

## ATTACHMENT 1

TWDB Contract No. 0704830697

### Region L, Region-Specific Studies 1-5:

#### **TWDB Comments on Draft Final Region-Specific Study Reports:**

- 1) Lower Guadalupe Water Supply Project for GBRA Needs
- 2) Brackish Groundwater Supply Evaluation
- 3) Enhanced Water Conservation, Drought Management and Land Stewardship
- 4) Environmental Studies
- 5) Environmental Evaluations of Water Management Strategies

#### **Region-Specific Study 1: Lower Guadalupe Water Supply Project for GBRA Needs**

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1. Page 21: Please note in the report why median inflow graphs are presented for scenarios 2 and 3 but are not required for scenario 1.

#### **Proposed Response** – The following sentence will be added to the discussion paragraph:

*“Thus graphics showing median inflow and flow frequency are not necessary, as the median values for both Baseline and Lower Guadalupe Water Supply Project for GBRA needs would be equal in all months.”*

2. Page 29, bullet number 3: please provide the basis for the assumption that “economic impacts” at the source area are “(benefits)”. Please address whether or not there may be potential negative economic impacts and quantify these, if anticipated, in accordance with Task 6 of the Scope of Work.

**Proposed Response** – “Benefits” is equated to “economic impacts” in an illustrative sense in that the value of the goods and services involved are useful to the population. The parenthetical “(benefits)” will be removed. The use of the term has no effect upon the analysis.

3. Page 30: please clarify in section 6.2 that the economic values associated with the terminus impacts are calculated for a drought-of-record year.

**Proposed Response** – The economic values of shortages in the terminus areas are calculated for a drought-of-record year, in that the quantities of shortages (needs) to which the economic values are applied are the difference between projected demands for dry year conditions and projected quantities of water supply available in a repeat of the drought-of-record.

## **Region-Specific Study 2: Brackish Groundwater Supply Evaluation**

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1. Scope of Work item 5 includes documentation of meetings. Please include documentation in the report for meetings conducted as part of the project.

**Proposed Response – No particular documentation is necessary, as study-specific meetings were not held regarding Brackish Groundwater Supply Evaluation.**

2. Scope of Work item 6 includes making recommendations. Please include a section on recommendations as appropriate.

**Proposed Response – No particular recommendations are required as the evaluation included only an analysis of four case-study projects.**

3. Please correct the name Refugio County Groundwater Conservation District or RCGCD to Refugio Groundwater Conservation District or RGCD throughout the report.

**Proposed Response – The name and abbreviation of the groundwater conservation district will be corrected.**

4. Page 41: under Implementation Issues. Text only states "coordination with groundwater district". For consistency, suggest adding the same language on this page that was on page 27 - to include "Permitting from the groundwater district".

**Proposed Response – The bullet labeled “coordination with groundwater district” will be changed to “Securing permits from groundwater district (Atascosa and Wilson Counties).”**

5. Page 5, paragraph 1: For clarity, please consider defining brackish and saline water, in terms of total dissolved solids (TDS), in the opening section of the report.

**Proposed Response – This comment applies to all four projects. It is suggested that the definition be placed in Section 1.0 on Page 1. As such, the following language will be inserted immediately following the first sentence in Paragraph 2 on Page 1 – “*For this study, brackish groundwater is defined as groundwater with salinity greater than secondary drinking water standards (500 ppm Cl and 1,000 ppm TDS) and less than 5,000 ppm TDS, while saline groundwater is groundwater with salinity greater than 5,000 ppm TDS.*”**

6. Page 5, paragraph 1: Please consider including in an appendix or as an attachment some geophysical logs that were used to identify brackish groundwater in the area.

**Proposed Response – Brackish groundwater was primarily identified using water quality data and well features information from the TWDB well database. Maps showing the pertinent information will be added as an appendix.**

7. Pages 13, 27, 41 and 54: As stated, it is not clear what the anticipated implementation issues of TCEQ regulations are. Please elaborate or specify the TCEQ regulations that are anticipated to be issues in the implementation of the projects.

**Proposed Response – Regulations by TCEQ include brine disposal discharge permits. The bullet will be changed to read “*Brine Disposal Discharge Permits by TCEQ.*”**

8. Page 31, last paragraph of section 4.2, lines 2-3: Please clarify the sentence stating that there are no groundwater districts to regulate well spacing and production in Bexar County. Bexar County does have a district, the Edwards Aquifer Authority, but its authority is limited to the Edwards Aquifer.

**Proposed Response – The sentence will be changed to read: “*In Bexar County, there is no groundwater district to regulate well spacing and production in the Wilcox Aquifer.*”**

9. Page 37, paragraph 1, lines 10-11: The sentence “Since, SAWS.....Bexar County.” is grammatically incomplete.

**Proposed Response – The sentence will be changed to read: “*SAWS is proposing to locate the plant next to their ASR facility in South Bexar County.*”**

### **Region-Specific Study 3:**

#### **Enhanced Water Conservation, Drought Management and Land Stewardship**

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1. There does not appear to be discussion regarding assessment on overlapping elements of conservation and potential drought management practices as included in task 1 of the Scope of Work. Please discuss overlapping elements of conservation and potential drought management practices.

**Proposed Response – References to the overlapping elements of conservation and potential drought management practices will be added to the Executive Summary (Sections ES.2 and ES.4), Section 2.1, and Section 4.2.**

2. Section ES.4: Please briefly describe; the potential effects of implementing drought management strategies upon other water management strategies; and, the potential benefits associated with drought management strategies per Scope of Work tasks 3 (d) and (e).

**Proposed Response – Brief descriptions of the potential benefits of drought management strategies and their effects on other water management strategies will be added to Sections ES.4 and 4.0.**

3. Page ES-3, first paragraph, second sentence: Because the planning guidance under 357.7(a)(7)(B) is not restricted to consideration only of approved drought management plans and to avoid confusion, please clarify that the rule interpretation presented in the

report applies only for the purposes related to the particular methodology used in this study.

**Proposed Response – Referenced text will be revised for clarity in Sections ES.4 and 4.0.**

4. Page ES-3, first paragraph: Please clarify that it is for the purpose of the study's particular methodology that drought management is specifically characterized within this report as "*the conscious decision not to develop firm water supplies greater than or equal to projected water demands with the understanding that demands will have to be reduced or go unmet during times of shortage.*" Implementing drought management, in general, does not require a corresponding reduction in available water supply and may occur regardless of available water supplies on hand or in the future.

**Proposed Response – Referenced text will be revised for clarity in Sections ES.4 and 4.0.**

5. Page ES-3, first paragraph, Section 4.2, Table 4-6, and Appendix C: The report states that the "*economic impact of not meeting projected water demands can be estimated and compared with the costs of other potentially feasible water management strategies in terms of annual unit costs.*" In making these comparisons, the lost utility revenues have been included in the drought management unit 'costs' (e.g. Figure 4-6) per the data provided by TWDB in Table 4-1. While these lost revenues are a recognized 'economic impact' they should not be included as costs when making comparisons to potentially feasible water management strategies as they represent a financial transfer; a financial loss to the utilities that corresponds to a financial savings to customers. Adding together both the economic impact to the customers of shortage and the lost utility revenue double counts this economic impact. Please do not include lost revenues in cost estimates of drought management when directly comparing them to the unit costs of potentially feasible WMSs (e.g. Figure 4-6, Appendix C).

**Proposed Response – Title of Table 4-6 will be revised to "Total Annual Economic Impact." Average unit cost values in Table 4-7 will be revised to exclude economic impacts associated with lost water and wastewater utility revenues. Similarly, unit cost values in Figure 4-6 and throughout Appendix C will be revised to exclude economic impacts associated with lost water and wastewater utility revenues for direct comparison to the unit costs of other potentially feasible water management strategies. Text throughout Sections ES.4 and 4 will be revised accordingly.**

6. Page ES-4, first paragraph, third sentence: The term 'alternative' might suggest that a different methodology was used. Please clarify that the "alternative methodology" (applied only in SAWS' case due to budget and time constraints) was a refinement to the same methodology that generally more accurately reflects: a) the actual design and implementation of drought management plans; and, b) the TWDB methodology used in evaluating economic impacts in the 2007 State Water Plan.

**Proposed Response – Requested clarification will be provided and the words "alternative methodology" replaced with "refined methodology" in Sections ES.4 and 4.**

7. Page ES-4, second paragraph, fourth sentence: Sentence refers to SAWS having the “flexibility” to avoid reductions to commercial and manufacturing water use but does not also acknowledge the focus on reducing outdoor water use first. Please include additional language explaining that reduced economic impacts were also partially due to focusing on reducing outdoor water use first.

**Proposed Response – Requested explanatory language will be added to Sections ES.4 and 4.4.**

8. Section 4.2: Report does not present the historic per capita water use estimates that are the basis of the calculated risk factors. For reference, please include a table presenting the annual per capita water use rates that were used to calculate the risk factors (e.g. in an appendix).

**Proposed Response – A summary table of historical per capita use estimates provided by the TWDB for each water user group will be included as an appendix to the study report.**

9. Section 4.2, Figure 4-4: The method of calculating the risk factors effectively assumes that the historic annual per capita water use numbers occur during drought-of-record water supplies. It is likely that some of the annual per capita water use numbers that are greater than the year 2000 per capita water use numbers occurred during non-drought years when available water supplies were greater. Please discuss the implications that this might have on the resulting calculated risk factors and resulting calculated unit costs of drought management strategies.

**Proposed Response – Additional discussion will be added to Section 4.2 regarding potential implications of observed trends in per capita use rates on methodology development, magnitude of risk factors, and unit costs. Discussion will also clarify that such trends are due, in part, to recent Edwards Aquifer pumpage restrictions during drought and that accounting for these trends would necessitate hydrologic and climate modeling beyond the scope of this study in order to quantify unconstrained per capita use.**

10. Section 4.2: Report does not address the degree to which drought management had already impacted the annual historic per capita water use numbers as this was not part of the Scope of Work. Embedded drought management might reduce the ability to implement further drought strategies and could increase the expected costs of implementation. Please briefly discuss what impact this factor might have on: the potential water savings from drought management; and, the magnitude of the expected economic impacts resulting from implementation of drought management strategies.

**Proposed Response – See proposed response to Comment #9. Additional discussion will be added to Section 4.2 regarding effects of embedded drought management on the magnitude of economic impacts resulting from a drought management strategy.**

11. Page 15, Second paragraph: Methodology does not explain how the risk factor values were actually measured/calculated. Please explain how the risk factors (e.g. areas under the curves) were actually measured/calculated (e.g. auto-generated on computer or graphically by hand).

**Proposed Response – Risk factors were calculated in a Microsoft Excel workbook with equations being unique to each water user group. Alternative procedures may be considered for refined drought management strategy evaluations in the 2011 Region L Water Plan.**

12. Page 17, Table 4-1: The ‘A’-‘F’ graphical notations on Table 4-1 do not address the SAWS ‘alternative’ analysis. If practical, please annotate Table 4-1 to indicate how SAWS ‘alternative’ analysis was constructed.

**Proposed Response – See proposed response to Comment #13.**

13. Page 18: Tables 4-2, 4-3, and 4-5, for example, do not illustrate how to calculate the ‘alternative’ SAWS economic impact estimates. Please add an additional example table similar in format to Tables 4-2 and 4-3 that illustrates how the ‘alternative’ SAWS analysis was developed and that; splits domestic water use showing Horticultural Impacts separately; and, shows the elimination of the associated Lost Sewer Revenue impacts.

**Proposed Response – Supplemental tables will be added to Section 4 to demonstrate calculations for SAWS refined methodology.**

14. Page 19, first paragraph, last sentence: Includes a reference to averaging the 5% and 10% scenarios to arrive at the 10% scenario. Please confirm that these do not need to be weighted averages.

**Proposed Response – The words “unit cost” will be replaced with “approximate unit cost” in the referenced sentence.**

15. Page 19, second paragraph: Referenced “information provided by SAWS” is not summarized. Please briefly present the information that SAWS provided to facilitate the SAWS ‘alternative’ analysis.

**Proposed Response – Key information provided by SAWS included the relative percentages of indoor and outdoor water use in the domestic/residential sector as well as written comments suggesting refinements to the general methodology in order to more accurately represent SAWS drought management strategies. A footnote will be added to acknowledge these contributions.**

16. Page 25, Section 4.4, fourth sentence: Sentence does not mention that a key reason for the lower expected economic impacts of the SAWS ‘alternative’ analyses were initial water reductions focused on outdoor domestic water uses. Please add language explaining how

outdoor uses were split out and that outdoor water use was targeted first for reductions and how this resulted in lower estimated economic impacts including the elimination of associated 'Lost Sewer Revenues'.

**Proposed Response – See proposed response to Comment #7.**

17. Page 25, Section 4.4: Summary doesn't address whether or not the per capita water use rates used to calculate risk factors included embedded drought management water savings. Please discuss whether or not per capita water use rates used to calculate the risk factors may already have embedded drought management water savings and the implications this may have on the potential effectiveness and economic impacts of implementing drought management strategies.

**Proposed Response – See proposed response to Comments #9 and #10.**

18. Page 27: Please note that, to adopt brush management as a recommended water management strategy in a regional water plan, it will require a technical evaluation of: water supply yield (i.e. firm yield) during drought of record; calculated total costs and unit costs of water; and, consideration of environmental, water quality and any other factors used to evaluate water management strategies by the planning group.

**Proposed Response – The following sentence will be added at the end of Section 5.0.**  
***“Pursuant to TWDB rules and guidance, this technical evaluation will include quantitative and qualitative assessments of firm yield, costs of water, environmental effects, water quality, and other factors in a manner consistent with the technical evaluations of other water management strategies in Region L.”***

19. Appendix B: For clarity, please consider adding the following additional language to the end of the TWDB methodology contained in Appendix B as follows:

***“The Phasing-in of Water Shortages to Calculate Economic Impacts***

*The TWDB estimates the economic impacts of not meeting water needs from the perspective of water user groups rather than the perspective of water utilities. This is a requirement mandated by administrative rules as specified Section 357.7(4) of the Texas Administrative Code. Thus, municipal and manufacturing water user groups are treated as separate entities in the regional planning process.*

*Water shortages as reported by regional planning groups are the starting point for economic impact analyses. No adjustments or assumptions regarding the magnitude or distributions of unmet needs among different water use categories are incorporated in the TWDB analyses. Any such adjustments must be requested by a planning group.*

*When estimating the economic impacts of not meeting water needs for municipal water user groups, the TWDB assumes that:*

- *a region and each water user group within a region is experiencing drought of record conditions;*
- *for a given municipal water user group, all unmet needs that are less than 30 percent of total average annual water demand would be eliminated by restricting all outdoor residential water use;*
- *for unmet water needs that range from 30 to 50 percent of total average annual water demand, all domestic outdoor water use would be restricted as would a portion of indoor domestic water use;*
- *if unmet needs exceed 50 percent of total average annual water demands, all of the above conditions would hold true, and in addition water intensive commercial businesses such as car washes, restaurants, recreational venues would be forced to reduce water use and domestic water consumers would have to further reduce water consumption.*

*For manufacturing water user groups, TWDB economic analysis assumes that producers would implement emergency measures to alleviate water shortages (note that these efforts are not planned programmatic or long-term operational changes); assumptions for manufacturing include:*

- *if unmet water needs are 0 to 5 percent of total water demand, no corresponding reduction in output (i.e., gross sales) is assumed;*
- *if water shortages are 5 to 30 percent of total water demand, for every 1.0 one percent of unmet need, there is a corresponding 0.25 percent reduction in output;*
- *if water shortages are 30 to 50 percent of total water demand, for every 1.0 one percent of unmet need, there is a corresponding 0.50 percent reduction in output; and*
- *if water shortages are greater than 50 percent of total water demand, for every 1.0 one percent of unmet need, there is a corresponding 1.0 percent reduction in output (i.e. a proportional reduction).*

### **Valuation of Residential Water Shortages**

*Valuation of residential water shortages are based on statewide average values reported by the TWDB in the 2007 state water plan, and adapted for this study via a linear extrapolation. Ideally, estimates of the value of residential water shortages should be based on non-linear demand functions (i.e., constant*

*elasticity demand curves) estimated at the utility level. These values would be more accurate when measuring shortages of different magnitudes, and lower than the values applied in this study for small shortages. In other words, the impacts of a small deficit relative to total annual water use (e.g., less than five percent) would be minimal. As the magnitude of shortages grew, the impacts increase in a non-linear fashion, and values at the other extreme would be much higher than those using the values in this study. Theoretically, as shortages approach 100 percent, the value of water becomes infinite assuming there were no readily alternatives available. In reality, alternatives to utility supplied tap water would likely be available such as bottled water or water delivered by tanker (“hailed in” water). For example, costs per acre-foot of delivered water can be very high ranging anywhere from \$20,000 to \$70,000, and the cost of retail bottled water is approximately \$162,000 per acre-foot. To value residential shortages using constant elasticity demand curves requires a considerable amount of effort and data, and was beyond the scope of this study. However, it would be a very useful refinement in any future studies that quantify economic impacts of drought.”*

**Proposed Response – Language suggested by the TWDB will be added to Appendix B verbatim.**

20. Appendix C slides (e.g. pages 1, 2, and 8) do not include the ‘alternative’ economic impact analysis for SAWS which show significantly lower impacts. Please include the SAWS ‘alternative’ drought management unit costs in all relevant graphical comparisons in addition to the non-alternative SAWS cost estimates. The alternative SAWS impacts, for example, could be foot-noted in the figures as a refined estimate of expected costs.

**Proposed Response – SAWS alternative or refined unit cost estimates for drought management strategies will be added to relevant graphical comparisons in Appendix C.**

#### **Region-Specific Study 4: Environmental Studies**

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Page ES-3: Data units in Tables ES-1, 2 are not labeled. Please label data units.

**Proposed Response – The units “acft” will be added to both these tables, as well as the tables in the main body of the text on Pages 9 and 10.**

#### **Region-Specific Study 5: Environmental Evaluations of Water Management Strategies**

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Please include a list of the names of the attendees of the December 19<sup>th</sup>, 2007 and January 18<sup>th</sup>, 2008 meetings described in Appendix C.

**Proposed Response – Names of the committee members along with notes regarding meeting attendance are listed in Appendix C.**