table ES-3. Please provide additional details as to who decided on the minimum threshold and interim milestones for groundwater removed from storage as this was not vetted by TAC. In addition, several of these wells have multiple wells installed (i.e. USBR 6 has three wells), is the author referencing USBR-06S, if so, please provide additional descriptions. Also, at selected representative monitoring sites, groundwater levels actually increase, why was this methodology selected?
- ES 4.3 Minimum Thresholds, Measurable Objective and Interim Milestones, ES-20, Table ES-3 (Sustainable Management Criteria for Degraded Water Quality), should be referenced as Table ES-4. Recent groundwater sampling in Sand Canyon had TDS valued greater than 500 mg/L. Given this water quality will increase in TDS as it is percolated through the subsurface, is it reasonable to have TDS values less than 500 mg/L in this basin? Also, please explain in a table legend what ND stands for.
- ES 4.3 Minimum Thresholds, Measurable Objective and Interim Milestones, ES-20, Table ES-5. How will SMC for land subsidence be controlled if NAWS increased pumping and/or is not willing to participate in the GSP implementation?

- ES 5.0 Project and Management Actions, page ES-23, first paragraph. Please include additional explanations as to how Projects and Management Actions were vetted prior to being decided upon.
- ES 5.1 Management Action 1, page ES-23, first paragraph. How was the base period from 2010 to 2014 determined? The term "safe yield" is not defined and should not be part of this analysis, rather the sustainable yield should be evaluated based upon specific SMCs in order to evaluate how management actions will be implemented. Also, as detailed throughout this process, the 7,650 AFY is only an estimate based on a numerical model (which has errors). The allocation plan should be evaluated after collecting additional SMC specific data for a minimum of 5 years. Management Action 1 unfairly targets individuals that do not sit on the IWVGA board (which is primarily made up of non-pumper members). In addition, IWVGA board members selected who has a chance to participate in annual and transient pool allocation, which again is unfair to pumpers and members of the public.
- ES 5.4 Project No. 3: Basin-Wide Conservation Efforts, page ES-26, first paragraph. The text should note that some Large Agricultural interest groups have also adopted conservation measures (i.e. pilot testing other crops).
- ES 5.5 Project No. 4: Shallow Well Mitigation Program, page ES-27, first paragraph. The shallow mitigation program should not be implemented until additional data (i.e. groundwater levels, groundwater pumping, well construction, etc.) is collected, evaluated and then utilized to assess the implementation of developing Management Action No. 1 (**reference Attachment 4**).
- ES 5.7 Project 6: Pumping Optimization Project, page ES-28, second paragraph. As agreed upon by most technically competent members of the IWVGA committees, current pumping in the North Brown Road area is sustainable; therefore landowners who purposely selected this area of the basin to operate are being unfairly forced from their property to allow for other users (who are determined by IWVGA board members) to move into this area and continue to operate. There are other management options that can be utilized to avoid this process (such as developing a physical solution among pumpers within the basin).
- ES 5.8 Conceptual Projects Still Under Consideration, page ES-29. As detailed in our November 2019 comment letter (**reference Attachment 5**), there are additional conceptual projects that should be further studied, refined and evaluated rather than driving non IWVGA pumpers out of the basin. A summary of these projects could include: Utilize groundwater from the El Paso subarea (estimated to be approximately 4,000 AFY); pump and treat current de-designated area groundwater supply from NAWS property, utilize evaporative loses from Coso Geothermal field and SVM, evaluate projects for SVM to treat groundwater in Salt Wells Valley Basin or find alternative sources of useable groundwater.
- ES 6.0 Implementation Summary, page ES-30, first paragraph. Please provide further explanation on how undesirable impacts are being defined and identify where they are occurring.
- ES 6.0 Implementation Summary, page ES-30, second paragraph, second sentence. There are, in fact, several reliable sources of water available, but unfortunately the IWVGA board has purposely chosen not to evaluate these other sources and given the lack of transparency has alienated all non-urban pumpers from developing a physical solution.
- ES 6.2 Cost and Funding, page ES-32, Table ES-4 Estimated GSP Implementation Costs, should be referenced as Table ES-6. Please provide additional specific details as to how financially viable it

will be to implement any of the Management Actions and Projects given the IWVGA's funding gaps and if NAWS is not required to participate in pumping fee. What will the cost impacts be to IWVWD customers and groundwater pumpers, and more importantly are these costs (estimated to result in an increase of several thousand dollars per year per household) realistic.

SECTION 1 – INTRODUCTION

General Comments:

- **November 2019 Comment** - Section 1.2 Sustainability Goal, page 1-3, second paragraph. The sustainability goal is to manage and preserve the IWVGB groundwater resources as sustainable water supply for all beneficial users. To the greatest extent possible, the goal is to preserve the character of the community, and beneficial users, preserve the quality.
- **November 2019 Comment** - Section 1.4 Agency Information, page 1-5, second paragraph. Text should provide additional detail on whether the federal agencies are also voluntarily willing to comply with any decisions with the GSA to impose projects and management actions on federal land in order to ensure the basin is sustainable by 2040.
- **November 2019 Comment** - Section 1.4.1 (Organization and Management Structure of the IWVGA), page 1-5. Include additional details identifying notable exclusions of some beneficial users (i.e. agricultural and environmental interests, whether as voting or non-voting members) and the reason(s) why beneficial users were not included despite this group makes up more than 50% of the pumping in the basin.
- Section 1.4.2 Legal Authority, page 1-8, first paragraph. Please further expand on why members of the IWVGA board (primarily comprised of non-pumpers) decided to exclude most pumpers and also have the powers to implement fees on pumpers that they are attempting to force out of the basin.
- Section 1.4.2.2 Technical Advisory Committee (TAC), page 1-10, first paragraph. Please explain why TAC members were not given the opportunity to review specific sections of the GSP (i.e. 3, 4, 5, 6, the ES and **reference Attachment 4**) prior to the release of the complete draft GSP.
- Section 1.4.2.2 Technical Advisory Committee (TAC), page 1-11, first paragraph. This author disagrees with the statement regarding the incorporation of TAC comments into how GSP content was developed. There have been no written responses from the WRM to any technical comments (delivered through comment letters (**reference Attachments 1 through 5**). In addition, during the development of the draft GSP, there was no formal tracking of TAC specific comments and ultimately all TAC comments were vetted through the WRM (who works directly for the IWVGA board, again who are made up primarily of non-pumpers with).
- **November 2019 Comment** - Section 1.5 Notice of Communication. Although the author references the C&E, DWR is also looking for summary documentation of all meetings, and examples of how all public meetings were advertised (including how specific technical content was distributed to **non-English speaking members of the public**).
- **November 2019 Comment** – Why was the DWR Preparation Checklist not moved from the appendix and incorporated into this section to allow more efficient review by CA DWR?

- Section 1.5.1 Public Outreach, page 1-19. Please include as an appendix a summary of the workshop activities, attendees and comments received. In addition, please replace the bullet format with a summary table, that lists the event, the data and the specific topics covered at the event.

SECTION 2 – PLAN AREA

General Comments:

- **November 2019 Comment** - Section 2.5.2.1 (Kern County), page 2-17, first paragraph. Although the El Paso area is largely uninhabited and current groundwater demand does not require "significant" groundwater extraction, given the increasing trends in groundwater levels to this area over the last decade, future "significant" groundwater extraction could be possible and should be further investigated for potential projects and management actions prior to enforcing perhaps unnecessary or insufficiently supported pumping allocations.
- **November 2019 Comment** - Section 2.5.2.1 Kern County, page 2-17, Table 2-6. Please include a footnote to explain to the reader the designation of Limited Agriculture and Exclusive Agriculture.
- **November 2019 Comment** - Section 2.7.1 Background, page 2-27, last paragraph. Please provide a reference to historic and recent studies regarding overdraft conditions in the basin. Are the current conditions a result of overdraft or removal of temporary surplus (or both)?
- **November 2019 Comment** - Section 2.7.3 Conservation Programs, page 2-29. Please include a detailed section of both water efficiency and demand management measures and practices currently underway by large Agriculture (specifically to Alfalfa operations along north Brown Road).
- **November 2019 Comment** - Section 2.7.6 Groundwater Contamination Cleanup, page 2-37. Please provide additional details on all chemicals of concern (including chemicals per- and polyfluoroalkyl substances (PFAS)) and results of the 2017 sampling that turned up PFAS levels of 8 million parts per trillion (which are the highest in California, and one of the highest globally as noted in the report).
- **November 2019 Comment** - Section 2.7.7.4 IWVGA Policies, page 2-42. Provide additional details on how the extraction fee was calculated.
- Section 2.7.7.4 IWVGA Policies, page 2-44. Please provide specific details on the outreach efforts as part of IWVGA Ordinance 01-19 to reach out to non de minimis and de minimis extractors and based on best available data how many non de minimis and de minimis pumpers have failed to register their wells. In addition, explain the current management process for enforcement for unregistered groundwater extraction facilities.
- Figure 2-4. Please add labels for all major streams, creeks and springs.
- Figure 2-5. Please distinguish between IWVWD pumping wells and CSD wells. Also, please include location of all wells including NAWS wells.
- Figure 2-14. Please include additional details (table insert) summarizing the status of the contaminated site (i.e. active, closed, groundwater, vadose zone, current monitoring activities, etc.).

- Figure labeling needs to be consistent, as an example, Section 2 figure captions are located in the top right-hand side of the page, while figure captions for Section 3 are located on the bottom right hand side of the page.

SECTION 3 – BASIN SETTING

General Comments:

- Section 3.1 Introduction, page 3-1, third sentence. Please check formatting.
- **November 2019 Comment** - Section 3.1 Introduction, page 3-1, first paragraph, third sentence. The descriptive HCM…will be used to describe basin setting "static" conditions. Why is the author using the word "static" here?
- **November 2019 Comment** - Section 3.2 History of Water Use in the Indian Wells Valley, page 3-4, third paragraph. According to the data presented, peak groundwater usage occurred in 1985 (approximately 29,730 AF), not in 2007 (29,430 AF). In addition, significant conservation efforts were made by the Navy (60% reduction), Meadowbrook Dairy (35% reduction), but an increase occurred of 45% IWVWD. Please revise paragraph and tables to reflect peak water usage and conservation measures implemented by all beneficial groundwater users.
- Section 3.3 Hydrogeologic Conceptual Model, page 3-6, first paragraph. Please include a description why more recent geologic and hydrogeologic data (funded in part by CA DWR) was not utilized as part of the GSP (**reference Attachment 1**). In addition, please explain how this data will be incorporated into a revised numerical model and how current management decisions will be refined and or modified if revised modeling activities contradict the current model (that is not utilizing the most current data sets).
- **November 2019 Comment** - Section 3.3.1 (Geology and Hydrogeology), page 3-7, first paragraph, Figures 3-5a and 3-5b. Given the recent amount of new geologic and hydrogeologic information, and concerns about overdraft in this basin, the author should include more recent local geologic information (i.e. SkyTEM, supported financially by DWR and recent installation of new production wells, **reference Attachment 1**). Also please revise cross-section to be in color. Also provide more than just two cross-sections (the minimum required by SGMA). Additional cross-sections should be developed specifically through the North Brown Road Area and include at least one diagonal cross-section (either oriented Northeast-Southwest and/or Northwest-Southeast).
- **November 2019 Comment** - Section 3.3.1 Geology and Hydrogeology, page 3-9, first paragraph. Please provide a more detailed description of the two principal aquifers (i.e. thickness) and how the applicable aquifer characteristics (thickness, permeability, etc.) change throughout the basin.
- **November 2019 Comment** - Section 3.3.1 Geology and Hydrogeology, page 3-9, second paragraph. Regarding USBR (1993) slug test data. Typically slug tests are not very useful as they only represent a very small area within the vicinity of the test location. A sentence should be included to reflect the value of this data.
- Section 3.3.2 Soils, page 3-10, second paragraph. Please include Bullard et al 2019 report into the appendix. As required by SGMA, all reference material used to support the GSP must be included.
- Section 3.3.3.1 Climate and Precipitation, page 3-11, second paragraph, first sentence, please check spelling.

- Section 3.3.3.1 Climate and Precipitation, page 3-11, second paragraph, last sentence. Text states annual precipitation by water year, but reference (No. 26) indicated data by water year were not available. Please clarify and resolve. As detailed under SGMA, this data should be reported as the average for 1980 through 2010 as water year (per DWR) and not calendar year.
- **November 2019 Comment** - Section 3.3.3.1 Climate and Precipitation, page 3-11, second paragraph, Figure 3-9. A paragraph should be included to explain whether the information illustrated on Figure 3-9 was used to select the historical water budget period. Also, these plots should be redone to report data in water years and not calendar year per GSP regulations.
- Section 3.3.3.2 Streamflow and Mountain Front Recharge, page 3-11, first paragraph. Please provide all streamflow data, analysis type (including calculations), field notes, as an appendix for all stream gauging.
- **November 2019 Comment** - Section 3.3.3.2 Streamflow and Mountain-Front Recharge, page 3-13, first paragraph. Mountain front recharge is difficult to quantify and estimate and often has a lot of uncertainty associated with it. Please reference current work on mountain front recharge as part of the Antelope Valley adjudication and provide revised documentation utilizing current methodologies using all recent data (the author should not rely exclusively on others' work).
- **November 2019 Comment** - Section 3.3.3.2 Streamflow and Mountain-Front Recharge, page 3-14, first paragraph. Is there data that proves the statement "There are no significant interconnected surface water systems"? To exclude this SMC, GSP needs to have data to support this. The use of the phrase".....no significant....." implies there are interconnected surface-waters, yet in the opinion of the author they are not significant. They either are or are not interconnected surface waters.
- Section 3.3.3.2 Streamflow and Mountain-Front Recharge, page 3-14, if influent steam TDS concentrations are greater than 500 mg/L is it not realistic to have SMC for water quality set lower than 500 mg/L.
- **November 2019 Comment** - Section 3.3.3.2 Streamflow and Mountain-Front Recharge, page 3-14, first paragraph, fourth sentence "The IWVGB has many natural springs....." if the basin contains springs, then it contains interconnected surface water.
- Section 3.3.4 Water Budget and Overdraft and Overdraft Conditions, page 3-15, first paragraph. Please include a section detailing in plain language terms what a water budget is (i.e. Water budgets are similar to a bank account in that there are inflows, outflows, and a change in the bank account balance or storage. Inflows and outflows in the hydrologic system are largely driven by processes occurring on the land surface. Within the Subbasin, these inflows and outflows are dominated by land use).
- Section 3.3.4.1 Water Budget Elements, page 3-16, first complete paragraph. The USGS BCM model has been issued as a draft and given the large range in recharge estimates would be very useful for this GSP. Please include USGS even as an estimate to Table 3-4.
- Section 3.3.4.1 Water Budget Elements, page 3-16, Table 3-4. Given the range of recharge estimated, baseline model runs should utilize a range, and not just rely on a single recharge estimate, developed by NAWS sub-contractor (**reference Attachment 1**).

- Section 3.3.4.1 Water Budget Elements/Groundwater Pumping, page 3-17, first paragraph. Please provide data as appendix that summarizes the analysis conducted utilizing the McGraw et al. 2016 reference.
- Section 3.3.4.1 Water Budget Elements, page 3-20, second paragraph. With all the various sources of groundwater pumping data described and the known error through the reporting process in previous sections, please provide detail on what quality control measures were implemented, and how this author's comparisons of pumping estimates made over time periods were common to each of the investigations? Also, how did previous studies vary and compare to the Cooperative Group's historical data? Please include additional details on this information in the text and include all analysis as an appendix (**reference Attachment 2**).
- **November 2019 Comment** - Section 3.3.4.1 Water Budget Elements, page 3-20, third paragraph. How was the domestic wells residence average of 1 AFY determined (**reference Attachment 2**)? This should be explained and also how do pumping volumes vary over time. Same comment applies to water use by mutuals and co-ops. Footnote 13 should be expanded upon and included into this paragraph.
- **November 2019 Comment** - Section 3.3.4.1 Water Budget Elements, page 3-18, fourth paragraph. The previous paragraphs sound exclusively promotional for the Navy while a similar tone and content is not provided other non-IWVGA members. There is no mention of the reduction in ag pumping from 1985, 2007 or 2015 like there is for urban discussion or the Navy, why not?
- **November 2019 Comment** - Section 3.3.4.1 Water Budget Elements, page 3-19, second paragraph the last sentence of this paragraph is not supported by any information provided to support it. Unless there is relevant agreed upon information available, please remove the sentence "unless restricted, agricultural use is expected to increase significantly", as this is not necessarily true.
- **November 2019 Comment** - Section 3.3.4.1 Water Budget Elements, page 3-19, second paragraph. Does the current ET value vary on an annual basis? If so, a range should be presented along with any variations associated with dry versus wet climatic conditions.
- **November 2019 Comment** - Section 3.3.4.2 Historical Water Budgets, page 3-21, Table 3-6. The historical water budget spans almost 100 years and does not account for any temporary surplus. This is not a representative period of analysis for evaluating a SGMA historical water budget period because the selection of this long of a period includes different cultural conditions that have occurred over that time frame. This selection of such a long-time frame is not consistent with industry practice in the selection of a representative period that represents average annual historical conditions.
- **November 2019 Comment** - Section 3.3.4.2 Historical Water Budgets, page 3-21, first paragraph. Revise first sentence from "extractions increased" to "extractions occurred." In addition, please explain whether the IWVGA has considered the process described in this paragraph to be related to removal of temporary surplus rather than an overdraft condition.
- Section 3.3.4.2 Historical Water Budgets, page 3-21, Table 3-6. Since there is still outflow from the basin (ET and Interbasin Subsurface Flow), which is similar to what happened in San Fernando), IWVGA should conduct an analysis and consider whether this reduction in storage is not overdraft but removal of temporary surplus.

- **November 2019 Comment** - Section 3.3.4.3 Current Water Budget, page 3-22, first paragraph. For GSP purposes, the "current water budget" follows the historical water budget; it is not a subset of the historical water budget. Since the historical water budget used for the GSP was 1922 through 2016, it is not clear why the current water budget should be 2011 to 2015. In addition, the 2011 through 2015 period corresponds to an extremely dry period in California history and any review of groundwater levels or water budgets is going to show dramatic declines. The selection of this period appears to be a case of "pick a period and pick your answer".

- **November 2019 Comment** - Section 3.3.4.4 Overdraft Conditions, page 3-22. If there is still outflow from the basin to Salt Wells Valley and extensive ET still occurs at the playa, IWVGA must consider whether this is a removal of temporary surplus, and not overdraft.

- Please provide basin wide figures illustrating groundwater elevations for select periods (dry, wet, historic, current, change in groundwater elevation) utilizing all known data sets. Do not just rely on work by others, the author should utilize their own interpolations and include adequate details (utilizing linear and color contour statistical methodologies).

- Section 3.3.4.4 Overdraft Conditions, page 3-23, second paragraph. As mentioned, several times throughout our review of the GSP development process, USBR-6 is not a single well, this location has three different wells, each screened at a specific interval. For the last 5 years, groundwater levels have been stable at the USBR-6S location. There are two other well depths, but they are screened below all major pumping depths in this area. Based on this data, is it rationale to defend that current pumping volumes in and around the Brown Road area are not operating sustainably? Please revise the text to provide a more comprehensive analysis of all wells detailed in this section.

- **November 2019 Comments** - Section 3.3.4.4 Overdraft Conditions, page 3-22, first paragraph, last sentence. Disagree with the author, as you are using a historically dry period, coupled with a period of temporary surplus to conclude overdraft occurs. In addition, the current water budget period should follow historical water budget period, not be part of it (reference GSP Best Management Practices).

- Section 3.3.4.4 Overdraft Conditions, page 3-25. Please include text that details the most current estimated available storage from both the DRI model and recent WRM evaluation. Recent preliminary investigations by others have estimated that usable amount of available storage could exceed 10 million AF.

- Assuming there is approximately 10 million AF of groundwater in storage, and the cumulative change in storage has been approximately 620,000 AF since 1992 (23-year period); this cumulative change in storage, which includes both representative dry and wet years, reflects a rate of approximately 0.3% per year. It would not be reasonable to expect that the available groundwater in storage would be exhausted over any foreseeable time period.

- Section 3.3.5 Sustainable Yield, page 3-26, first paragraph. Please provide written documentation where the IWV TAC estimated the long-term average natural recharge to be 7,650 AFY (**reference Attachment 1**). Several members of the TAC agreed to a range for recharge and attempted to utilize a range as well as sustainable management criteria into analysis (see Attachment). Please remove reference to TAC.

- **November 2019 Comment** - Section 3.3.5 (Sustainable Yield), page 3-26. Please include details on what the estimated sustainable yield would be if climate change is incorporated (as required by SGMA, **reference Attachment 4**)?
- **November 2019 Comment** - Section 3.3.5 Sustainable Yield, page 3-27, Table 3-8. Regarding Outflows, specific to ET. The ET should be separated out to differentiate between ET from vegetation versus ET from China Lake Playa. ET from China Lake is water that could instead be captured by increasing extraction, thereby removing surplus and increasing aquifer storage space. This is water that is being wasted unless it is meeting a reasonable and beneficial use.
- **November 2019 Comment** - Section 3.3.5 Sustainable Yield, page 3-27, Table 3-8. Regarding Outflows, specific to Extractions. Provide information on extraction by water use sector (ag, urban, domestic, and other).
- Section 3.3.5 Sustainable Yield, page 3-27, Table 3-8. Regarding Change of Groundwater Storage. This increase of -4.080 AFY in aquifer storage depletion indicates that sustainability is not being projected beyond 2040 on an annual basis. As described in the text, the water budget is not intended to be a direct measure of sustainability, instead sustainability indicators are used. Given this fact, please incorporate this context into the overall long-range plan on this basin, i.e., focus on sustainability indicators in specific areas of the basin, and then adjust the specific management actions to meet the sustainability metrics without specifically targeting large agriculture where in certain parts of the basins are actually operating (pumping) without having an negative impact on groundwater levels (i.e. USBR 6S groundwater levels are stable).
- Section 3.3.5 Sustainable Yield, page 3-29. The formulation of the water budget should be separated into a ground-surface water budget and a groundwater budget to clarify the water budget dynamics of the basin, or the author could potentially have more sustainable yield in order to reduce the amount of outflow via ET and subsurface flows to Salt Valley to near zero. Please include the equation that was used to estimate sustainable yield. Currently, the author is only assuming that recharge equals sustainable yield when in reality water lost to ET and outflow to Salt Valley should be included. DWR's Draft BMP also indicates that reducing pumping to an estimated basin-wide average annual recharge does not equate to sustainability.
- Section 3.3.5 Sustainable Yield, page 3-29. Why did the author not include climatic variability over the 50-year planning horizon?
- Section 3.4 Current and Historical Groundwater Conditions and Hydrology, page 3-28, second paragraph, third sentence. Please check formatting.
- Section 4.4.1 Reduction of Groundwater Storage. Overdraft is noted to be occurring in specific areas of the basin (as noted in text developed by the GSP author in section 3.4.2); however please include a detailed section on why specific management areas and/or zones were not developed to allow for specific problem areas to be managed separately and not impact areas that are currently operating in a sustainable manner (**reference Attachment 2**).
- Section 4.4.2 Chronic Lowering of Groundwater Levels. Please provide a figure in the main text that illustrates where in the basin groundwater levels are experiencing "significant" declines and also please define "significant". As denoted above, groundwater levels currently being measured by non-GSA board members indicate that groundwater levels are relatively stable (i.e., not significantly declining" and in fact at least two wells that are currently being monitored as part of this GSP are relatively stable).

- Section 4.4.2 Chronic Lowering of Groundwater Levels. Please include a section detailing the location of all domestic wells where groundwater elevation was collected and provide a summary table of how water levels have changed through time. Given several statements in the GSP documentation are made about domestic well water levels being impacted from pumping, it is crucial the GSP author provide defensible data to support these statements.
- **November 2019 Comment** - Section 3.4.4 Groundwater Quality Conditions, page 3-30, first paragraph. Please include a discussion on the distribution of anthropogenic contaminants (i.e. PFASS), and an evaluation for the potential future potable, industrial or other uses of de-designated groundwater (which would require varying degrees of treatment) on NAWS property.
- Section 3.4.4 Groundwater Quality Conditions, page 3-30. Please include a section detailing the location of all domestic wells that were sampled for water quality and provide a summary table of how that water quality has changed through time. Given several statements in the GSP about domestic well water levels and water quality being impacted from pumping, it is crucial the GSP author provide defensible data to support these statements.
- **November 2019 Comment** - Section 3.4.5 Land Subsidence, page 3-33. Please include additional details on actions the Navy is planning to implement to avoid increasing further land subsidence and also provide a detailed approach on how applicable changes to Navy and other pumping would impact other relevant SMC's.
- **November 2019 Comment** - Section 3.4.7 Groundwater-Dependent Ecosystems, page 3-34. Please include additional details on actions the Navy is planning to implement to avoid impacting GDE's which are located primarily if not entirely on Navy property.
- Section 3.4.7 Groundwater-Dependent Ecosystems, page 3-34. Please include a section detailing what other ecological conditions were assessed to determine the conservation value of potential GDE's. Were critical habitats evaluated?
- Section 3.5.1 Initial Model Document, page 3-36, second paragraph. As described in the text, DRI developed the model for NAWS prior to the formation of the TAC, please note this in the text.
- Section 3.5.2 Flow Model Review and Recalibration. Although the TAC model-ad hoc group had the opportunity to review model documentation, no review occurred of any of the model input or output files. In addition, as discussed during several technical meetings, there was no willingness to adjust the structural architecture of the model, which is known to be flawed. Also, please include a statement that described how quality control was maintained within the DRI model team, after the departure of the primary model leader and what QA/QC processes were implemented by the GSP author to ensure technical data related to the model were simulated correctly. Did the GSP author review all input model files prior to implementing a specific model simulation?
- Section 3.5.4 Baseline Conditions, page 3-43, first paragraph the "current" baseline model developed for the initial modeling scenarios, should not be considered a true baseline scenario (**reference Attachment 4**). For the "current" baseline period, a request was made by the WRM to selected producers to estimate potential future pumping over a 50-year period (factoring in growth). This information was compiled and utilized by the WRM in the current groundwater flow model. Subsequent model scenarios have been compared to this "current" baseline model run. Recommend that a "revised" baseline model scenario be developed in accordance with the

GSP Regulations. The exact development of how pumping rates in the "revised" baseline model scenario should be discussed further.

- Section 3.5.4 Baseline Conditions, page 3-43, Table 3-10. Please insert a description as why future climatic conditions were not incorporated into the baseline simulation.
- **November 2019 Comment** - Section 3.5.5 Numerical Model Scenario 6.2, page 3-44. Concerns with Scenario 6 (as well as Scenarios 3-5) have been extensively documented in the public record (**reference Attachment 4**), but largely remain unaddressed and unresolved. Scenario 6.2 includes many built-in assumptions, including for example, imposition of groundwater pumping allocations that require Meadowbrook and other large producers to cease production over a given time period, relocating the IWV Water District's pumping locations to very area of the Basin from which Meadowbrook and others would be eradicated, and importing water, all of which are more accurately described as Projects and Management Actions, and many of which are objectionable, not fully vetted and not agreed upon. Scenario 6.2 is, in other words, more accurately described as a Project and Management Action model scenario, and not a valid framework for a GSP. At a minimum, individual PMA's should instead be specifically identified, detailed in their assumptions, vetted for feasibility and consensus, and then compared to a revised baseline scenario, before being considered for inclusion or implementation in a GSP. As described under the GSP regulations, PMA's should be developed to address sustainability goals, measurable objectives, and undesirable results identified in the Basin. The PMAs developed for the GSP should consider reducing the potential socioeconomic impacts associated with actions required to sustainably manage groundwater in the Basin.
- **November 2019 Comment** - Section 3.5 Numerical Groundwater Model. All documentation related to the model should be included as an appendix. In addition, please provide more details to how the groundwater model is related to the current conceptual understanding of the basin, and where there are known issues where the current flow model does not represent the current conceptual understanding of the basin (i.e. along north Brown Road, Layer 1 in current flow model does not accurately represent the actual lithology (the model underestimates the actual thickness, which would then overestimate the amount of drawdown occurring from pumping in that area). As detailed during several TAC meetings, current groundwater levels (i.e. USBR 6) in North Brown Road have not changed since approximately 2010. Current pumping in the North Brown Road area is estimated to be greater than 15,000 AFY, and recent groundwater data (i.e. USBR 6S, on-going monitoring by large Ag) has not decreased, suggesting that the sustainable yield in the North Brown Road area could be greater than 15,000 AFY. In addition, the El Paso area has increased groundwater levels over the last decade, which by some preliminary estimates equates to approximately 1,000 to 4,000 AFY of additional recharge. This additional recharge could be utilized to supplement existing supplies. Please include a discussion of this and add as a project Concept in Section 5. The potential use of such additional recharge should be seriously considered in informing any "allocation" scheme.
- **November 2019 Comment** - Section 3.5.5 Numerical Model Scenario 6.2, page 3-44, Management Action No. 1. Please explain in more detail how the allocations over a 20-year period to 2040 were determined, how was the "highest beneficial use determined", and why was the highest continual pumping from 2010 to 2014 used for domestic and municipal pumping (which was also an extremely dry period in California).

- Section 3.5.5 Numerical Model Scenario 6.2, page 3-46, last bullet summary item. Although the GSP author considers projects 3, 4 and 5 not relevant, it is critical to at a minimum explain what these Projects included. Please refine and modify text accordingly.
- **November 2019 Comment** - Section 3.5.5 Numerical Model Scenario 6.2, page 3-46, Table 3-11. Why would agricultural water use necessarily increase from 42% (in 2020) to 56% (in 2070)? Please include text to explain or correct error.
- **November 2019 Comment** - Section 3.5.6 Climate Change, page 3-47. Section 354.18(c)(3) of the GSP regulations require climate change be considered. Model inputs for climate projections should be developed using guidelines outlined in the DWR "Guidance for Climate Change Data Use During Groundwater Sustainability Plan Development" document (DWR, 2018).
- Section 3.5.6 Climate Change, page 3-47. Please include a section in the text on how model uncertainty due to climate change was evaluated.
- **November 2019 Comment** - Management Areas Section should be included as detailed in DWR Annotated outline – Please provide a detailed explanation of why management areas were not evaluated and were not determined to be appropriate for this basin to help facilitate groundwater management by the different water use sector, geology and aquifer characteristics. Multiple requests and suggestions were made from TAC members and the public to consider management areas (**Attachment 2**).
- Section 3.6 Existing Monitoring Network and Evaluation, page 3-47. Why is this section included here? This section should be moved to Sustainability Management Criteria Section (as detailed in DWR annotated guideline document).
- Figure 3-2. Specific contour lines are not legible on this figure, please revise. In addition, a digital elevation map should also be included to help the reader better visually illustrate the topography of this area.
- Figure 3-3. Please include additional details as an overlay of the contaminated sites, the approximate location of NAWS property and the El Paso area.
- Figure 3-4a. Please provide additional cross-sections as requested (**reference Attachment 5**).
- Figure 3-5a and Figure 3-5b. Revise figure format to include color and utilize 11 X 17 format. Also, please include the original geophysical logs (as an overlay) next to the lithology for each well.
- Figure 3-5b. As detailed in Figure 3-5a, please include where NAWS area is depicted in the figure.
- Figure 3-9. As detailed in the cumulative departure curves from China Lake, 2010 – 2015 indicates a dry year, and not an average year, and therefore the methodology used to develop the baseline model scenario, and proposed allocation concepts are technically flawed.
- Figure 3-10. Please provide similar hydrograph data for all creeks that are currently being monitored, including Sand Canyon.
- Figure 3-12. As detailed by the hydrographs, groundwater levels measured from USBR-06 shallow have been stable since approximately 2010 and USBR-10 groundwater levels from all depths have been stable since 2000. Please include additional details on this figure to illustrate the change in groundwater elevation for all key wells. Also, please include at least 5 other contour figures (1995, 2000, 2005, 2010), developed by WRM that include the entire area. Please do not rely solely on

others work. Also, please include at least four figures that illustrate the relative change in groundwater levels (i.e. from 2000 to 2005, 2005 to 2010, 2010 to 2015, and 2000 to 2015).

- Figure 3-13. Based on recent water quality data, TDS values in the shallow wells from USBR-6, USBR-10, NR-2, USBR-5 (located in primary ag pumping areas) and NACC-71 have not shown any significant increase in TDS values since at least 1995. MW TTBK-MW12 (located on NWAS property) has shown significant increase in TDS. Please address this comment.
- Figure 3-19. As discussed above, because of the errors in the original structural architecture of the model, and where pumping has been assigned, the model currently overestimates pumping impacts.
- Figure 3-22. Baseline annual and cumulative plots are misleading, as illustrated this baseline is not a true baseline scenario (please include a footnote to identify the assumptions, **reference Attachment 2, 3 and 5**).

SECTION 4 – SUSTAINABILITY MANAGEMENT CRITERIA

General Comments:

- **November 2019 Comment** - Revise entire Section 4 to follow DWR GSP annotated outline as agreed upon among the TAC and WRM. As an example, why are undesirable results presented prior to measurable objectives and minimum thresholds?
- **November 2019 Comment** – Please include a general summary table for sustainable management criteria. The summary table should include the Sustainability Indicator, Minimum Threshold, Measurable Objective and Undesirable Result.
- As noted in Section 3, data gaps and uncertainty are known to exist in the characterization of the hydrogeologic conceptual model and groundwater conditions. Please explain how this uncertainty was considered when developing the sustainable management criteria and how these uncertainties could impact the SMCs presented in this section.
- Section 4.2.3 Sustainability Measures, page 4-4. Please include a description of how sustainable management criteria were developed using information from interested parties and public input.
- Section 4.2.4 Explanation of How Goal will be achieved. Why is the GSP author including a description of PMA before they are introduced? Remove all reference to PMAs and include language that ensures the Plan area meets its sustainable goal by 2040, the GSA proposed projects and management actions (PMAs) described in Chapter 5, to address undesirable results. The projects and PMAs proposed include augmentation projects and management actions that optimize groundwater use in the Subbasin. The sustainability goals will be maintained through proactive monitoring and management by the GSA as described in this and the following chapters".
- Section 4.2.4 Explanation of How Goal will be Achieved, page 4-5, first bullet. Why is the GSP author constantly dismissing water conservation efforts currently being implemented by other users, i.e. large agriculture?
- Section 4.3 Undesirable Results, page 4-7. There is no reference in the introduction in regard to all beneficial use type, please include a statement (as required by GSP regulations).

- Section 4.3.1 Cause of Undesirable Results, page 4-8, last paragraph. Baseline conditions are referenced as no action, but this baseline as defined is not realistic (**Attachment 3, 4 and 5**). A realistic baseline model scenario (utilizing realistic, peer-reviewed data that follows GSP regulations) should be run. As is, the Baseline condition detailed in this report is not realistic and will affect all additional model results and impacts on how various SMCs are set.
- Section 4.3.1.2 Criteria to Define Undesirable Results, page 4-9, second paragraph. Regarding the reference to the NAWS letter, given the concern of encroachment concerns, please state what actions NAWS is taking to reduce those concerns (e.g. what PMA are they willing to support financially).
- Section 4.3.1.2 Criteria to Define Undesirable Results, page 4-9. Again, using the incorrect baseline model scenario will result in overestimating impacts to domestic wells. A baseline model scenario that complies with GSP regulations should have been used. In addition, given the current structural architecture of the model, pumping is overestimated in the upper aquifer (which is were all domestic wells are screened). The domestic well analysis utilized groundwater elevation contours prepared by others and relied on "hear say" from well owners and did not utilize any peer-reviewed verified data and should be considered as a preliminary analysis, which will be further expanded up during GSP implementation.
- Section 4.3.2.1 Cause of Undesirable Results, page 4-10. As detailed in previous comments, the current Baseline (no action) is not realistic and should be modified to a realistic baseline condition in compliance with GSP regulations as all subsequent SMC criteria (i.e. land subsidence) based on this scenario are not accurate (**reference Attachment 3, 4 and 5**).
- Section 4.3.2.1 Cause of Undesirable Results, page 4012, first bullet. Other than NAWS related pumping, what other beneficial users have control on inducing potential land subsidence?
- Section 4.3.3.1 Cause of Undesirable Results, page 4-12. Given the concern of elevated TDS concentrations, please identify where these are occurring and explain why management areas were not implemented to help manage these specific areas (**reference Attachment 2**).
- Section 4.3.4.2 Criteria to Define Undesirable Results, page 4-14. Given that land subsidence is primarily occurring on NAWS property, potential effects are constrained to this area of the subbasin, and NAWS is not required to participate in SGMA, how can land subsidence be alleviated by non-NAWS pumping? A groundwater management area concept could have allowed for local control to help alleviate these area specific problems (**reference Attachment 2**). Please include a description of management areas was not implemented and who decided that.
- Section 4.4 Minimum Thresholds, page 4-15. Please revise this section to align with GSP Annotated Outline, i.e., Measurable Objectives should be first, followed by Minimum Thresholds and then introduce Undesirable Results. In addition, the Monitoring Network detailed in Section 3 should be moved to Section 4.
- Section 4.4.1 Reduction of Groundwater in Storage Minimum Threshold. Since Groundwater levels serve as a proxy for storage, groundwater level minimum thresholds should be presented prior to groundwater storage.
- Section 4.4.1 Reduction of Groundwater in Storage Minimum Thresholds. As required by GSP regulations, Minimum thresholds for reduction of groundwater storage shall be calculated based on historical trends, water year type and projected water use. Reduction in storage in not a

parameter that can be directly measured; rather, change in storage should be calculated from change in change in groundwater levels and aquifer material. The numerical model is one tool, but please utilize additional analysis to evaluate. As an example, develop spatially weighted average differences of groundwater levels and model derived storage.

- **November 2019 Comment** - Section 4.4.1.7 Method of Quantitative Measurement, page 4-19. For comparison purposes, please provide the Theissen weighted average polygon method to historic and current groundwater conditions and include a detailed description and figures in Section 3. This information will then inform the baseline comparison and can be utilized to assess the impacts of future project management actions into the future.
- Section 4.4.2.6 Representative Monitoring Sites, page 4-23, Table 4-1. Please clarify that USBR-06S is the well be designated as the monitoring well, not just USBR-6.
- Section 4.4.2.6 Representative Monitoring Sites, page 4-23, Table 4-1. Include a column detailing the proposed baseline water surface elevation for each well.
- Section 4.4.2.6 Representative Monitoring Sites, page 4-23. Please reference an appendix that contains hydrographs from which minimum thresholds were developed.
- Section 4.4.3.1 Criteria Used to Establish Minimum Thresholds, page 4-24, first paragraph. SGMA water quality objectives focuses on a constituent's contribution due to activities at the land surface rather than on the presence of naturally occurring constituents. Please provide additional details on what information was reviewed to develop TDS as a constituent.
- **November 2019 Comment** - Section 4.4.3 Degraded Water Quality Minimum Thresholds, page 4-24, second paragraph. Please provide further justification on why the author is increasing minimum threshold values to 600 mg/L and 1,000 mg/L in areas with poor water quality. In addition, water quality data for current agricultural wells have not significantly changed since the early 1990's. Significant data already exists to determine minimum thresholds in this area and should also be derived based on beneficial usage. Please explain how postponing the establishment of minimum thresholds impacts proposed management actions and projects—including potentially imposing severe groundwater pumping limitations that would eliminate an entire class of producers—and how such postponement is justified under SGMA, the DWR Regulations and related requirements.
- Section 4.4.3.1 Criteria Used to Establish Minimum Thresholds, page 4-24, first paragraph. Given the known uncertainty in the current solute transport model, why were other methodologies not utilized to evaluate TDS minimum thresholds. As detailed in the text, TDS concentrations are only available for a few GSP monitoring locations. One common methodology would be to calculate the expected concentration of TDS utilizing the trend in annual changes in concentrations (i.e. expected concentration = initial concentration + (Trend concentration X the number of years since initial concentration). Then compare the expected concentration value to the TDS expected value. If the analyzed concentration is lower than expected concentration, then the analyzed concentration is better than expected concentration for that particular year that represents the measurable objective. If the analyzed TDS concentration is higher than the expected concentration, then add the minimum threshold relative change in concentration value to the expected concentration to obtain TDS concentration that, if exceeded would exceed the minimum threshold concentration. Then compare the analyzed TDS concentration to the expected

minimum concentration and is the analyzed concentration is lower than the minimum threshold would not be exceeded.

- Section 4.4.3.6 Representative Monitoring Sites, page 4-27, Table 4-2. Please include a column that details the minimum threshold concentration for each well.
- **November 2019 Comment** - Section 4.4.3.6 Representative Monitoring Sites, page 4-28. Given the potential for additional groundwater extraction from the El Paso area, recommend adding additional wells to this monitoring network.
- Section 4.4.4 Land Subsidence, page 4-29, first paragraph. This section is confusing as an MT of 0.09 inches/year is being proposed, but then a subsequent sentence suggested that setting the MT may not provide total protection. In addition, as detailed above this area is on NAWS property, and therefore if NWAS is not planning to curtail pumping how can subsidence (induced from NAWS pumping) be managed. Other than on NAWS property, is land subsidence an issue for this basin? If not, then suggest removing this SMC from the GSP.
- Section 4.4.4.2 Relationship to Other Sustainability Indicators. If groundwater levels fluctuate from NWAS pumping, then subsidence could occur. Without controlling NWAS pumping, subsidence will more than likely occur in SNORT area.
- Section 4.4.4.6 Representative Monitoring Sites, page 4-30, third paragraph. If land subsidence is going to be part of this GSP, then please list key indicator wells and the subsequent threshold. Thresholds should be both rate of change and groundwater elevation.
- Section 4.5 Measurable Objectives, page 4-31, first paragraph. Present Groundwater elevation data prior to reduction in storage.
- Section 4.5.1 Reduction of Groundwater in Storage Measurable Objective and Interim Milestones, page 4-31. Provide a summary table that presents the interim milestones (5, 10 and 15 yr.) for change in groundwater storage, not the cumulative volume of groundwater removed from storage.
- Section 4.6.1 Reduction of Groundwater in Storage, Table 4-3, page 4-33. Please include a column that details the change in storage and not just the groundwater removed from storage estimates. In addition, since change in storage is directly related to change in groundwater elevations (multiplied by aquifer storage coefficients) and the areal extend of the subbasin, please also reference the wells used to measure groundwater elevation change as part of this analysis.
- Section 4.6.2 Chronic Lowering of Groundwater Levels Summary, Table 4-4. Include a column that contains the baseline (i.e. 2015) groundwater elevation, and date of the baseline measurement.
- Section 4.6.2 Chronic Lowering of Groundwater Levels Summary, Table 4-4. Please provide further justification as to why only 10 wells are proposed to be utilized to monitor sustainable management criteria. DWR has developed specific regulations and guidance documents (reference Monitoring Networks and Identification of Data Gaps BMP) that recommend that in a basin the size of IWV (600 square miles) and pumps more than 10,000 AFY, the minimum number of monitoring well locations should be between 24 and 60. In addition, why would the author not integrate current agricultural well monitoring into the program?
- Section 4.6.2 Chronic Lowering of Groundwater Levels Summary, Table 4-4. Please include the specific well designation that will be utilized, i.e. USBR-06S.

- **November 2019 Comment** - Section 4.6.2 Chronic Lowering of Groundwater Levels. Several monitoring wells listed in the proposed network have groundwater data that indicate groundwater levels have been stable since 2010 (USBR-01, USBR-04), 2012 (USBR-06S), 2014 (USBR-2), and 2016 (NR 2). Why would current pumping in these areas need to be adjusted or reduced since current groundwater levels in these areas indicate that current pumping is sustainable? And if imposed, how does the IWVGA justify the Scenario 6.2 PMA that would eradicate Agriculture and then move the water district and other producers into that very area?
- Section 4.6.3 Degraded Water Quality Summary, Table 4-5. As detailed above, interim milestones for water quality should be described as annual TDS increase. Also, wells designated as ND, TDS concentrations have not been determined at this time. Given this uncertainty, how will water quality SMCs be derived post-GSP?
- Section 4.6.4 Land Subsidence Summary, Table 4.6. In addition to a subsidence rate, please include groundwater elevation data that would also be used as proxy from nearby wells to monitor land subsidence.
- **November 2019 Comment** - Section 4.7.1 GSP Proposed Monitoring Network, page 4-36, first paragraph. Please provide further justification as to why only 10 or 11 wells are proposed to be utilized to monitor sustainable management criteria. DWR has developed specific regulations and guidance documents (reference Monitoring Networks and Identification of Data Gaps BMP) that recommend that in a basin the size of IWV (600 square miles) and pumps more than 10,000 AFY, the minimum number of monitoring well locations should be between 24 and 60.
- Section 4.7.1 Proposed Monitoring Network and Schedule, page 4-36, second paragraph. If the additional 198 wells are going to be utilized to monitoring groundwater level changes and calculate change in storage, then these wells needs to be included as key monitoring wells and applicable SMC's need to be developed for that group as well.
- Section 4.7.1 Proposed Monitoring Network, page 4-37, third paragraph. If there are additional water quality data from GAMA wells, why are they not being included into the list of key water quality monitoring wells?
- Section 4.7.1 Proposed Monitoring Network, page 4-37, fourth sentence. Please provide specific details on how IWVGA will coordinate with U.S. Navy to identify wells that will be monitored to evaluate land subsidence. In addition, please explain how potential reduction in pumping on U.S. Navy property will be implemented.
- Section 4.7 GSP Proposed Monitoring Network, page 4-36. Please include a summary table that lists the well, GPS coordinates, the specific SMC the associated well will monitor, the monitoring frequency and the basis for selecting that specific well(s).
- Figure 4-1. Please include a list of all the NAWS contaminated sites on this figure.
- Figure 4-2. Additional key wells are needed in the NE and SW areas. Based on previous monitoring well location figures, there are data available. Please revise figured to include all monitoring wells needed (per recommendations by DWR) for a basin this size and then pumps in excess of 10,000 AFY.
- Figure 4-5e. Based on the historic hydrograph, groundwater elevations in this well have been stable since 2011, indicating that groundwater pumping in this area is currently sustainable.

Please revise linear historic trend line accordingly and quantify and display both the annual and 5-year change in GWE.

- Figures 4-6a – 4-6f. Please quantify and display annual and 5-year change in TDS concentrations.

SECTION 5 – PROJECTS AND MANAGEMENT ACTIONS

General Comments:

- Section 5.1 Introduction, page 5-1, first paragraph. SGMA defines "sustainable yield" as the maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus, that can be withdrawn annually from a groundwater supply without causing an undesirable result. Please insert a description that details this information and provide the base period time period.
- Section 5.1 Introduction, page 5-1, second paragraph. Please remove first sentence as the current sustainable yield estimate as mentioned several times throughout the development of this GSP should be further evaluated, provided as a range as this is misleading the reader.
- **November 2019 Comment** - Provide a summary table for each PMA that includes the project, measurable objective expected to benefit, expected benefits to stakeholders, current status, timetable (initiation and completion), estimated cost and permitting and regulatory process.
- Section 5.2.1 Management Action No. 1, page 5-5, last paragraph. Please provide the SGMA code reference for the establishment of a base period. As detailed several times throughout the GSP development process, 2010 – 2015 might not be considered an appropriate base period as this period represents a predominately dry period in California, the base period does not represent long term conditions, etc.
- Section 5.2.1 Management Action No. 1, page 5-6. The allocation and transient pool concept will be determined by IWVGA, which currently only represents select groundwater pumpers (IWVWD and the Navy) in the basin (totaling less than 40% of the pumping in the basin). Please explain how the proposed allocation concept is going to protect those entities that are not represented by IWVGA?
- Section 5.2.1 Management Action No. 1, page 5-6, third paragraph. Please provide additional details on how the 51,000 acre-feet estimate was derived, the individual parties that were involved with developing that estimate. Also, please explain how other pumpers who are not represented on the IWVGA board were involved with evaluating and providing input on this methodology concept.
- Section 5.2.1 Management Action No. 1, page 5-7, second paragraph, fourth sentence. Reference to 37,000 AFY baseline is incorrect and overestimated pumping in the basin. As detailed numerous times in this letter, the referenced baseline should not be considered a baseline, as this assumed "business as usual", which all water users in the basin realized is not possible.
- Section 5.2.1.3 Justification, page 5-9, third paragraph. Without a clear understanding of the FRWR, it will be extremely difficult if not impossible to implement any allocation scheme. As this author has said several times throughout the development of this GSP, all pumping (including from the Navy) needs to be quantified prior to attempting to manage the basin. Water budgets are similar to a bank account in that there are inflows, outflows, and a change in the bank account balance or storage. Inflows and outflows in the hydrologic system are largely driven by processes

occurring on the land surface and it is impossible to estimate the bank account in this basin without qualifying NAWS future pumping demands.

- Section 5.2.1.5 Permitting and Regulatory Process, page 5-11, last paragraph. Please elaborate on how determination, implementation and enforcement of groundwater allocations will occur.
- Section 5.2.1.7 Implementation Process and Timetable, page 5-12, second paragraph. Please explain who is included in the "All groundwater pumpers" category and how domestic de-minimis users and NAWS pumping information will be evaluated, given this is a variable that has not been quantified and would be critical in understanding total volumes pumped from the entire basin.
- Section 5.2.1.7 Implementation Process and Timetable, page 5-12, second paragraph. It is not realistic to only have 15 days to review and provide comments on this document. In addition, the WRM works for the IWVGA, which does not represent all groundwater pumpers in the basin, please provide a detailed process for how this information will be reviewed, and perhaps bring in a third-party state agency to participate in the review.
- Section 5.2.1.8 Legal Authority, page 5-12, last paragraph. Although the GSA has the authority to regulate groundwater extractions, an initial allocation of groundwater extraction or any other limitation on groundwater extraction by the GSA "shall not be construed to be a final determination of the rights to extract groundwater from the basin or any portion of the basin." (Water Code, § 10726.4(a)(2).) In this instance, similar to a physical solution, the management strategy must pay due regard to common law and competing water right claims. (See *City of Santa Maria v. Adam*, (2012) 211 Cal.App.4th 266, 288; *California Am. Water Co. v. City of Seaside*, (2010) 183 Cal.App.4th 471, 480.)
- Section 5.2.1.8 Legal Authority, page 5-13. For each management action and project, please include a section that details how the PMA relates to groundwater sustainability and the expected benefits and metrics. Also include a summary table to detail this process.
- Section 5.3.3 Project No. 3: Basin-wide Conservation Efforts, page 5-33, second paragraph. Why is the WRM excluding large and small agricultural interests from discussing historical, current and proposed future conservation measures that could be implemented?
- Section 5.3.4 Project No. 4: Shallow Well Mitigation Program. Recommend the shallow well mitigation program be established, data collected and then depending on the results of this program allocation, discussions for all groundwater users could be further refined and implemented during the 5-year GSP update.
- Section 5.3.6 Project NO. 6: Pumping Optimization Project. Please explain why IWVGA wants to force agriculture (who are not represented by any IWVGA board members) out of the NW area of the basin (where current pumping is sustainable), and then allow other pumpers (that are represented on the IWVGA board) to move into this area and begin pumping? Is there not a potential conflict of interest in making these management decisions?
- Section 5.4 (Conceptual projects under consideration). Please include an additional project to this list. The project would focus on investigating the potential to utilize surplus groundwater in the El Paso subarea to supplement existing supplies. Preliminary useable groundwater estimates are greater than 4,000 AFY, or even higher if additional volumes are removed from storage. This PMA should be seriously investigated and considered before imposing groundwater pumping limitations or allocations.

- **November 2019 Comment** - Section 5.4.3 Conceptual project under consideration. Please include a project that would focus on treating and using the current de-designated area groundwater supply below NAWS property (which is preliminarily estimated to exceed 500,000 AF). This PMA should be seriously investigated and considered before imposing groundwater pumping limitations or allocations.
- **November 2019 Comment** - Section 5.4.3 Conceptual project under consideration. Please include a project that would evaluate the feasibility to capture current evaporative loses from the Coso Geothermal field and utilize to enhance water in the IWV (which is preliminarily estimated to exceed 10,000 AFY). This PMA should be seriously investigated and considered before imposing groundwater pumping limitations or allocations.
- **November 2019 Comment** - Section 5.4.3 Conceptual project under consideration. Please include a project that would evaluate the feasibility for SVM to treat local groundwater in the Salt Wells Valley Basin (which is preliminarily estimated to exceed 500 AFY).
- **November 2019 Comment** - Section 5.4.3 Conceptual project under consideration. Please include a project that would evaluate the feasibility for SVM to capture current evaporative loses from their facilities.
- Include additional figures to illustrate the approximate location of ALL conceptual projects also under consideration.

SECTION 6 – IMPLEMENTATION PLAN

General Comments:

- **November 2019 Comment** - Section 6.1 Implementation Plan Summary. Please include how stakeholder engagement through the advisory committee activities will be utilized to allow the general public to provide input and develop an exchange amongst a broad range of stakeholders. Develop a schedule (including meeting times, i.e. quarterly) to discuss GSP and GSA activities, provide input and present on items of interest.
- **November 2019 Comment** - Describe how public outreach will continue and provide opportunities for engagement during GSP implementation. This should include providing opportunities for public participation, especially from all beneficial users, at public meetings, providing access to GSP information online, and continued coordination with entities conducting outreach.
- Section 6.3 GSP Implementation Costs and Funding, page 6-5, Table 6-1. Please provide costs for conceptual projects under consideration. This information is critical to ensure that all projects are considered.
- **November 2019 Comment** - Section 6.3.2 Potential Funding Sources, page 6-6. Please provide more detail on the potential funding amount associated with each potential funding source and how that related to applicable projects and management actions.
- **November 2019 Comment** - Section 6.3.2 Potential Funding Sources. Please provide a planning level estimate of annual amount of funds needed to implement GSP projects. Also, prior to implementation of any fee or assessment program needed to fund these projects, please detail the types of assessment studies or other analysis (consistent with regulatory requirements) needed in this section. Notably, the IWVGA's currently imposed GSP development groundwater

extraction fee of $30/AF is among the highest in the State, was not supported by a traditional Proposition 26/218 study or analysis and was imposed over extensive objections raised by many producers and members of the public.

- **November 2019 Comment** - Section 6.4 Periodic Evaluations and Assessment. Please include a summary table for GSP Schedule for Implementation. The table should highlight the high-level activities anticipated for each five-year period. These activities are necessary for ongoing plan monitoring and updates, as well as tentative schedules for projects and management actions.
- **November 2019 Comment** - Provide an additional section, entitled First Five Year Update (2020 – 2025) and identify several key tasks that were identified during the development of the first GSP that need to be further developed or resolved in the five-year GSP update. These could be special studies that need resolution but could not be resolved during the initial GSP development. These could include establishment of metering program, finalizing allocation framework, developing methodology for establishing minimum thresholds for new wells, refining and improving the current groundwater model, mitigation for possible future domestic wells, creating a data gap plan, etc.

APPENDIX (1-A) – GSP MODEL DOCUMENTATION

General Comments:

- Please provide a revised document that includes signatures for all members, as the current version does not.

APPENDIX (1-D) – LISTING OF INTERESTED PARTIES

General Comments:

- Please include a data as to when this list was generated. As is, there are several interested parties' names missing from this list.

APPENDIX (1-E) – COMMUNICATION AND ENGAGEMENT PLAN

General Comments:

- Donna Thomas is no longer associated with the IWVGA PAC, therefore please revise PAC chair, or whoever was in charge of further implementing the Communication and Engagement Plan.

APPENDIX (2-A) – POSSIBLE AND CONFIRMED GROUNDWATER CONTAMINATION SITES

General Comments:

- Please add additional data that approximates both the vertical and horizontal contamination for each contaminated site. As displayed, the data only identified the site and not the lateral and vertical extend of the site contamination.

APPENDIX (3-A) – WATER PRODUCTION DATA

General Comments:

- Please provide a revised table that is complete (through 2017) and estimate the error associated with gathering this pumping information. Please include a graphic to illustrate the change in groundwater usage for each entity from 2000 – 2005, 2005 – 2010, 2010 – 2015 and 2015 – 2017.

APPENDIX (3-D) – GROUNDWATER ELEVATION CONTOUR MAPS AND SELECTED WELL HYDROGRAPHS

General Comments:

- There are no contour maps included in this appendix. Please include contour maps or remove the word contour map from this appendix.
- Also, please revise selected hydrographs to include all current data (through 2018).

APPENDIX (3-E) – SHALLOW WELL IMPACT ANALYSIS

General Comments:

- What independent analysis occurred to verify the 2014 estimate of shallow wells?
- Section 3.0 Changes in Depth to Groundwater. Why did the author rely on KCWA contour maps and not perform their own independent contouring analysis?
- Figure 4 and Figure 5. Please include the well control points used by KCWA to interpolate this information. In addition, also provide a change in groundwater elevation contour map between 2000 – 2005, 2005 – 2010, and 2000 to 2015.
- Please include additional details to how regional pumping changed from 2010 to 2015 in specific areas to correlate pumping to these changes in groundwater levels. According to Appendix 3-A, pumping in 2010 was approximately 27,000 AFY and in 2015 it was 25,000 AFY. Given the reduction in pumping, why would groundwater elevation data not correlate?
- Section 7. Please provide a similar analysis using a realistic baseline scenario (less than 35,000 AFY) as this presents an unbiased review of planned pumping and would align with current annual pumping estimates (approx. 25,000 AFY).

APPENDIX (3-E) – SHALLOW WELL IMPACT ANALYSIS

General Comments:

- Please include a Table of Contents
- Section II.5 Subsidence modeling with MODFLOW, page 267, last paragraph. The author admits that the model overestimated subsidence, which was also observed in several groundwater elevation simulations. This overestimation is related to the model structure and how pumping is allocated into specific layers.

APPENDIX (3-H) – GSP MODEL DOCUMENTATION

General Comments:

- **November 2019 Comment** - The primary authors of this model document should sign, date and stamp this document per California Code of Regulations.
- **November 2019 Comment** - Section 2.4.1, page 2, describe the vertical extension of the General-Head Boundary. Also, provide a figure which illustrates the location of GHB and No-Flow boundary conditions on the perimeter boundaries and a cross section which shows the vertical distribution of the boundary conditions as well.
- **November 2019 Comment** - Section 2.4.3, page 3, describe if the recharge rates are specified only at the highest active layer of the model or only at the first layer. Also, describe briefly why the author did not use "Recharge" package of MODFLOW to simulate the mountain-front recharge and instead, the "Well" package was utilized.
- Based on previous work, transient recharge is not constant (i.e. the same as steady state recharge). Why was this not incorporated into the model to take advantage of additional wet years, which would result in additional water in storage.
- Section 2.4.3, and the associated figure 4 on page 6 implies that there are some recharge boundary conditions on the perimeter boundaries but the figure shows "black lines" everywhere on the perimeter boundary. Provide more transparent description or revise the figure with color lines representing different boundary conditions (No-Flow/GHB/Recharge) on the study domain.
- **November 2019 Comment** - Figure 4, page 24, provide units for the flux values.
- **November 2019 Comment** - Section 2.4.5, page 4, provide a range of depth for the pumping wells.
- Figure 11. Where NAWS pumping wells simulated? If so, please include approximate locations.
- **November 2019 Comment** - Section 2.4.5, page 11, describe the package used for simulating the pumping wells. Is it "Well" package or "MNW" package (Multi-Node Well)?
- Section 2.5.1 Steady-State Model, page 16, vertical anisotropy value is not realistic and will underestimate the impact from pumping. Vertical anisotropy ratio should be closer to 0.1 (or 10% of horizontal hydraulic conductivity) and should also be varied spatially. Please revise model language to address this uncertainty and explain the potential impacts on all model scenarios.
- Section 2.5.1 Steady-State Model, Figure 14. Please include the locations of calibration targets.
- Section 2.5.1 Steady-State Model, Figure 17. Given the error in using unrealistic vertical anisotropy values, and the non-unique solution for this code, please address the uncertainty in this calibration and identify other hydrologic properties that will need to be refined as part of the modeling process, and the impacts this will have and the proposed allocation schemes.
- Section 2.5.2 Transient-Historical Model, Figure 27. In general, simulated groundwater levels are lower than observed groundwater levels. In addition to the error in vertical anisotropy (which would indicate simulated water levels should be less than observed), please explain this model error and the impacts it will have on any model simulations.
- Section 2.6 Sensitivity Analysis. Please revise sensitivity analysis to include vertical anisotropy evaluation. Recommend running at 0.1, 0.5 and comparing to baseline. In addition, given that

this model is being utilized to drive management decisions, please include at least 15 wells to assess simulated heads.

- Section 2.7 Predictive Flow Models, page 39. Reference is made to the baseline flow model simulates a "no action" alternative, where most groundwater withdrawal rates and locations that occurred in 2016 are continued into the future…….These baseline assumptions do not align with the baseline scenario presented in the GSP. Please explain the difference and resolve accordingly.
- Section 2.7 Predictive Flow Models, page 39. There were in fact more than just two predictive flow models run, please present a brief summary of all predictive model scenarios and the applicable inputs and assumptions for each.
- **November 2019 Comment** - Section 3.2, page 13, provide more detailed information about the temporal-resolution of the transport model. The flow model has annual time discretization for the transient model and monthly discretization for the predictive model. What is the time-step of the transport model?
- Section 3.3 Configuration, page 41, third paragraph, third sentence. Please correct reference to Section XX.
- **November 2019 Comment** - Section 3.4, page 14, last line, and the associated figure 36, page 43, simple averaging of simulated TDS value from layers of the multi-screen well is not exactly an appropriate approach, unless the flow rates to the well screens are the same for those layers. The calculation of mean concentration from a multi-screen well is usually based on volumetric flow rates to/from each screen. This flow rate can be captured by using MNW package in modeling the pumping wells (https://pdfs.semanticscholar.org/e8f2/dc3b4aa227532ad74f977b99abf070560321.pdf):

$$C_{average} = \frac{\sum_{i=1}^{n} Q_i C_i}{\sum_{i=1}^{n} Q_i}$$

where Q_i and C_i are flow rates and concentrations for each layer of the multi-screened well, respectively.

- Section 3.4 Initial Boundary Conditions, page 49, Figure 41. Influent concentrations of 350 mg/L are too low. Based on recent surface water sampling data (Sand Canyon), TDS concentrations are greater than 500 mg/L. Please revise analysis accordingly.
- **November 2019 Comment** - Section 3.5, page 50, provide additional graphs to describe the qualitative validation of the model using box and whisker plot of the TDS concentrations (simulated vs. measured) for different time intervals (for example 1920-50, 1951-70, 1971-90, 1991-2016) for shallow (plot #1), intermediate (plot #2), and deep (plot #3) TDS zones. Collect all available measured concentrations for each depth zone, for each time interval, and then compare them with the model's results at the same location and time (As reference, review https://doi.org/10.1016/j.jconhyd.2019.103521 , section 3.1).
- Section 3.5, page 51, Figure 42. For clarification, based on proposed DRI baseline model predictions, there is no annual rate of change for TDS is several areas (not designated as yellow or orange), please clarify this and incorporate into the legend (reference as TDS = no change).

- Section 3.6 Transport Results, page 52, first paragraph, last sentence. Correct reference to Section XX of the GSP report.
- Section 3.6 Transport Results, page 53, Figure 43 and Figure 44. Based on transport results, there is very little change predicted to occur under assuming baseline and model scenario 6.2. Given these results, is there really a TDS issue from pumping occurring in this basin?
- Section 4, page 17, add to the limitation list, that this transport model is qualified only for the purpose of "scenario analysis" and it is not an "absolute predictive model" because the transport model has not been quantitatively calibrated (which increases the uncertainty of the simulated results).
- Section 4, page 17. Please include an explanation why climate change was not evaluated as part of this modeling effort.
- Either address or include a statement as to why not all PMA were evaluated and presented as part of this modeling report (instead they are buried in an appendix). This is critical to ensure sustainability is achieved utilizing one or more PMA's.
- Please note that numerical groundwater models are created based on simplified assumptions used to replicate complex natural systems. Consequently, results are generally subject to errors and limitations due to conceptual misunderstandings of the hydrologic system and uncertainties in estimating aquifer properties and boundary conditions. These uncertainties are due to both spatial and temporal limitations in observation data and the types of observation data available.
- Please include a summary and conclusions section in this report
- Please highlight the sustainability yield calculated from all scenarios and present as a range in AFY.

APPENDIX (4-A) – NAVY LETTER ON ENCROACHMENT CONCERN

General Comments:

- If Navy correspondence is going to be included, please also include all correspondence material from all entities. Including Navy only correspondence indicates favoritism by the IWVGA and will be looked on negatively by DWR.

APPENDIX (5-A) – U.S. NAVY LETTER ON HISTORICAL WATER USE

General Comments:

- This correspondence should be removed and be incorporated as part of the allocation discussion scheduled to occur after the GSP has been submitted in 2020 or allow other beneficial users to provide similar documentation and include into this GSP appendix.

Thank you for considering our comments and recommendations for the December 2019 Draft and we expect that response to all comments from all letters and the public for this review (unlike the November 2019 comments) will be reviewed, categorized and addressed in writing. We look forward to working with you to further produce and implement the Groundwater Sustainability Plan in Indian Wells Valley.

Sincerely,

LUHDORFF & SCALMANINI
CONSULTING ENGINEERS

Eddy Teasdale, P.G., C.HG
Supervising Hydrogeologist

CC: Adam Bingham (Chair Technical Advisory Committee)

Attachments:

Attachment 1 – Indian Wells Valley Groundwater Authority Technical Advisory Committee Member on March TAC Item (February 22, 2018) – Items presented, included water budget, establishment of baseline, groundwater modeling, transparency, development of annual storage volumes (analytical and numerical methods), groundwater levels, contour maps, overdraft, additional resources,

Attachment 2 – Indian Wells Valley Groundwater Authority Technical Advisory Committee Member on Match TAC Item (dated March 28, 2018) - Items presented included model update, water budget elements and historical pumping, recycled water opportunities, alternative water and imported water opportunities, reporting on production.

Attachment 3 – IWV TAC Comments on Proposed Modeling Scenario 1 (dated January 9, 2019) – Provided comments on Model Scenario 1.

Attachment 4 – Indian Wells Valley Groundwater Authority Technical Advisory Committee Member Comments on September 5, 2019 TAC Items (dated September 12, 2019). Items included draft model documentation appendix, shallow well impact results & sustainable management criteria, concerns about the baseline model scenario and scenario 6.2.

Attachment 5 – LSCE Comment Letter on TAC/PAC GSP Draft (dated November 15, 2019).

Attachment 1

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February 22, 2018
File No. 18-1-021

Sent Via E-mail: JeanM@stetsonengineers.com

Ms. Jena Moran, P.G., C.HG
Senior Hydrogeologist
Stetson Engineers Inc.
785 Grand Avenue, Suite 202
Carlsbad, CA 92408

SUBJECT: Indian Wells Valley Groundwater Authority Technical Advisory Committee Member Initial Comments on Water Budget Elements and Initial Groundwater Levels

Dear Ms. Moran:

This letter is submitted in response to the Indian Wells Valley Groundwater Authority (GA) Water Resources Manager Discussion Overview memorandum to the GA Technical Advisory Group (TAC) members, dated February 1, 2018, which was provided for the TAC February meeting. As indicated in that memorandum, Stetson Engineers requested TAC members to provide written initial comments on: (1) Water Budget; (2) Initial Groundwater Levels; and (3) specific Water Resources Manager Questions for TAC Members. We appreciate the opportunity to provide preliminary comments on these subjects to lay groundwork for the next several TAC meetings, and we look forward to developing a process to reach technical consensus as we move forward through the GSP process. Our comments are itemized below based on the three discussion topics outlined in the February 1, 2018 memorandum provided by Stetson Engineers.

Discussion Topic Number 1 - Water Budget

A water budget is defined by SGMA as an accounting of the total groundwater and surface water entering and leaving the basin including the changes in the amount of water stored. Water budgets should be developed based on accepted scientific practices as documented in DWR's Water Budget Best Management Practices. The water budget should be developed based upon best available data, information and science. Water budgets and base period analysis should be arrived at through consensus among the TAC and with the Water Resources Manager. As they are developed, water budgets should be compared to the water budgets from previous studies to evaluate whether the modeling tools produce similar water budget estimates. In accordance with GSP regulations, the evaluation of a base period representing average conditions and for the analysis of sustainable yield should also be derived through TAC and Water Resources Manager consensus.

Historical water budget information should be a primary basis for estimating future baseline conditions of hydrology, water demand and groundwater supply reliability over the 50-year GSP planning and implementation horizon. Historical precipitation, evapotranspiration information should be developed based on best available science and information, and used in developing future baseline hydrology conditions. The uncertainty associated with climate change should be considered and addressed, including through evaluation of climate change scenarios provided by DWR and reliable local data. Per GSP regulations, the most recent land use, evapotranspiration, and crop coefficient information should be evaluated for baseline conditions for estimating future water demands with consideration given to future water demand uncertainty associated with projected changes in local land use planning, and population growth. Likewise, the most recent water supply information should be evaluated for baseline conditions for estimating future surface water supply incorporating the historical surface water supply reliability with consideration given to projected changes in local land use planning and population growth. The projected water budget accounting should also include estimated changes in the projected water budget resulting from planned implementation of the selected projects and should be used to quantify the estimated future baseline conditions of supply, demand, and aquifer response to GSP implementation. The projected water budget assessment in the GSP should also evaluate and identify the level of uncertainty in the projected water budget estimate.

Initial Comments on Topic Number 1 – Water Budget

- A methodology should be developed and agreed upon for how measurements of all groundwater extraction volumes will be calculated, recorded, stored and reported, and to whom.
- The Cooperative Groundwater Management Group has tabulated historical groundwater pumping data back to 1975. To the extent that data is relied upon, the quality control and assurance of that data collection and calculation process should be reviewed and updated where data gaps and data overlap appear to exist, for example:
    - Indian Wells Valley Water District (IWVWD) (which acquired lands and/or pumping from other entities listed on the chart)
    - Naval Air Weapons Station – China Lake (as to conservation efforts listed in the footnotes)
    - Orchards, Private Wells, and various ranches where the data, as currently presented, includes overlap as described in part in the footnotes.
- To account for diverse conditions and water users in the basin, discussion should occur, and decisions should be made as to the appropriateness of developing or utilizing basin management areas within the context of the water budget.
    - GSP Regulations define a management area as, “an area within a basin for which the Plan may identify different minimum thresholds, measurable objectives, monitoring, or projects and management actions based on differences in water use sector, water source type, geology, aquifer characteristics, or other factors” (Section 351).

  - Individual management areas must be coordinated to achieve a basin's overall sustainability goal.
- Groundwater model utilization to support basin water budget.
  - As described in DWR's Groundwater Modeling BMP, the development and use of groundwater model in support of a GSP should promote transparency, coordination and data sharing.
  - Greater transparency and TAC engagement is necessary to achieve "buy-in" on current groundwater modeling efforts in the Indian Wells Valley. We reiterate a previous recommendation that a TAC model review panel be established to peer-review the current groundwater flow and transport model. At the March TAC meeting, dates and times for a TAC model review panel workshop should be established, and individual workshop participants identified. Participants should also include the Desert Research Institute (DRI). I also request to be on the panel.
  - Develop annual change in storage volumes utilizing both analytical and numerical methodologies and evaluate the similarities and differences between the methods.
  - Discuss how climate models, land use and growth production will be incorporated into future model scenarios.

Discussion Topic Number 2 - Initial Groundwater Levels

Through GSP development, gaps in available monitoring data including for groundwater levels, and groundwater quality, should be determined. In addition, potential approaches for filling the gaps, including incorporation of existing wells into GSP monitoring activities, and for construction of new monitoring wells should occur. The GSP groundwater monitoring network should be developed using existing and new infrastructure and coordinated with other GSP efforts including but not limited to:

1) Regular groundwater level collections (e.g., CASGEM, DWR, USGS, local entities);
2) Regular groundwater quality testing required by the California Division of Drinking Water for public supply wells;
3) Project- or industry-specific groundwater quality data collection required by the Regional Water Quality Control Board for regulated facilities (e.g., contamination sites);
4) Existing wells that can be added to the monitoring network; and
5) New dedicated monitoring well installations

Groundwater elevation data, groundwater contour maps, and hydrographs prepared as part of the development of the Hydrogeologic Conceptual Model should be evaluated further in terms of sustainability goals, minimum thresholds, measurable objectives, and sustainable yield. Similarly, the amount of groundwater storage and groundwater storage capacity should be determined relative to sustainability criteria and sustainable yield.

Initial Comments on Topic Number 2 – Initial Groundwater Levels

- Well location names utilized to construct the contour maps references on PLATE7-IWV-GW DEPTH Spring 2015 and PLATE8-IWV-GW ELEV Spring 2015 should be posted on the applicable figure.
- Interpolation and contouring methodologies should be described and discussed.
- TDS values should be considered in contouring as an analogy for evaluating groundwater flow patterns.
- Well information such as depth, well type (production or monitoring well) should be defined within the figure legend.
- Groundwater elevation and change in groundwater elevation figures for both shallow and deep wells should be created and evaluated.
- Groundwater elevation hydrographs for each well should also be posted within the figure to help facilitate future discussions regarding base period selection.
- All available groundwater elevation data (contour maps and hydrographs) should be incorporated into the IWV DMS platform to help facilitate development of future measurable threshold and measurable objective discussion topics.
- It is crucial that groundwater level information will be considered in the establishment of minimum thresholds and measurable objectives for IWV to consider as part of the development of the GSP. Per GSP regulation 354.28, minimum thresholds need to be established for each sustainability indicator at each monitoring site. Exceedance of a minimum threshold is presumed to cause undesirable results. The development of a minimum threshold that is unique to each monitoring facility allows the GSA to utilize historical data in establishing those thresholds that are representative of the monitoring facility location in the basin. The level of effort involved in this task could be significant and depends on the number of existing facilities agreed upon for monitoring of the sustainability indicators that are identified. Although this task may involve a substantial effort in the short term, the long-term benefits for groundwater management in IWV will be pronounced and more accurately account for historical variations and conditions. The recommended minimum thresholds should focus on sustainability indicators and be consistent with the GSP regulations.
- Review and develop a revised GSP applicable monitoring program (as compared to data gaps present in the historical data record conducted as part of the existing scope of work) and identify data gaps related to current monitoring of the sustainability indicators listed below. The review should include frequency of monitoring, monitoring facility locations, and types of data collected. The results of the review should be documented in a monitoring network plan that will focus on the following sustainability indicators that are relevant to:
    - Land Subsidence
    - Chronic Lowering of Groundwater Levels

  - Reduction of Groundwater Storage
  - Degraded Water Quality
- The monitoring network plan should include recommendations for augmentation, as appropriate, of the current monitoring program to ensure compliance with GSP regulations and address data gaps as presented in Article 5, Subarticle 4 of the GSP regulations and how uncertainty in monitoring will be addressed.

Discussion Topic Number 3 - Water Resources Manager Questions for TAC Members Regarding Overdraft as related to future sustainable yield discussion

"Sustainable Yield" is defined as the maximum quantity of water, calculated over a base period representative of long-term conditions in a basin and including any temporary surplus, that can be withdrawn annually from a groundwater supply without causing an undesirable result. As such, the sustainable yield translates to the amount of groundwater pumping that can be sustained without producing significant and unreasonable declines in groundwater storage or other undesirable results. There are three primary methods for estimating sustainable yield: 1) using water budgets; 2) performing change in groundwater storage calculations; and 3) using a groundwater flow model.

The first method looks at water budget components over a balanced hydrologic period in a basin to determine if pumping results in long-term declines in groundwater storage (as determined annually from the balance of total inflows and outflows) or if other sustainability indicator thresholds are being exceeded. Long-term storage decline and/or exceeding other sustainability indicators may indicate a need for specific projects/management actions to meet the basin sustainable yield.

The second method involves looking at changes in the measured groundwater elevations over specific time periods and relating that to changes in groundwater storage over time. An effective way of assessing the change in storage under this method is to utilize groundwater elevation surfaces during spring, when much of the winter recharge has occurred and basin pumping is typically at a minimum, and to compare these spring water levels from year to year. Changes in groundwater storage can be translated to volumes of water lost or gained from year to year in this manner. These changes in groundwater storage over the long-term (or at least multiple years) can then be compared to pumping amounts over the same time periods to determine which time periods resulted in stable conditions when no net depletion of storage occurred (or how much storage was lost compared to total pumping).

The third method involves utilizing a groundwater flow model. The flow model would be the most robust tool to determine sustainable yield, as various management actions and groundwater pumping model inputs can be altered and effects on groundwater storage, streamflow contributions, and subsurface lateral flows can be simulated. The testing of various combinations of management actions/projects and different amounts of groundwater pumping and the evaluation of simulated effects on groundwater storage, streamflow contributions, and subsurface lateral flows would lead to an

estimate of sustainable yield. See comments on Topic Number 1 regarding recommendations for establishing a model review panel.

Comments on Topic Number 3 - Specific Water Resources Manager Questions for TAC Members

The Water Resources Manager's February 1 memorandum asked TAC members to provide comments on two questions: (1) "Is there TAC agreement the basin is over drafted?" (2) "Are there additional studies and/or resources the TAC believes should be considered during the development of the Hydrogeological Conceptual Model?"

GSP Regulation 354.18(b) provides that a water budget shall quantify the following, either through direct measurements or estimates based on data:

> (1) Total surface water entering and leaving a basin by water source type.
>
> (2) Inflow to the groundwater system by water source type, including subsurface groundwater inflow and infiltration of precipitation, applied water, and surface water systems, such as lakes, streams, rivers, canals, springs and conveyance systems.
>
> (3) Outflows from the groundwater system by water use sector, including evapotranspiration, groundwater extraction, groundwater discharge to surface water sources, and subsurface groundwater outflow.
>
> (4) The change in the annual volume of groundwater in storage between seasonal high conditions.
>
> (5) If overdraft conditions occur, as defined in Bulletin 118, the water budget shall include a quantification of overdraft over a period of years during which water year and water supply conditions approximate average conditions.
>
> (6) The water year type associated with the annual supply, demand, and change in groundwater stored.
>
> (7) An estimate of sustainable yield for the basin.

Bulletin 118, Update 1980 defines a groundwater basin as being *subject to critical conditions of overdraft* "when continuation of present water management practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts." It further states that "the adverse impacts do not necessarily occur throughout the entire basin; in fact, water levels may be rising in one portion of the basin, or in one aquifer, even though the basin is in overdraft or subject to critical conditions of overdraft."

Bulletin 118, Update 2003, describes *groundwater overdraft* as a "condition of a groundwater basin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years, during which the water supply conditions approximate average conditions."

It states further that "despite its common usage, the term overdraft has been the subject of debate for many years. Groundwater management is a local responsibility, therefore, the decision whether a basin is in a condition of overdraft is the responsibility of the local groundwater or water management agency."

Under SGMA, all high- or medium-priority basins that have been designated in Bulletin 118 as basins that are *subject to critical conditions of overdraft* must be managed under a GSP by January 31, 2020. Bulletin 118 has identified the IWV basin as one of twenty-one basins in California that are *subject to critical conditions of overdraft*.

First Question: Is there TAC agreement the basin is over drafted? If so, by how much?

- Based upon current and available data and DWR's designation of the IWV basin as a basin that is subject to critical conditions of overdraft, the IWV groundwater basin does presently appear to be experiencing overdraft.
- The *extent* of overdraft, however, requires further analysis and the collection, compilation and evaluation of relevant data, including the elements required by GSP regulation 354.18(b) set forth above. Studies currently underway (e.g. USGS recharge study) will further refine the analysis. As described in Topics 1 and 2 above, more and better refined data is needed for each water budget element, which will be used to define and estimate historic, current and projected potential overdraft.

Second Question: Are there additional studies and/or resources the TAC believes should be considered during the development of the Hydrogeological Conceptual Model?

- Ongoing SkyTEM hydrostratigraphic and water quality data should be incorporated into the refined HCM.
- DRI November 17, 2017 Technical Memorandum detailing updates to the Indian Wells Valley Groundwater model since the 2016 model update.
- Sandia Report (SAND2016-8930) – Frontier Observatory for Research in the Geothermal Energy: Phase 1 Topical Report West Flank of Coso, CA.
- Work with the TAC to create a comprehensive bibliography list of all reference documents and highlight why selected studies are or are not to be utilized (ex. Todd Report).
- When applicable, define the methodology of how extraction and recharge estimates are derived (i.e. directly measured versus equation derived) in prior reports.

Thank you for considering our initial comments and recommendations. We look forward to working with you to further define, develop and produce the Groundwater Sustainability Plan in Indian Wells Valley.

Sincerely,

LUHDORFF & SCALMANINI
CONSULTING ENGINEERS

Eddy Teasdale, P.G., C.HG
Senior Hydrogeologist

Attachment 2

March 28, 2018
File No. 18-1-021

Sent Via E-mail: SteveJ@stetsonengineers.com

Mr. Steve Johnson, P.E.
Indian Wells Valley Groundwater Authority Water Resources Manager
Stetson Engineers Inc.
861 S. Village Oaks Drive, Suite 100
Covina, CA 91724

SUBJECT: Indian Wells Valley Groundwater Authority Technical Advisory Committee Member Comments on March TAC Items

Dear Mr. Johnson:

This letter is submitted in response to the Indian Wells Valley Groundwater Authority (GA) Water Resources Manager's (WRM) March 6, 2018 request for input from Technical Advisory Committee (TAC) members on the following items:

1. Model Update
2. Water budget elements and historical pumping
3. Recycled water opportunities
4. Alternative water and imported water opportunities
5. Reporting on production pumping
6. July TAC meeting date

We appreciate the opportunity to provide preliminary comments on these items to lay groundwork for the next several TAC meetings, and we look forward to developing a process to reach technical consensus as we move forward through the GSP process. Our comments are itemized below based on the six discussion topics outlined in the March 6, 2018 e-mail correspondence from Stetson Engineers to the TAC.

Discussion Topic Number 1 - Model Update

WRM Request: "Model Update. No input requested at this time. Next update April 5, 2018."

Comments on Topic Number 1 – Model Update

- We look forward to receiving an update from the WRM at the April TAC meeting. As agreed upon at the March TAC meeting, an ad hoc groundwater model group of TAC members has been formed. Members of this ad hoc group include Adam Bingham (representing wholesaler and

industrial use); Eddy Teasdale (representing large agriculture); and Don Decker (representing domestic well users).

- The first task for this group should be to prepare for and attend a groundwater model workshop during the second quarter of 2018 with the model development team and the WRM to discuss the groundwater model inputs, outputs, calibration, sensitivity and uncertainty.
- The second task for this group should be to report back to the TAC, along with recommendations to the TAC and WRM.
- The ad hoc group and TAC should discuss and seek consensus on how climate models, land use and growth production will be incorporated into future model scenarios,
  and how the groundwater model will be utilized to support key GSP components including but not limited to water budgets, any proposed fees, and in-basin water transfers.
- As described in DWR's Groundwater Modeling BMP, the development and use of groundwater model in support of a GSP should promote transparency, coordination and data sharing. TAC members have offered to help develop an agenda for the ad hoc model workshop. As stated during the March TAC meeting, greater transparency and TAC engagement is necessary to achieve "buy-in" on current groundwater modeling efforts in the Indian Wells Valley, particularly because
  groundwater modeling will help the determination and mitigation of undesirable results, and establishing minimum thresholds, measurable objectives and sustainability goals
- The model should be utilized to identify gaps in available monitoring data including for groundwater levels, and groundwater quality. The WRM should outline these gaps and potential approaches for filling the gaps, including incorporation of existing wells into GSP monitoring activities, and construction of new monitoring sites. The GSP groundwater monitoring network should be developed using existing and new infrastructure including but not limited to:
  - regular groundwater level collections (e.g., CASGEM, DWR, USGS, local entities);
  - regular groundwater quality testing required by the California Division of Drinking water for public supply wells;
  - project- or industry-specific groundwater quality data collection required by the Regional Water Quality Control Board for regulated facilities;
  - existing wells that can be added to the monitoring network;
  - new dedicated monitoring well installations;
  - public land subsidence data collected from Continuous Global Positioning Systems sites (CGPS) by the Plate Boundary Observatory (PBO) and the University NAVSTAR Consortium (UNAVCO), which provide land surface elevation data at 15-minute intervals.
  - The monitoring network should be designed and tailored to meet GSP requirements in order to track each applicable sustainability indicator. Monitored wells should be selected and grouped in order to provide representative data for a particular geographic and hydrogeologic condition. Local stakeholder input will be crucial for participation and cooperation in this tailored approach to the monitoring network, especially for

groundwater levels and groundwater quality. The manner in which monitoring data will be compiled and stored in a DMS, and included in the GSP and Annual Reports, should also be addressed.

Discussion Topic Number 2 – Water Budget Elements and Historical Pumping

WRM Request: "Water Budget Elements/Historic Pumping. Received Ad Hoc designation from Adam Bingham. Workshop to be scheduled in June/July. No input requested at this time. Next Update April 5, 2018."

Comments on Topic Number 2 – Water Budget Elements and Historical Pumping

Water budgets should be developed based on accepted scientific practices as documented in DWR's Water Budgets BMP. The best available data and science should be used to develop water budgets for the Indian Wells Valley Groundwater basin over the selected base period of analysis. In accordance with GSP regulations, a base period must be selected so that the analysis of sustainable yield is performed for a representative period, with minimal bias that might result from the selection of an overly wet or dry period while recognizing changes in other conditions including land use and water demands. A preliminary base period assessment should be conducted by the WRM and then reviewed by TAC members. TAC input and recommendations should be incorporated in the final selection of the base period. Projected water budget accounting should also include estimated changes resulting from planned implementation of the selected projects determined through the recycled and imported water tasks and should be used to quantify the estimated future baseline conditions of supply, demand, and aquifer response to GSP implementation. The projected water budget assessment in the GSP should also evaluate and identify the level of uncertainty in the projected water budget estimate.

Future workshop discussions regarding water budget elements and historical and future pumping data should include and or address the following comments:

- To account for diverse conditions and water users in the basin, TAC discussions should occur, and recommendations should be made as to the appropriateness of developing or utilizing basin management areas within the context of the water budget. GSP Regulations define a management area as, "an area within a basin for which the Plan may identify different minimum thresholds, measurable objectives, monitoring, or projects and management actions based on differences in water use sector, water source type, geology, aquifer characteristics, or other factors" (Section 351). Individual management areas must be coordinated to achieve a basin's overall sustainability goal.
- In terms of groundwater levels, the minimum thresholds should be developed based on long-term groundwater level data. Representative wells selected for geographic areas and particular aquifer units (such as management areas) should be used to develop minimum thresholds. For groundwater storage, minimum thresholds should be developed such that groundwater storage changes are maintained within a reasonable limit, pending water year types and planned groundwater management projects. Groundwater quality minimum thresholds will likely be

related to drinking water maximum contaminant levels (MCLs), agricultural limits, and other water quality standards for constituents of interest. A list of water quality parameters specific to the IWV Basin should be used for developing minimum thresholds for groundwater quality constituents.

- The Cooperative Groundwater Management Group has tabulated historical groundwater pumping data voluntarily provided by pumpers dating back to 1975. That data, however, contains several acknowledged gaps and inconsistencies. To the extent that data is relied upon, the quality control and assurance of that data collection and calculation process should be reviewed and updated where data gaps and data overlap appear to exist, for example:
    - Indian Wells Valley Water District (IWVWD) (which acquired lands and/or pumping from other entities listed on the chart)
    - Naval Air Weapons Station – China Lake (as to conservation efforts listed in the footnotes)
    - Orchards, Private Wells, and various ranches where the data, as currently presented, includes overlap as described in part in the footnotes.
- It is critical that data gaps in historic and current pumping figures must be filled before attempting to impose any type of volumetric fee based on pumping.

Discussion Topic Number 3 – Recycled Water Opportunities

WRM Request: "Recycled Water Opportunities. Please provide input on the TAC presentation. Please include all recycled water opportunities for supply and use, known constraints, and input on next steps."

Comments on Topic Number 3 – Recycled Water Opportunities

The preliminary recycled water presentation at the March TAC meeting summarized potential current and future opportunities for the use of recycled water in the Indian Wells Valley. The next step in the analysis is for the WRM to incorporate regulatory, facilities and economic feasibility for each of the identified recycled water opportunities. As detailed below under Topic Number 4, WRM could follow a similar methodology to evaluate recycled water opportunities. All potential recycled water sources should be considered and utilized in the Indian Wells Valley basin, to maximize use of currently available water resources.

Discussion Topic Number 4 – Alternative Water and Imported Water

WRM Request: "Please Provide input on the Imported Water presentation. Please include all imported and alternative water supply opportunities, all storm water capture opportunities, all new water conservation opportunities, information on all constraints, information of potential costs, and suggested next steps."

Comments on Topic Number 4 – Alternative Water and Imported Water

The preliminary potential imported water source presentation at the March TAC meeting summarized current and future opportunities for the utilization of imported water. As noted in the presentation slide deck, another potential imported water source could be through Antelope Valley East Kern Groundwater Bank (AVEK). AVEK does have an existing conveyance system located in Boron, CA (approximately 60 miles south of the City of Ridgecrest). There could be opportunities to convey that water into the Indian Well Valley area or wheel it through the aqueduct, provided that such importation must comply with the Antelope Valley Judgment. Additionally, several ideas were presented at the March TAC meeting to increase domestic and landscaping water use effiency, modeled after examples in other desert regions such as Nevada and Arizona. Best management practices for water use efficiency in those and other areas should be considered for implementation in the Indian Wells Valley.

The WRM has an existing $125K task order to develop an alternative water and imported water feasibility report. Next steps should involve conducting an evaluation of the alternatives. The evaluation of each alternative should be documented using a common template. To aid with comparisons, the same methodology should be used for all alternatives to allow for efficient analysis and documentation. A "scorecard" approach is one effective way to analyze a range of alternatives across several criteria. This approach helps organize both the qualitative and quantitative information to inform decisions. An example proposed evaluation criteria is provided in Table 1:

Table 1: Example Evaluation Criteria Categories and Sub-Categories

Primary Evaluation Criteria	Proposed Associated Evaluation Sub-Criteria
Water Supply Availability and Quality	• Amount of water available to meet Basin Needs • Water availability throughout the year and in dry and wet years • Amount of treatment or complexity of alternative to provide potable level water quality
Supply Impact, Reliability and Flexibility	• Timeliness and impact to protect GW basin and prevent seawater intrusion. • Reliability of supply over the long-term (e.g. 20 year period). • Flexibility for expansion and/or adaption to climate change.
Environmental Permitting Considerations	• Environmental Issues and anticipated support for the alternative by environmental regulatory agencies • Potential environmental benefits in addition to groundwater protection • Complexity and/or effort for the permitting process
Legal and Implementation Considerations	• Ability of the basin to obtain water rights or regulatory approval for the supplemental supply • Complexity of property and right-of-way acquisition for associated facilities and pipelines • Dependency on partners or other agencies, where there could be a

Primary Evaluation Criteria	Proposed Associated Evaluation Sub-Criteria
	risk of non-participation • Potential for technical innovation and implementation.
Customer/ Stakeholder Acceptability and Benefit	• Anticipated support for the alternative by users • Potential to provide a higher level of public safety during disaster • Potential to provide benefits to other local groundwater users or the broader community
Financial and Funding Considerations	• Potential opportunities for cost-sharing or grant funding • Ability to finance the proposed alternative
Project Costs	• Relative Capital Cost • Relative Operations and Maintenance (O&M) Cost • Relative Unit cost of Water ($ per Acre-Foot of supply)

The proposed evaluation categories could include the related sub-criteria, described in Table 1, to help make the scoring as specific and objective as possible. Since most of these criteria do not have quantifiable values, they could be evaluated and scored based on a relative set of factors described below. The criteria considerations could be scored on a scale of 1 to 5; in which 1 is the lowest or least favorable score and 5 is the highest or most favorable score. Each sub-criterion is scored separately and then the score is rolled into a total criterion score. The criterion scores are weighted and summed to provide a total score for each proposed alternative.

The presentation of the alternative scores could be color coded to help the reader visualize the more favorable and less favorable criteria scores that make up an alternatives total score. Table 2 below shows potential color coding of the associated scores that relate to specific project criteria and objectives.

Table 2: Example Color Code Presentation for Evaluation Criteria

Color-Coded Key	More Favorable, More Feasible, or Beneficial (Score = 5)	Moderately Favorable, Moderately Feasible, or Neutral (Score = 3)	Less Favorable, Less Feasible, or Flawed (Score = 1)

DISCUSSION OF ALTERNATIVE EVALUATION CRITERIA

The following sections describe how each criterion could be evaluated.

Water Supply Availability and Quality

This criterion considers the ability of this alternative to meet all or a portion of the supplemental water supply objectives. The alternative may need to be combined with another alternative if it does not produce sufficient supplemental supply over a multi-year period. Generally, the larger amount of water supply, the more favorable the scoring.

The criterion considers reliability of the supplemental supply over a year-long period and through different hydrologic cycles. Water that is consistently available throughout the year and from year to year is generally considered more favorable.

The criterion also considers complexity of the alternative to provide water. This alternative would include required natural or engineered treatment but would also include the complexity of implementation (such as negotiating water transfers or exchanges).

Supply Impact, Reliability and Flexibility

This criterion considers the timeliness and impact to the groundwater basin. This criterion also should consider reliability, defined by the Department of Water Resources as "how much one can count on a certain amount of water being delivered to a specific place at a specific time" and depends on the availability of water from the source, availability of the means of conveyance, and level and pattern of water demand at the place of delivery. A reliable source would have the ability to provide sufficient water, year-round for at least 20 years, to assist with the goals of restoring the groundwater basin. Generally, the more reliable the source of water is, the more favorable the scoring.

Additionally, this criterion considers flexibility in terms of the ability for expansion such that a project or program is not over-sized. Examples of flexibility include a project that can be phased-in such that the volume of water it produces is not exceedingly greater or lower than the original need. This could also address adaptation to climate change and changed conditions requiring more or less water for the basin. Generally, the more flexible the project is, the more favorable the scoring.

Environmental Permitting Considerations

This criterion considers environmental needs and requirements under CEQA. For alternatives that do not have existing CEQA documentation, the alternative will be ranked based on known environmental conditions and/or the anticipated environmental impacts for the area and the concerns associated with similar alternatives.
This criterion also looks at the environmental benefits an alternative could provide such as groundwater protection, habitat restoration, reduced energy demands, etc.

Legal and Implementation Considerations

This criterion should consider the ability of the basin to obtain water rights or regulatory approval for the supplemental supply, as well as the complexity of property and right-of-way acquisition for associated facilities and pipelines, and the complexity of finding suitable locations with respect to private well owners and separation requirements for non-potable water injection. This criterion considers also considers strategic partnerships with other agencies, including ways to maximize regional water resources and needs.

Customer/Stakeholder Acceptability and Benefit

This criterion considers factors that are important to water producers and users.

It considers the potential benefits the alternative may provide to other groundwater users or the broader community.

Financial and Funding Considerations

This criterion considers how the users would fund a project over its lifespan and the basin's financial positioning to cover the cost to evaluate, build, operate, maintain, and replace assets. This also addresses cost saving opportunities for the users including cost sharing (splitting the cost with other project partners) and receipt of grant funding.

This criterion also considers the financial ability to fund multiple alternatives if a single project cannot meet the quantity of water needed to meet the water shortage needs.

Project Costs

This criterion considers the estimated capital cost of the alternative and the annual operations and maintenance costs (such as electrical, chemical, and labor). This criterion considers the cost-effectiveness of an alternative and the relative unit cost of water (annual cost for the project divided by the annual production) in dollars per Acre-Foot of water ($/AF).

RECOMMENDED WEIGHTING OF CRITERIA

Once the alternatives are explored and evaluated based on a set of criteria, the next step is to generate a "scorecard" to score and rank the back-up supplemental supply alternatives. The evaluation criteria could have different weightings based on the relative importance of the criteria to meet the basins goals and objectives. An example of the scorecard approach is included below:

Benefits of Scorecard Approach Alternatives Based Analysis

- Alternatives can to be analyzed using a common criterion set that organizes both qualitative and quantitative information
- Decision makers can establish a weighting system based on goals and objectives.
- Sensitivity analysis can be performed to weigh other criteria more heavily (such as cost, water supply availability, customer acceptability, etc.) to evaluate the effects of the alternative's overall total score and ranking.
- Will help the users in the basin develop several different portfolios of options that could include one alternative or several alternatives to meet the goals and objectives.

Discussion Topic Number 5 – Reporting of Production

WRM Request: "Reporting of Production. Jim Worth, attorney, requests TAC input on estimating pumping where there is no water meter. Please provide input. WRM requests broad input on ensuring complete and accurate pumping information is provided to the Authority, guidance from TAC for well owners who would like to voluntarily install a water meter (reference, costs, etc.), and reporting of pumping for assessment purposes (format, due dates, Authority administration, etc.)."

Comments on Topic Number 5 – Reporting of Production

As detailed in Comment response number 2, The Cooperative Groundwater Management Group has tabulated historical groundwater pumping data voluntarily provided by pumpers dating back to 1975. That data, however, contains several acknowledged gaps and inconsistencies. To the extent that data is relied upon, the quality control and assurance of that data collection and calculation process should be reviewed and updated where data gaps and data overlap appear to exist. In addition, a standard operating procedure should be developed to ensure that data is being collected and reported in a consistent manner from all pumpers.

- If production rates and volumes are not directly recorded by a direct inline flow meter, then efforts should be planned to make this happen and develop procedures for monitoring production. Lacking direct measurements, a combination of alternative methods are typically used such as historical electrical usage (assuming the well is on its own electric meter or that more than one well doesn't supply just one home) and land use data to estimate groundwater usage.
- All users, including "de minims users" should be required to report or develop a method to estimate pumping. Estimated pumping from the group described as "domestic well owners" is currently estimated to be between 800 to 1,730 AFY. This range in domestic pumping volumes is greater than 10% of some of the current estimates of the basin's sustainable yield. Therefore, every effort should be utilized to accurately measure the current and future use of this group's usage in this basin. Additionally, it has been acknowledged in TAC meetings that not all the "domestic well owners" necessarily qualify as "de minimis" users. A "de minimis extractor" is defined in SGMA as a person who extracts, for domestic purposes, two acre-feet or less per year. These three criteria must be evaluated and confirmed for all pumpers claiming de minimis use: (1) that the person extracts groundwater; (2) that the extraction is not historically more than two acre-feet per year; and (3) that **all** of that person's water use is for domestic purposes. Additionally, any change or expansion of use by a de minimis user must be regularly tracked and reported. The WRM should consider utilizing a reporting form similar to those used in other basins by which "small pumpers" or "de minimis" users claim to qualify. That reporting would then need to be verified by the WRM through other means such as those described above.
- Initial discussions of a potential volumetric fee structure to cover GSP related costs has begun Therefore, it is critical that historic, current and future pumping rates and volumes are

accurately measured and reported correctly by all users of groundwater in the basin. Standard measurement and reporting protocols should be developed and agreed upon. At a minimum, monthly pumping volume data should be collected and reported utilizing agreed upon standards.

- Evaluate the potential implementation of alternatives to volumetric pumping fees, such as land-based fees, well registration fees, standby fees, development-related and all other potential funding mechanisms that do not unduly burden any particular group or pumper

Discussion Topic Number 6 – TAC meeting date for July 2018

WRM Request: "Please coordinate through Adam Bingham to provide a few alternative TAC meeting dates for July 2018."

Comments on Topic Number 6 – TAC meeting date for July 2018

The monthly TAC scheduled meetings occurs on the first Thursday, which coincidentally in July is a federal holiday (July 4th). As requested, alternative dates should include PAC coordination and could be:

- Monday (7/2); Tuesday (7/3), Monday (7/9), Tuesday (7/10), Wednesday (7/11), Thursday (7/12) or Friday (7/13)

Thank you for considering our initial comments and recommendations. We look forward to working with you to further define, develop and produce the Groundwater Sustainability Plan in Indian Wells Valley.

Sincerely,

LUHDORFF & SCALMANINI
CONSULTING ENGINEERS

Eddy Teasdale, P.G., C.HG
Senior Hydrogeologist

Attachment 3

Transmittal

DATE: January 9, 2019 PROJECT: 18-021

TO: Steve Johnson, P.E.
Indian Wells Valley Groundwater Authority - Water Resources Manager

FROM: Eddy Teasdale, P.G., C.HG

SUBJECT: **IWV TAC COMMENTS ON PROPOSED MODELING SCENARIO 1**

THE FOLLOWING ITEMS ARE BEING FORWARDED:

Item	Number	As Requested	For Your Review	Comments
Table 1. Proposed Modeling Scenario 1 – Option A	1	X	X	

COMMENTS:

Please find the enclosed Proposed Modeling Scenario 1, which includes my TAC Member comments to the Water Resources Manager's proposed modeling scenarios presented to the TAC at the January 3, 2019 TAC meeting. Please note the scenario details and explanatory footnotes that are included in this Proposed Modeling Scenario 1. If you have any questions, please let me know. Otherwise, please utilize the enclosed for the first model run.

LSCE

Table 1. Proposed Modeling Scenario 1 - Option A[1]								
Use	**Owner**	**Amount (AFY)**	**Year**	**Recharge (AFY)**	**Recycle (AFY)**	**Imported Water (AFY)**	**Storage Change (AFY)**	**Scenario Details**
Large Ag	MBD	12,303	2020	7650	0	0		*Utilize 2020 Estimated Pumping and Annual recharge of 7,650 AFY*
	Mojave	6,054						
Small Ag	Small Ag	3,278						
Other Irrigation, Dust Control	Kern County	18						
	City of Ridgcrest	407						
Municipal & Domestic	IWVWD	6,518						
	Inyokern CSD	191						
	Mutuals	354						
	DOM	832						
Mining	SVM	2,907						
Federal	Navy	2,041						
Total (2020)[2]		**34,903**		**7,650**	**--**	**--**	**(27,253)**	
Large Ag	MBD	8,612	2025	7,650	700	0		*30% reduction in pumping for all users, Except the Navy Pumping; Recycled Water (700 AFY)[4]*
	Mojave	4,238						
Small Ag	Small Ag	2,295						
Other Irrigation, Dust Control	Kern County	13						
	City of Ridgcrest	285						
Municipal & Domestic	IWVWD	4,563						
	Inyokern CSD	134						
	Mutuals	248						
	DOM	582						
Mining	SVM	2,035						
Federal	Navy	2,041						
Total (2025)[3]		**25,044**		**7,650**	**700**	**--**	**(16,694)**	
Large Ag	MBD	8,612	2031	7,650	700	15,000		*No Change to Pumping; Supplemental Recharge Project (15,000 AFY)[6]*
	Mojave	4,238						
Small Ag	Small Ag	2,295						
Other Irrigation, Dust Control	Kern County	13						
	City of Ridgcrest	285						
Municipal & Domestic	IWVWD	4,563						
	Inyokern CSD	134						
	Mutuals	248						
	DOM	582						
Mining	SVM	2,035						
Federal	Navy	2,041						
Total (2031)[5]		**25,044**		**7,650**	**700**	**15,000**	**(1,694)**	
Large Ag	MBD	8,612	2033	7,650	700	15,000		*Cliff Pumping for selected Tree Crops (Concept Provided to the TAC by the WRM on January 3, 2019); Recycle Water (700 AFY); Supplemental Water (15,000 AFY)[6]*
	Mojave	4,238						
Small Ag	Small Ag	2,295						
Cliff Pumping[7]		**(10,000)**						
Other Irrigation, Dust Control	Kern County	13						
	City of Ridgcrest	285						
Municipal & Domestic	IWVWD	4,563						
	Inyokern CSD	134						
	Mutuals	248						
	DOM	582						
Mining	SVM	2,035						
Federal	Navy	2,041						
Total (2033)[8]		**15,044**		**7,650**	**700**	**15,000**	**8,306**	

Notes:

1 Proposed Modeling Concept: Utilize 2020 Baseline Pumping Volumes and Recharge (7,650 AFY) until 2025. In 2025 through 2031, Recycle (700 AFY), Reduction in Pumping forAll Users, except Navy, Recharge (7,650 AFY). Starting in 2031, No Change to Total Pumping (i.e. same pumping volumes as 2025) or Recharge (7,650 AFY); Supplemental Water Supply (15,000 AFY). Starting in 2033, Cliff Pumping concept for Select Tree Owners (reducing demand by 10,000 AFY), No Other Changes to other Pumpers (i.e. same pumping volumes as 2025), Recharge (7,650 AFY), Recycle Water (700 AFY) and Supplemental Water (15,000 AFY).

2 Utilize 2020 Estimated Baseline Pumping Summarized and Presented to the Technical Adisory Committee (TAC) Meeting on January 3, 2019 by the Water Resources Manager (WRM).

3 30% reduction in pumping for Large Ag (MBD - Alfalfa, Mojave), Small Ag, Mun, Domestic, other irrigation and Mining (SVM); No change to Navy Pumping; Recycle Water (700 AFY).

4 700 AFY Recycle Water Injected for Direct Use as Presented to the TAC Committee Meeting on January 3, 2019 by the WRM

5 No Change to Pumping; Supplemental Recharge Project (15,000 AFY).

6 Imported Water Storage Recovery Project of 15,000 AFY, as Presented to the TAC Committee on January 3, 2019 by the WRM.

7 Implement Cliff Pumping Concept As Presented to the TAC Commitee on January 3, 2019 by the WRM. Cliff Pumping Participants Will Not Participate In Ramp Down Pumping, but will be required to stop pumping in 2033. WRM to identify Ag (Tree Crops) Users participating in Cliff Pumping Concept.

8 Utilize Cliff Pumping Concept, as presented to the TAC Commitee by the WRM on January 3, 2019. Cliff Pumping for selected Tree Crops (WRM to identify cliff pumping participats, Selected Pumpers Will Not Participate In Ramp Down); Recycle Water (700 AFY); Supplemental Water (15,000 AFY).

Attachment 4

Luhdorff & Scalmanini
Consulting Engineers

September 12, 2019
File No. 18-1-021

Sent via e-mail: SteveJ@stetsonengineers.com

Mr. Steve Johnson, P.E.
Indian Wells Valley Groundwater Authority Water Resources Manager
Stetson Engineers Inc.
861 S. Village Oaks Drive, Suite 100
Covina, CA 91724

Indian Wells Valley Groundwater Authority Technical Advisory Committee Members
c/o Water Resources Manager

SUBJECT: INDIAN WELLS VALLEY GROUNDWATER AUTHORITY TECHNICAL ADVISORY COMMITTEE MEMBER COMMENTS ON SEPTEMBER 5, 2019 TAC ITEMS

Dear Mr. Johnson:

This letter is being written on behalf of our client, Meadowbrook Dairy ("Meadowbrook"). This letter is submitted in response to the Indian Wells Valley Groundwater Authority (GA) Water Resources Manager's (WRM) September 5, 2019 request for input from Technical Advisory Committee (TAC) members on the following items:

1. Draft Model Documentation Appendix (DRI, August 2019)
2. Shallow Well Impact Results & Sustainable Management Criteria (WRM Presentation, September 5, 2019)

With respect to each of these discussion items, we reserve the opportunity to provide further comments as more detailed information is provided by the WRM, including for example, further comments on draft GSP materials and chapters, and in response to comments offered by other TAC members. Please distribute this letter to the TAC members prior to the October TAC meeting.

We appreciate the opportunity to provide preliminary comments on these items that lay the groundwork for the forthcoming Groundwater Sustainability Plan (GSP), and we look forward to developing a process to reach technical consensus as we move forward through the GSP process.

DISCUSSION TOPIC NUMBER 1 – DRAFT MODEL DOCUMENTATION APPENDIX

General Comments:

- Final model documentation should include a detailed table of contents and adhere to requirements of the GSP Regulations and DWR Modeling Best Management Practices.
- Model documentation should include at a minimum the following details presented in an organized report format. An example format has been provided below:
    - Executive Summary
    - Introduction
        - Background
        - Objectives and Approach
        - Report Organization
            - Model Code Section
            - Model Development Section
                - Spatial Discretization and Model Layering
                - Temporal Discretization
                - Climate
                - Groundwater Pumping
                - Off-Season Irrigation
                - Land Use
                - Crop Coefficients
                - Soil Type
                - Boundary Conditions
                - Aquifer Properties
                - Geological Framework
                - Simulation
                - Upscaling Hydraulic Parameters
                - Hydraulic Conductivity
                - Storage
                - Initial Conditions
                - Calibration
            - Groundwater Flow Model Results Section
                - Aquifer Parameters (Hydraulic Conductivity, Storage Coefficients)
                - Model Calibration
                    - Statistical Measures of Model Fit
                    - Hydraulic Head (Groundwater levels)
                    - Model Water Budget
                    - Land Surface System
                    - Groundwater System
                    - Estimate of Sustainable Yield

    - Model Sensitivity
- Predictive Model Development Section
    - Baseline Model
        - Model Period and Hydrology
        - Model Geometry (Stress-Periods)
        - Climate
        - Groundwater Pumping
        - Boundary Conditions
        - Initialization
        - Climate Change
        - Model uncertainty due to climate change should be evaluated in accordance with Section 354.18(c)(3) of the GSP regulations and the DWR "Guidance for Climate Change Data Use During Groundwater Sustainability Plan Development" document (DWR, 2018).
- Projects and Management Actions Section
    - Utilize model to evaluate Projects and Management Actions considered by IWVGA as part of GSP preparation described in Project and Management Actions Section of GSP.
- Solute Transport Model Development Section
    - Porosity
    - Dispersion and Diffusion
    - Temporal Discretization
    - Initial Conditions
- Solute Transport Model Results Section
    - Calibration Results
    - Solute Budget
    - Residual Error Descriptive Statistics
- Conclusions & Recommendations Section
- Model Uncertainty and Limitations Section
- References Section

DISCUSSION TOPIC NUMBER 2 – SUSTAINABLE MANAGEMENT CRITERIA

General Comments on Shallow Well Impact Summary Slides (Agenda Item 3bi)

Given very limited site-specific (i.e. field verified, well construction information (age/depth/quality) and groundwater usage) domestic well information has been utilized in the current Shallow Well Impact Analysis, a much more reliable data is necessary in order to consider and evaluate any management action that would be implemented to address shallow well impacts. Current efforts to require registration of domestic wells is underway; however, based on the lack of current responses on the domestic well survey, domestic site-specific well information will not be available until after 2020 at the earliest (assuming

individual well owners respond). Implementation of the management actions built into Model Scenario 6 would jeopardize tens if not hundreds of millions of dollars of business investments and business value of the named "Non-Domestic Group" by, for example, forcing those producers including Meadowbrook to entirely cease pumping. It is unfathomable that the GSP would implement such harsh management actions in order to try to preserve a couple of dozen domestic wells utilizing the current Shallow Well Impact method that does not utilize quantifiable data such as the geographic location of the well, depth to water in the well, the age of the well, water quality from the well and historic usage.

Recommend that an official Economic Analysis and Framework for Potential Domestic Well Mitigation Program be developed and incorporated as an Appendix to the GSP. That Appendix should include an overview of the proposed program, discuss the benefits and costs of faster implementation of demand management. The mitigation program should discuss, for example:

1. Well mitigation program/purpose statement – Define the mission of the program, for example the program is to address any unreasonable adverse effects of groundwater pumping on domestic wells.
2. Definition of unreasonable adverse effects – Program should clearly define the types of impacts to domestic wells that will and will not be eligible for mitigation.
3. Register domestic wells – Develop a registration system. The current outreach methodology utilized has not resulted in much of a response.
4. Mitigation measures – Define mitigation measures. Other well mitigation programs suggest the following examples:
    a. Domestic wells where municipal water service is not expected to exist in the near future (deepen or replace)
    b. Domestic wells near existing municipal services (connect to municipal service)
    c. Domestic wells impacted within a small geographic area (develop mutual/municipal to serve the impacted areas)
5. Define mitigation costs – Define how mitigation fund will pay for each type of impacted domestic well. Other well programs suggest:
    a. Establish payment of $XX/ft to deepen wells. If well cannot be deepened, establish standard cost to replace well $XX/well
    b. Decide how to compensate well owners that can connect to municipal systems
    c. Establish "rapid response" approach for situations when wells go dry.
6. Establish review process – Develop a board to review and approve well mitigation claims consistent with the guidelines established. Establish process for expedient review.
7. Financing – Identify program financing sources, with priority toward external support including grants and low interest loans.

The program would be expected to be further developed during the first five years of GSP implementation. There are several well mitigation programs already in the state and they should be reviewed and considered for implementation in this basin.

General Comments on current Baseline Scenario:

The "current" baseline model developed for the initial modeling scenarios, should not be considered a baseline scenario for modeling comparisons. The "current" baseline model was initiated by a request from the WRM to selected producers to estimate future pumping over a 50-year period (factoring in growth). Those estimates were compiled and utilized in the current groundwater flow model, and subsequent model scenarios (only two of which, Model Scenarios 1 and 2, were vetted by the TAC prior to running) have been compared to this "current" baseline model run. Recommend that a "revised" baseline model scenario be developed in accordance with the GSP Regulations. (Please reference, for example, GSP Regulations Section 354.18 for more details).

Sustainable Management Criteria (SMC) including measurable objectives and minimum thresholds would be developed according to the "revised" baseline model scenario and in accordance with GSP Regulations and DWR's SMC Best Management Practices. All Projects and Management Actions and model scenarios to evaluate Projects and Management Actions would be compared to the "revised" baseline in developing Sustainable Management Criteria.

General Comments on Sustainable Management Criteria Slides (Agenda 3bii Slides):

1. Following presentation of a specific topic (i.e. Sustainable Management Criteria), additional written documentation should also be provided to allow the reviewer to provide meaningful comments. The documentation could be in the form of a Technical Memorandum, and the contents could efficiently be incorporated into applicable sections of the GSP. Providing detailed comments only on summary PowerPoint presentation slide materials, where often the assumptions are not included, can be difficult, as is the case with the September 5 TAC meeting materials on SMCs.
2. For comparison purposes, include hydrographs for "revised baseline" results.
3. A description of the proposed minimum thresholds and measurable objectives and how they were established for the PowerPoint materials, and for all further SMC-related materials prepared by the WRM, should be provided. The assumptions should include recognition of the anticipated fluctuations in basin conditions around the established measurable objectives. In addition, please describe how each of the Projects and Management Actions and how the GSP will meet each measurable objective, how each measurable objective is intended to achieve the sustainability goal for the Plan area for the long-term beneficial uses, and how the interim milestones are intended to reflect the anticipated progress toward the measurable objectives during the 2020 to 2040 implementation period.
4. The GSP regulations define undesirable results as occurring when significant and unreasonable effects are caused by groundwater conditions occurring throughout the Plan area for a given sustainability indicator. Significant and unreasonable effects occur when minimum thresholds (MTs) are exceeded for one or more sustainability indicators. Information should be provided to the TAC and to the public to describe the following for each sustainability indicator relevant to

Plan area: the methodology used to set the minimum threshold and how selected MTs avoid causing undesirable results, relationships to other sustainability indicators, impact on adjacent subbasins, impacts on beneficial use/users, comparison to relevant federal, state, local standards, the measurement method.

5. To improve upon the technical understanding in the North Brown Road area, suggest adding additional domestic and existing agricultural wells to the current monitoring network.

6. Given the known uncertainties of the current groundwater model, recommend utilizing historical groundwater elevation and water quality measurements to define measurable objectives. Under SGMA, undesirable conditions prior to 2015 do not have to be addressed. As an example, the measurable objective for the groundwater levels at each monitoring site could be determined by taking the average groundwater elevation over the current monitoring period. Looking at groundwater levels in more recent years allows a more realistic, attainable goal to be set.

General Comments on Model Scenario 6.2

1. Scenario 6.2 includes many built-in assumptions, including for example, imposition of groundwater pumping allocations that require Meadowbrook and other large producers to cease production over a given time period, relocating the IWV Water District's pumping locations, and importing water, all of which are more accurately described as Projects and Management Actions, and many of which are objectionable, not fully vetted and not agreed upon. Scenario 6.2 is, in other words, more accurately described as a Project and Management Action model scenario, and not a valid framework for a GSP. At a minimum, individual PMA's should instead be specifically identified, detailed in their assumptions, vetted for feasibility and consensus, and then compared to a revised baseline scenario, before being considered for inclusion or implementation in a GSP

2. As described under the GSP regulations, PMA's should be developed to address sustainability goals, measurable objectives, and undesirable results identified in the Subbasin. The PMAs developed for the GSP should consider reducing the potential socioeconomic impacts associated with actions required to sustainably manage groundwater in the Subbasin.

For your reference, GSP Regulation §354.44 requires the following:

a. Each Plan shall include a description of the projects and management actions the GSA has determined will achieve the sustainability goal for the basin, including projects and management actions to respond to changing conditions in the basin.

b. Each Plan shall include a description of the projects and management actions that include the following:

    1. A list of projects and management actions proposed in the Plan with a description of the measurable objective that is expected to benefit from the project or management action. The list shall include projects and management actions that may be utilized to meet interim milestones, the exceedance of minimum thresholds, or where undesirable results have occurred or are imminent. The Plan shall include the following:

        A. A description of the circumstances under which projects or management actions shall be implemented, the criteria that would trigger implementation and termination of

projects or management actions, and the process by which the Agency shall determine that conditions requiring the implementation of particular projects or management actions have occurred.

B. The process by which the Agency shall provide notice to the public and other agencies that the implementation of projects or management actions is being considered or has been implemented, including a description of the actions to be taken.

2. If overdraft conditions are identified through the analysis required by California Code of Regulations (CCR) Section 354.18 [Water Budget], the Plan shall describe projects or management actions, including a quantification of demand reduction or other methods, for the mitigation of overdraft.

3. A summary of the permitting and regulatory process required for each project and management action.

4. The status of each project and management action, including a timetable for expected initiation and completion, and the accrual of expected benefits.

5. An explanation of the benefits that are expected to be realized from the project or management action, and how those benefits will be evaluated.

6. An explanation of how the project or management action will be accomplished. If the projects or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall beincluded.

7. A description of the legal authority required for each project and management action, and the basis for that authority within the Agency.

8. A description of the estimated cost for each project and management action and a description of how the Agency plans to meet those costs.

9. A description of the management of groundwater extractions and recharge to ensure that chronic lowering of groundwater levels or depletion of supply during periods of drought is offset by increases in groundwater levels or storage during other periods.

c. Projects and management actions shall be supported by best available information and best available science.

d. An Agency shall consider the level of uncertainty associated with the basin setting when developing projects or management actions.

Thank you for considering our initial comments and recommendations. We look forward to working with you to further define, develop and produce the Groundwater Sustainability Plan in Indian Wells Valley.

Sincerely,

LUHDORFF & SCALMANINI
CONSULTING ENGINEERS

Eddy Teasdale, P.G., C.HG
Senior Hydrogeologist

CC: Adam Bingham (Chair Technical Advisory Committee)

Attachment 5

Luhdorff & Scalmanini
Consulting Engineers

November 15, 2019
File No. 18-1-021

Sent via e-mail: SteveJ@stetsonengineers.com

Mr. Steve Johnson, P.E.
Indian Wells Valley Groundwater Authority Water Resources Manager
Stetson Engineers Inc.
861 S. Village Oaks Drive, Suite 100
Covina, CA 91724

Indian Wells Valley Groundwater Authority Technical Advisory Committee Members
c/o Water Resources Manager

SUBJECT: INDIAN WELLS VALLEY GROUNDWATER AUTHORITY TECHNICAL ADVISORY COMMITTEE MEMBER COMMENTS ON DRAFT GROUNDWATER SUSTAINABILITY PLAN

Dear Mr. Johnson:

This letter is being written on behalf of our client, Meadowbrook Dairy ("Meadowbrook"). This letter is submitted in response to the Indian Wells Valley Groundwater Authority (GA) Water Resources Manager's (WRM) November 7, 2019 request for input from Technical Advisory Committee (TAC) members on the following items:

1. Draft Groundwater Sustainability Plan Documentation Text
2. Draft Groundwater Sustainability Plan Figures
3. Draft Groundwater Sustainability Plan Appendices

With respect to each of these discussion items, we reserve the opportunity to provide further comments on public draft GSP materials and chapters, and in response to comments offered by WRM, Policy Advisory Committee (PAC) and other TAC members.

Although we are very disappointed with the lack of transparency that occurred during the development of GSP Sections 3, 4, 5 and 6, we do appreciate the opportunity to provide preliminary comments on these items and we look forward to developing a process to reach technical consensus as we move forward through the GSP process.

EXECUTIVE SUMMARY

General Comments:

- Why was a draft of an executive summary (ES) not provided as part of this review process? Please provide for review to this committee prior to issuing draft of the complete GSP packet for public comment. ES should include a table of contents, applicable support figures and include a detailed description for each of the major sections of the GSP.

SECTION 1 – INTRODUCTION

General Comments:

- Please include list of tables and figures in the Table of Contents
- DWR Preparation Checklist should be moved from the appendix and incorporated into this section.
- Section 1.2 (Sustainability Goal), page 1-4, second paragraph. The sustainability goal is to manage, not just preserve the IWVGB groundwater resources as sustainable water supply for all beneficial users. To the greatest extent possible, the goal is to preserve the character of the community, and beneficial users, preserve the quality…….
- Section 1.3 (Agency Information), page 1-5, fourth paragraph. This whole paragraph should be rewritten to convey to the reader where NAWS China Lake is located in relation to the IWVGB. A figure showing all entities, including NAWS China Lake should be included in order to get a spatial sense of where the entities are located within the basin.
- Section 1.3 (Agency Information), page 1-6, first paragraph, last sentence. This paragraph should be rewritten to identify other industries and their contribution to the economy of the basin and region.
- Section 1.3 (Agency Information), page 1-6, second paragraph. Text should provide additional detail on whether the federal agencies are also voluntarily willing to comply with any decisions with the GSA to impose projects and management actions on federal land in order to ensure the basin is sustainable by 2040.
- Section 1.3.1 (Organization and Management Structure of the IWVGA), page 1-6. Include a footnote identifying notable exclusions of some beneficial users (i.e. agricultural and environmental interests, whether as voting or non-voting members) and the reason(s) why all beneficial users were not included.
- Section 1.4 (Notice of Communication). Although the author references the C&E, DWR is also looking for summary documentation of all meetings, and examples of how all public meetings were advertised (including how specific technical content was distributed to non-English speaking members of the public). Please provide a summary table detailing the process (do not just reference a website).

SECTION 2 – PLAN AREA

General Comments:

- Please include list of tables and figures in the Table of Contents
- Please check DWR annotated outline to ensure all required content is included. As an example, per DWR the GSP should include an analysis of the density of wells per square mile. This information is not included in this section of the GSP.
- Section 2.2.4 (Water Supply Source), page 2-5, third paragraph. Provide a paragraph detailing the methodology used to determine the number of wells, well type, uncertainty in the number of wells and reference to how this uncertainty will be reduced through future data gap analysis.
- Section 2.4.6 (Indian Wells Valley Cooperative Groundwater Management Group), page 2-11, last paragraph. Provide additional details on other beneficial use members, including small and large agriculture, and also include a summary of who the original members were.
- Section 2.4.6 (Indian Wells Valley Cooperative Groundwater Management Group), page 2-12, last paragraph. Provide reference and additional details as to why the Cooperative Group is no longer a functional entity.
- Section 2.5.2.1 (Kern County), page 2-15, second paragraph. Although the El Paso area is largely uninhabited and current groundwater demand does not require "significant" groundwater extraction, given the increasing trends in groundwater levels to this area over the last decade, future "significant" groundwater extraction could be possible and should be further investigated for potential projects and management actions prior to enforcing perhaps unnecessary or insufficiently supported pumping allocations.
- Section 2.4.6 (Indian Wells Valley Cooperative Groundwater Management Group), page 2-15, Table 2-5. Please include a footnote to explain to the reader the designation of Limited Agriculture and Exclusive Agriculture.
- Section 2.7.1 (Background), page 2-24, last paragraph. Please provide a reference to historic and recent studies regarding overdraft conditions in the basin. Are the current conditions a result of overdraft or removal of temporary surplus (or both)?
- Section 2.7.3 (Conservation Programs). Please include a detailed section of both water efficiency and demand management measures and practices currently underway by large Agriculture (specifically to Alfalfa operations along north Brown Road).
- Section 2.7.6 (Groundwater Contamination Cleanup), page 2-33. Please provide additional details on all chemicals of concern (including chemicals per- and polyfluoroalkyl substances (PFAS)) and results of the 2017 sampling that turned up PFAS levels of 8 million parts per trillion (which are the highest in California, and one of the highest globally as noted in the report).
- Section 2.7.7.4 (IWVGA Policies), page 2-38. Provide additional details on how the extraction fee was calculated, what outreach efforts occurred to reach out to non de minimis and de minimis extractors and based on best available data how many non de minimis and de minimis pumpers have failed to register their wells. In addition, explain the current management process for enforcement for unregistered groundwater extraction facilities.

SECTION 3 – BASIN SETTING

General Comments:

- Please include list of tables and figures in the Table of Contents
- Please check DWR Annotated Outline to ensure all required content is included. As an example, per DWR, the GSP should include description of neighboring basins. This information is not included in this section of the GSP.
- Section 3.1 (Introduction), page 3-5, first paragraph, second sentence. The descriptive HCM….will be used to describe basin setting "static" conditions. Why is the author using the word static here?
- Section 3.2 (History of Water Use in the Indian Wells Valley), page 3-8, second paragraph. According to the data presented, peak groundwater usage occurred in 1985 (approximately 29,730 AF), not in 2007 (29,430 AF). In addition, significant conservation efforts were made by the Navy (60% reduction), Meadowbrook Dairy (35% reduction), but an increase occurred of 45% IWVWD. Please revise paragraph and tables to reflect peak water usage and conservation measures implemented by all beneficial groundwater users.
- Section 3.3.1 (Geology and Hydrogeology), page 3-10, first paragraph, Figures 3-5a and 3-5b. Given the recent amount of new geologic and hydrogeologic information, and supposed concerns about overdraft in this basin, the author should attempt to include more recent local geologic information (i.e. SkyTEM, supported financially by DWR and recent installation of new production wells). Also please revise cross-section to be in color. Also recommend providing more than just two cross-sections (the minimum required by SGMA). Additional cross-sections should be developed specifically through the North Brown Road Area and include at least one diagonal cross-section (either oriented Northeast-Southwest and/or Northwest-Southeast).
- Section 3.3.1 (Geology and Hydrogeology), page 3-12, first paragraph. Please provide a more detailed description of the two principal aquifers (i.e. thickness) and how the applicable aquifer characteristics (thickness, permeability, etc.) change throughout the basin.
- Section 3.3.1 (Geology and Hydrogeology), page 3-12. Regarding USBR (1993) slug test data. Typically slug tests are not very useful as they only represent a very small area within the vicinity of the test location. A sentence should be included to reflect the value of this data.
- Section 3.3.3.1 (Climate and Precipitation), page 3-14, second paragraph, Figure 3-8. Color flood information would show more numeric values between the two end numbers of 3 inches and 26 inches. Is this data reported as the average for 1980 through 2010 water year or calendar year? It should be reported as water year (per DWR).
- Section 3.3.3.1 (Climate and Precipitation), page 3-14, second paragraph, Figure 3-9. A paragraph should be included to explain whether the information illustrated on Figure 3-9 was used to select the historical water budget period. Also, these plots should be redone to report data in water years and not calendar year per GSP regulations.
- Section 3.3.3.2 (Streamflow and Mountain-Front Recharge), page 3-16, first paragraph. Mountain front recharge is difficult to quantify and estimate and often has a lot of uncertainty associated with it. Please reference work on mountain front recharge as part of the Antelope Valley

adjudication and provide revised documentation utilizing current methodologies using all recent data (and do not rely exclusively on others' work).

- Section 3.3.3.2 (Streamflow and Mountain-Front Recharge), page 3-17, first paragraph. Is there data that proves the statement "There are no significant interconnected surface water systems"? To exclude this SMC, GSP needs to have data to support this. The use of the phrase".....no significant....." implies there are interconnected surface-waters, yet in the opinion of the author they are not significant. They either are or are not interconnected surface waters.
- Section 3.3.3.2 (Streamflow and Mountain-Front Recharge), page 3-17, first paragraph, fourth sentence "The IWVGB has many natural spring....." if the basin contains springs, then it contains interconnected surface water.
- Section 3.3.4.1 (Water Budget Elements), page 3-18, first complete paragraph. The USGS BCM model has been issued as a draft. Interesting information, but not very useful for this GSP, unless there are plans to incorporate the content prior to adoption.
- Section 3.3.4.1 (Water Budget Elements), page 3-20, first paragraph. If pumping data was not available, how were pumping rates developed?
- Section 3.3.4.1 (Water Budget Elements), page 3-20, second paragraph. With all the various sources of groundwater pumping data described in previous sections, were any comparisons done of pumping estimates made over time periods that were common to each of the investigations? How did previous studies vary and compare to the Cooperative Group's historical data? Please include additional details on this information.
- Section 3.3.4.1 (Water Budget Elements), page 3-20, third paragraph. How was the domestic wells residence average of 1 AFY determined? This should be explained and also how do pumping volumes vary over time. Same comment applies to water use by mutuals and co-ops. Footnote 13 should be expanded upon and included into this paragraph.
- Section 3.3.4.1 (Water Budget Elements), page 3-21, third paragraph. Include a reference to Section 1 table. In addition, the previous paragraph sounds exclusively promotional for the Navy while a similar tone and content is not provided for elsewhere in this paragraph. There is no mention of the reduction in ag pumping from 1985, 2007 or 2015 like there is for urban discussion or the Navy, why not? The last sentence of this paragraph is not supported by any information provided to support it. Unless there is relevant agreed upon information available, please remove the sentence "unless restricted, agricultural use is expected to increase significantly", as this is not necessarily true.
- Section 3.3.4.1 (Water Budget Elements), page 3-21, first paragraph, last sentence. Does the current ET value vary on an annual basis? If so, a range should be presented along with any variations associated with dry versus wet climatic conditions.
- Section 3.3.4.2 (Historical Water Budgets), page 3-22. The historical water budget spans almost 100 years and does not account for any temporary surplus. This is not a representative period of analysis for evaluating a SGMA historical water budget period because the selection of this long of a period includes different cultural conditions that have occurred over that time frame. This selection of such a long-time frame is not consistent with industry practice in the selection of a representative period that represents average annual historical conditions. In addition, the use of rainfall gage stations presented in Figure 3-9 should have used stations that are located in the

areas in the western portion of the basin, which are supplying the majority of recharge to the basin, not the two that were presented.

- Section 3.3.4.2 (Historical Water Budgets), page 3-23, second paragraph. Revise first sentence from…….extractions increased to extractions occurred. In addition, please explain whether the IWVGA has considered the process described in this paragraph to be related to removal of temporary surplus rather than an overdraft condition.
- Section 3.3.4.2 (Historical Water Budgets), page 3-23 and 3-24, Table 3-6 (Historical Water Budget). Since there is still outflow from the basin (ET and Interbasin Subsurface Flow), which is similar to what happened in San Fernando), has the IWVGA considered whether this reduction in storage is not overdraft but removal of temporary surplus?
- Section 3.3.4.3 (Current Water Budget), page 3-24, first paragraph. For GSP purposes, the "current water budget" follows the historical water budget; it is not a subset of the historical water budget. Since the historical water budget was 1922 through 2016, the current water budget should be 2017. In addition, the 2011 through 2015 period corresponds to an extremely dry period in California history and any review of groundwater levels or water budgets is going to show dramatic declines. The selection of this period appears to be a case of "pick a period and pick your answer".
- Section 3.3.4.4 (Overdraft Conditions), page 3-25. If there is still outflow from the basin to Salt Wells Valley and extensive ET still occurs at the playa, then has the IWVGA considered whether this is a removal of temporary surplus, and not overdraft?
- Please provide basin wide figures illustrating groundwater elevations for select periods (dry, wet, historic, current, change in groundwater elevation) utilizing all known data sets. Do not just rely on work by others, the author should utilize their own interpolations and include adequate details (utilizing linear and color contour methodologies).
- Section 3.3.4.4 (Overdraft Conditions), page 3-25, first paragraph, last sentence. Disagree with the author, as you are using a historically dry period, coupled with a period of temporary surplus to conclude overdraft occurs. In addition, the current water budget period should follow historical water budget period, not be part of it (reference GSP Best Management Practices).
- Section 3.3.4.4 (Overdraft Conditions), page 3-26, third paragraph, last sentence. This sentence does not make sense.
- Section 3.3.4.4 (Overdraft Conditions), page 3-26. Provide additional information in addition to a single 25-year-old study (i.e. extrapolate storage from the DRI model, recent WRM evaluations) of the total current amount of groundwater in storage. Recent preliminary investigations by others have estimated that usable amount of available storage could exceed 10-million AF. What additional analysis was conducted by WRM to evaluate the total amount of storage?
- Assuming there is approximately 10 million AF of groundwater in storage, and the cumulative change in storage has been approximately 620,000 AF since 1992 (23-year period); this cumulative change in storage, which includes both representative dry and wet years, reflects a rate of approximately 0.3% per year. It would not be reasonable to expect that the available groundwater in storage would be exhausted over any foreseeable time period.
- Section 3.3.5 (Sustainable Yield), page 3-28, second paragraph, first sentence. What is the estimated sustainable yield if climate change is incorporated (as required by SGMA)?

- Section 3.3.5 (Sustainable Yield), page 3-28, Table 3-8. Regarding Outflows, specific to ET. The ET should be separated out to differentiate between ET from vegetation versus ET from China Lake Playa. ET from China Lake is water that could instead be captured by increasing extraction, thereby removing surplus and increasing aquifer storage space. This is water that is being wasted unless it is meeting a reasonable and beneficial use.
- Section 3.3.5 (Sustainable Yield), page 3-28, Table 3-8. Regarding Outflows, specific to Extractions. Provide information on extraction by water use sector (ag, urban, domestic, and other).
- Section 3.3.5 (Sustainable Yield), page 3-29, Table 3-8. Regarding Change of Groundwater Storage. This increase of -4.080 AFY in aquifer storage depletion indicates that sustainability is not being projected beyond 2040 on an annual basis.
- Section 3.3.5 (Sustainable Yield), page 3-29, first paragraph. The formulation of the water budget should be separated into a ground-surface water budget and a groundwater budget to clarify the water budget dynamics of the basin, or the author cold potentially have more sustainable yield in order to reduce the amount of outflow via ET and subsurface flows to Salt Valley to near zero. Please include the equation that was used to estimate sustainable yield. Currently, the author is only assuming that recharge equals sustainable yield when in reality water lost to ET and outflow to Salt Valley should be included. DWR's Draft BMP also indicates that reducing pumping to an estimated basin-wide average annual recharge does not equate to sustainability.
- Section 3.3.5 (Sustainable Yield), page 3-29, first paragraph, last sentence. Does the author include climatic variability over the 50-year planning horizon? If not, why?
- Section 3.4.4 (Groundwater Quality Conditions). Please include a discussion on the distribution of anthropogenic contaminants (i.e. PFASS), and an evaluation for the potential future potable, industrial or other uses of de-designated groundwater (which would require varying degrees of treatment) on NAWS property.
- Section 3.4.5 (Land Subsidence), page 3-33. Please include additional details on actions the Navy is planning to implement to avoid increasing further land subsidence and also provide a detailed approach on how applicable changes to Navy and other pumping would impact other applicable SMC's.
- Section 3.4.7 (Groundwater-Dependent Ecosystems), page 3-35. Please include additional details on actions the Navy is planning to implement to avoid impacting GDE's which are located primarily if not entirely on Navy property.
- Section 3.5.5 (Numerical Model Scenario 6.2). Concerns with Scenario 6 (as well as Scenarios 3-5) have been extensively documented in the public record, but largely remain unaddressed and unresolved. Scenario 6.2 includes many built-in assumptions, including for example, imposition of groundwater pumping allocations that require Meadowbrook and other large producers to cease production over a given time period, relocating the IWV Water District's pumping locations to very area of the Basin from which Meadowbrook and others would be eradicated, and importing water, all of which are more accurately described as Projects and Management Actions, and many of which are objectionable, not fully vetted and not agreed upon. Scenario 6.2 is, in other words, more accurately described as a Project and Management Action model scenario, and not a valid framework for a GSP. At a minimum, individual PMA's should instead be specifically identified, detailed in their assumptions, vetted for feasibility and consensus, and then compared to a revised baseline scenario, before being considered for inclusion or implementation in a GSP.

As described under the GSP regulations, PMA's should be developed to address sustainability goals, measurable objectives, and undesirable results identified in the Basin. The PMAs developed for the GSP should consider reducing the potential socioeconomic impacts associated with actions required to sustainably manage groundwater in the Basin.

- Section 3.5 (Numerical Groundwater Model). All documentation related to the model should be included as an appendix. In addition, please provide more details to how the groundwater model is related to the current conceptual understanding of the basin, and where there are known issues where the current flow model does not represent the current conceptual understanding of the basin (i.e. along north Brown Road, Layer 1 in current flow model does not accurately represent the actual lithology (the model underestimates the actual thickness, which would then overestimate the amount of drawdown occurring from pumping in that area). As detailed during several TAC meetings, current groundwater levels (i.e. USBR 6) in North Brown Road have not changed since 2010. Current pumping in the North Brown Road area is estimated to be greater than 15,000 AFY, and recent groundwater data (i.e. USBR 6S, on-going monitoring by large Ag) has not decreased, suggesting that the sustainable yield in the North Brown Road area could be greater than 15,000 AFY. In addition, the El Paso area has increased groundwater levels over the last decade, which by some preliminary estimates equates to approximately 1,000 to 4,000 AFY of additional recharge. This additional recharge could be utilized to supplement existing supplies. Please include a discussion of this and add as a project Concept in Section 5. The potential use of such additional recharge should be seriously considered in informing any "allocation" scheme.

- The "current" baseline model developed for the initial modeling scenarios, should not be considered a true baseline scenario. For the "current" baseline period, a request was made by the WRM to selected producers to estimate potential future pumping over a 50-year period (factoring in growth). This information was compiled and utilized by the WRM in the current groundwater flow model. Subsequent model scenarios have been compared to this "current" baseline model run. Recommend that a "revised" baseline model scenario be developed in accordance with the GSP Regulations. The exact development of how pumping rates in the "revised" baseline model scenario should be discussed further.

- Section 3.5.5 (Numerical Model Scenario 6.2), page 3-44. Why is model Scenario 6.2 included in this section but there is no section for the "baseline" model, which should be included and utilized for comparison purposes.

- Section 3.5.5 (Numerical Model Scenario 6.2), page 3-45, Management Action No. 1. Please explain in more detail how the allocations over a 20-year period to 2040 were determined, how was the "highest beneficial use determined", and why was the highest continual pumping from 2010 to 2014 used for domestic and municipal pumping (which was also an extremely dry period in California).

- Section 3.5.5 (Numerical Model Scenario 6.2), page 3-46, second bullet. Please define projects 3,4 and 5.

- Section 3.5.5 (Numerical Model Scenario 6.2), page 3-46, Table 3-11. Why would agricultural water use necessarily increase from 42% (in 2020) to 56% (in 2070)?

- Section 3.5.5 (Numerical Model Scenario 6.2), page 3-47, Table 3-12, Outflow, Groundwater Extraction. What is the distribution among "Ag" pumpers and how does this relate to pool allocations?

- Section 3.5.6 (Climate Change). GSP regulations require climate change be considered.
- Management Areas – Please provide a detailed explanation of why management areas were not evaluated and were not determined to be appropriate for this basin to help facilitate groundwater management by the different water use sector, geology and aquifer characteristics. Multiple requests and suggestions were made from TAC members and the public to consider management areas.

SECTION 4 – SUSTAINABILITY MANAGEMENT CRITERIA

General Comments:

- Please include list of tables and figures in the Table of Contents
- Revise entire section 4 to follow DWR GSP annotated outline as agreed upon among the TAC and WRM. As an example, why are undesirable results presented prior to measurable objectives and minimum thresholds?
- Include a general summary table for sustainable management criteria. The summary table should include the Sustainability Indicator, Minimum Threshold, Measurable Objective and Undesirable Result.
- Section 4.2.4 (Explanation of How Goal will be Achieved). NAWS operations are documented to be responsible for groundwater contamination, potential impacts to subsidence and depletion of interconnected surface water. Please include a detailed description of how NAWS groundwater production will impact the overall health of the basin to achieve sustainability goals under the proposed projected listed in Section 4.2.4.
- Section 4.4.1.7 (Method of Quantitative Measurement), page 4-22. For comparison purposes, please provide the Theissen weighted average polygon method to historic and current groundwater conditions and include a detailed description and figures in Section 3. This information will then form the baseline comparison and can be utilized to assess the impacts of future project management actions into the future.
- Section 4.4.2.6 (Representative Monitoring Sites), page 4-25, Table 4-1. Please justify why USBR (25S/38E-12L02 and 25S/38E-12L03) are being utilized to monitoring groundwater levels in this area. Both of these wells are screened below (1190 – 1210, and 1640 – 1660 feet below ground surface) any known deep pumping wells in this area and therefore do not represent localized pumping effects.
- Section 4.4.3 (Degraded Water Quality Minimum Thresholds), page 4-27, second paragraph. Please provide further justification on why the author is increasing minimum threshold values to 600 mg/L and 1,000 mg/L in areas with poor water quality. In addition, water quality data for current agricultural wells have not significantly changed since the early 1990's. Significant data already exists to determine minimum thresholds in this area and should also be derived based on beneficial usage. Please explain how postponing the establishment of minimum thresholds impacts proposed management actions and projects—including potentially imposing severe groundwater pumping limitations that would eliminate an entire class of producers—and how such postponement is justified under SGMA, the DWR Regulations and related requirements.

- Section 4.4.3.6 (Representative Monitoring Sites), page 4-29, third paragraph. Given the potential for additional groundwater extraction from the El Paso area, recommend adding additional wells to this monitoring network.
- Section 4.7 (GSP Proposed Monitoring Network), page 4-37, first paragraph. Please provide further justification as to why only 10 or 11 wells are proposed to be utilized to monitor sustainable management criteria. DWR has developed specific regulations and guidance documents (reference Monitoring Networks and Identification of Data Gaps BMP) that recommend that in a basin the size of IWV (600 square miles) and pumps more than 10,000 AFY, the minimum number of monitoring well locations should be between 24 and 60. In addition, why would the author not integrate current agricultural well monitoring into the program?
- Section 4.6.2 (Chronic Lowering of Groundwater Levels). Several monitoring wells listed in the proposed network have groundwater data that indicate groundwater levels have been stable since 2010 (USBR-01, USBR-04), 2012 (USBR-06S), 2014 (USBR-2), and 2016 (NR 2). Why would current pumping in these areas need to be adjusted or reduced since current groundwater levels in these areas indicate that current pumping is sustainable? And if imposed, how does the IWVGA justify the Scenario 6.2 PMA that would eradicate Agriculture and then move the water district and other producers into that very area?

SECTION 5 – PROJECTS AND MANAGEMENT ACTIONS

General Comments:

- Please include list of tables and figures in the Table of Contents
- Provide a summary table the includes the project, measurable objective expected to benefit, expected benefits to stakeholders, current status, timetable (initiation and completion), estimated cost and permitting and regulatory process.
- Section 5.2 (Planned Management Actions), page 5-10, third paragraph. Please provide information supporting the use of 2010 through 2014 period as a base period.
- Section 5.4 (Conceptual projects under consideration). Please include an additional project to this list. The project would focus on investigating the potential to utilize surplus groundwater in the El Paso subarea to supplement existing supplies. Preliminary useable groundwater estimates are greater than 4,000 AFY, or even higher if additional volumes are removed from storage. This PMA should be seriously investigated and considered before imposing groundwater pumping limitations or allocations.
- Section 5.5 (Conceptual project under consideration). Please include a project that would focus on treating and using the current de-designated area groundwater supply below NAWS property (which is preliminarily estimated to exceed 500,000 AF). This PMA should be seriously investigated and considered before imposing groundwater pumping limitations or allocations.
- Section 5.5 (Conceptual project under consideration). Please include a project that would evaluate the feasibility to capture current evaporative loses from the Coso Geothermal field and utilize to enhance water in the IWV (which is preliminarily estimated to exceed 10,000 AFY). This PMA should be seriously investigated and considered before imposing groundwater pumping limitations or allocations.

- Section 5.5 (Conceptual project under consideration). Please include a project that would evaluate the feasibility for SVM to treat local groundwater in the Salt Wells Valley Basin (which is preliminarily estimated to exceed 500 AFY).
- Section 5.5 (Conceptual project under consideration). Please include a project that would evaluate the feasibility for SVM to capture current evaporative loses from their facilities.

SECTION 6 – PROJECTS AND MANAGEMENT ACTIONS

General Comments:

- Please include list of tables and figures in the Table of Contents.
- Cover page needs to be modified and edited to detail Section 6 content, not Section 5.
- Section 6.1 (Implementation Plan Summary). Please include how stakeholder engagement through the advisory committee activities will be utilized to allow the general public to provide input and develop an exchange amongst a broad range of stakeholders. Develop a schedule (including meeting times, i.e. quarterly) to discuss GSP and GSA activities, provide input and present on items of interest.
- Describe how public outreach will continue and provide opportunities for engagement during GSP implementation. This should include providing opportunities for public participation, especially from all beneficial users, at public meetings, providing access to GSP information online, and continued coordination with entities conducting outreach.
- Section 6.3 (GSP Implementation Costs and Funding), page 6-6, Table 6-1. Estimated GSP Implementation costs are not complete. Also, please provide costs for Conceptual projects under consideration. Also, provide row that summarizes all annual costs.
- Section 6.3 (GSP Implementation Costs), page 6-6, Table 6-1. Please provide a column in the table that summarizes the assumptions for each task.
- Section 6.3.2 (Potential Funding Sources). Please provide more detail on the potential funding amount associated with each potential funding source and how that related to applicable projects and management actions.
- Section 6.3.2 (Potential Funding Sources). Please provide a planning level estimate of annual amount of funds needed to implement GSP projects. Also, prior to implementation of any fee or assessment program needed to fund these projects, please detail the types of assessment studies or other analysis (consistent with regulatory requirements) needed in this section. Notably, the IWVGA's currently imposed GSP development groundwater extraction fee of $30/AF is among the highest in the State, was not supported by a traditional Proposition 26/218 study or analysis, and was imposed over extensive objections raised by many producers and members of the public.
- Section 6.4 (Progress Assessment and Reporting). Revise section to state, as required under GSP regulations, annual reports must include three key sections: 1) General Information, 2) Basin Conditions, and 3) Plan Implementation Progress. Pease provide a detailed paragraph on each of the required sections (i.e. General Information, Basin Conditions, which must include how GDE's are being evaluated) and plan implementation progress.
- Section 6.4 (Periodic Evaluations and Assessment). SGMA requires that the GSP be evaluated regarding their progress towards meeting the approved sustainability goals at least every five

years, and to provide a written assessment to DWR. An evaluation must also be made whenever the GSP is amended.

- Section 6.4 (Periodic Evaluations and Assessment). Please include a summary table for GSP Schedule for Implementation. The table should highlight the high-level activities anticipated for each five-year period. These activities are necessary for ongoing plan monitoring and updates, as well as tentative schedules for projects and management actions.
- Provide an additional section, entitles First Five Year Update (2020 – 2025) and identify several key tasks that were identified during the development of the first GSP that need to be further developed or resolved in the five-year GSP update. These could be special studies that need resolution but could not be resolved during the initial GSP development. These could include establishment of metering program, finalizing allocation framework, developing methodology for establishing minimum thresholds for new wells, refining and improving the current groundwater model, mitigation for possible future domestic wells, creating a data gap plan, etc.

APPENDIX (3-H) – GSP MODEL DOCUMENTATION

General Comments:

- Please provide a Table of Contents for this document.
- The primary authors of this model document should sign, date and stamp this document per California Code of Regulations.
- There are some "Section XX" all inside the appendix text which should be replaced with the correct section number.
- Section 2.4.1, page 2, describe the vertical extension of the General-Head Boundary. Also, provide a figure which illustrates the location of GHB and No-Flow boundary conditions on the perimeter boundaries and a cross section which shows the vertical distribution of the boundary conditions as well.
- Section 2.4.3, page 3, describe if the recharge rates are specified only at the highest active layer of the model or only at the first layer. Also, describe briefly why the author did not use "Recharge" package of MODFLOW to simulate the mountain-front recharge and instead, the "Well" package was utilized.
- Section 2.4.3, page 3 and the associated figure 4 at page 24, the text on page 3 implies that there are some recharge boundary conditions on the perimeter boundaries but the figure shows "black lines" everywhere on the perimeter boundary. Provide more transparent description or revise the figure with color lines representing different boundary conditions (No-Flow/GHB/Recharge) on the study domain.
- Figure 4, page 24, provide units for the flux values.
- Section 2.4.5, page 4, provide a range of depth for the pumping wells.
- Section 2.4.5, page 4, describe the package used for simulating the pumping wells. Is it "Well" package or "MNW" package (Multi-Node Well)?
- Section 2.5.1, page 7, Table 2, provide the units.

- Section 3.2, page 13, provide more detailed information about the temporal-resolution of the transport model. The flow model has annual time discretization for the transient model and monthly discretization for the predictive model. What is the time-step of the transport model?
- Section 3.4, page 14, last line, and the associated figure 36, page 55, simple averaging of simulated TDS value from layers of the multi-screen well is not exactly an appropriate approach, unless the flow rates to the well screens are the same for those layers. The calculation of mean concentration from a multi-screen well is usually based on volumetric flow rates to/from each screen. This flow rate can be captured by using MNW package in modeling the pumping wells (https://pdfs.semanticscholar.org/e8f2/dc3b4aa227532ad74f977b99abf070560321.pdf):

$$C_{average} = \frac{\sum_{i=1}^{n} Q_i C_i}{\sum_{i=1}^{n} Q_i}$$

  where Q_i and C_i are flow rates and concentrations for each layer of the multi-screened well, respectively.

- Section 3.5, page 16, provide additional graphs to describe the qualitative validation of the model using box and whisker plot of the TDS concentrations (simulated vs. measured) for different time intervals (for example 1920-50, 1951-70, 1971-90, 1991-2016) for shallow (plot #1), intermediate (plot #2), and deep (plot #3) TDS zones. Collect all available measured concentrations for each depth zone, for each time interval, and then compare them with the model's results at the same location and time (As reference, review https://doi.org/10.1016/j.jconhyd.2019.103521 , section 3.1).
- Section 4, page 17, add to the limitation list, that this transport model is qualified only for the purpose of "scenario analysis" and it is not an "absolute predictive model" because the transport model has not been quantitatively calibrated (which increases the uncertainty of the simulated results).

Thank you for considering our initial comments and recommendations. We look forward to working with you to further produce and implement the Groundwater Sustainability Plan in Indian Wells Valley.

Sincerely,

LUHDORFF & SCALMANINI
CONSULTING ENGINEERS

Eddy Teasdale, P.G., C.HG
Supervising Hydrogeologist

CC: Adam Bingham (Chair Technical Advisory Committee