Response to comments from the NWRI Draft Final Report of the February 26, 2015, Meeting (Meeting #1) of the Independent Advisory Panel for West Basin Municipal Water District's Ocean Water Desalination Subsurface Intake Study – Guidance Manual Review

In 2015, National Water Research Institute (NWRI) formed an Independent Advisory Panel (Panel) on behalf of the West Basin Municipal Water District (WBMWD) to provide expert peer review of the technical and scientific aspects of a DRAFT Subsurface Seawater Intake (SSI) Feasibility Guidance Manual (Manual), which was developed by Geosyntec Consultants, under contract to WBMWD, with grant funding from the United States Department of Interior, Bureau of Reclamation (USBR) under USBR Project No. R14AP00173. The Guidance Manual is also a part of a larger WBMWD study, the "Ocean Water Desalination Subsurface Intake Study." The Panel issued a draft report on March 20, 2015 which included a number of comments on the Draft Manual. Geosyntec and WBMWD have reviewed the comments and will be making changes to Manual to reflect the expert opinions of the Panel members. The table below summaries the comments provided by the Panel in their draft report as well as the planned approach to incorporating the comments into the Manual.

#	Panel Comment	Response to Comment
1	The Panel recognizes WBMWD and Geosyntec for their effort in preparing for the meeting. The Panel appreciates the level of organization and information provided for the Panel to conducts its review.	Noted
2	The meeting presentations were informative and helpful in conducting this Panel review (with public input) of the Guidance Manual framework.	Noted
3	WBMWD needs to be clear as to the purpose and users of the Guidance Manual (as well as be clear in the documentation as they develop this manual). • Although the Guidance Manual is geared towards California, will it be general enough to use in other regions? • A statement is needed as to how it should be used, who should use it (i.e., the technical backgrounds of users), and what level of effort is required. • Be clear that the Guidance Manual framework is a cursory feasibility analysis performed with a desktop tool with limited information. It is a tool to provide guidance as to which options may be most appropriate for a given site. It is not a final determination. • Use of the Guidance Manual will standardize SSI evaluations in terms of consistency in SSIs evaluated and the evaluation criteria used. • The Guidance Manual is a tool to demonstrate that all SSI technologies have been considered and those eliminated had justification for being eliminated.	Explanation about intended user and purpose of tool will be added. The guidance tool is based on CEQA definition of feasibility. Information will be added in the tool and the final guidance document to explain that if it is used in a different state or country, the feasibility definition and regulatory requirements might be different. Discussion of how these requirements may vary will be included in the final guidance manual.
4	The Panel suggests that including practical issues (e.g., beach stability) in the Guidance Manual is important. In addition, input parameters should be data that could be obtained through a literature and database review and site inspection.	Noted
5	The intake type is linked to economics (i.e., to the cost of the project and the cost of water to consumers). • Describe in the Guidance Manual that proponents should recognize that economic, environmental, social, and regulatory issues should also be factored into the decision-making process, perhaps not at Level 1, but at subsequent levels. • Proponents should consider conducting an initial feasibility analysis (i.e., this Guidance Manual) followed by an economic and regulatory and environmental impact analysis to assess the full feasibility of each SSI and whether or not a given option might face insurmountable regulatory challenges. • Please refer to the modified flowchart in Appendix E.	Agreed that the user may consider doing economic/env/social/reg feasibility analysis before levels 2 and 3. In some cases, the user may decide to conduct levels 2 and/or 3 investigation before the other analyses, depending on specific circumstances. This should be at the discretion of the user. The flow chart will be updated to reflect this option.
6	The issue of risk of pursuing SSI options with limited experience is important. There is a need for pilot projects of different SSIs to reduce this risk and increase knowledge and confidence.	Agreed. Levels 2 and 3 can include pilot testing.
7	The Panel suggests that the Guidance Manual could be beta tested on one or more existing facilities as a validation of the Guidance Manual. The tool could show that the technology used for an existing facility selected is ranked high, but not necessarily the highest.	The matrix will be beta tested by applying it to West Basin's potential desalination site.
8	If the Guidance Manual is beta tested with existing facilities, the results could be used to validate the "weightings" addressed in Section 3.2.	Noted
9	The definition for "feasibility" is derived from the feasibility criteria established by the California Coastal Commission (Seawater Desalination and the California Coastal Act, 2004). Is this definition consistent with the use of the tool for other regions outside of California?	See response to comment #2.
10	The Panel has the following recommendations on terminology: • The title of the project of the study is mentioned as: "Ocean Water Desalination Subsurface Intake Study Guidance." Consider the title: "Seawater Subsurface Intake (SSI) Feasibility Guidance Manual." • WBMWD and the project team need to be consistent in using a consistent phrase such as "subsurface seawater intake" and not other variations. • The Panel suggests that description "Subsurface Seawater Intake (SSI) Feasibility Matrix" may be a better phrase than "Screening Framework" when describing the Matrix.	Recommended terminology will be adopted (subsurface seawater intake)

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11	An explanation is needed of the weights that are included in the final version of the Guidance Manual, including a description of the methodology and justification of the individual weights.	A narrative explanation of the weights will be provided in the final guidance manual.
12	A weighting based on Southern California or California needs may not be as applicable to users in other regions. If it is to be a more general tool, then the basis for weighting needs to be general (e.g., eliminate California Environmental Quality Act [CEQA] definitions).	CEQA references will be removed (see later comments).
13	Weights should be fixed by the Guidance Manual and should not allow the user to manipulate the numbers. Validating the weights based on a review of existing facilities would be a benefit if they are fixed. However, there could be an option to override the default weights if the user has more specific information. Users of the Guidance Manual may not understand, agree with, or actually disagree with the weights; therefore, the value of the tool may be diminished. WBMWD should consider this as a potential devaluing of the overall exercise and consider either a robust explanation of weights (as described above), or the ability of the user to change the weights after using the tool with "recommended weighting based on professional experience."	The matrix will have default weighting, but the user may change the weights if they have reason to do so. This will not affect the fatal flaw analysis, but will allow the user to customize the challenge section based on their understanding of their site. However, a note will be included that states that only the default weights have been peer reviewed, and therefore the results that come from altered weights are not based on peer reviewed information.
14	The Panel suggests qualifying the user input by adjusting weights on the basis of the input source. A risk factor would be assigned to the inputs, which in turn would be used to adjust the corresponding weights. For example, if the input is derived from a site-specific measurement or an observation, the input would be considered as high quality, if derived from regional estimates, literature review, and so on. The input would be considered of medium quality, and if the input is based on assumptions, anecdotal evidence, or any unsupported source, then the input would be considered of low quality. Also, uncertainly in the available data contributes to risk/uncertainty. The weightings could be adjusted based on the following assessment: • High quality input = low risk. • Medium quality input = medium risk. • Low quality input = high risk. The user would need to specify the source of the input, and the tool would perform the background calculation. It would be useful at the end, when the scores are displayed, to show the level of uncertainty that was factored in the scores of the SSIs. This element could provide guidance into what investigations need to be performed to remove uncertainty.	The option to rate quality of data and inputs (low, medium and high) will be added. This will allow the user to indicate the certainty of the data, and the results will include flags highlighting uncertain data.
15	Instead of providing a list of parameters, it may be possible to describe these items with a list of questions as questions can provide the context for better understanding the input required and limit misinterpretation. For example: • "What is the required capacity of the desalination plant?" • "What is the typical significant wave height at the depth of closure?" • "What is the top elevation of the beach relative to…?"	Recommended change will be made. Requests for inputs will be questions.
16	The Panel would like more clarification as to what some of the inputs encompass. For instance, how were the "Number of Units" calculated? Terminology or descriptive details should be provided in the Matrix to assist users when addressing these inputs.	More detailed descriptions of each input will be provided in the final guidance manual.
17	Regarding "Number of Units": • It is recommended that the Number of Units be removed as an input. The Panel feels that the Number of Units should be calculated by the Guidance Manual (based on the input provided) rather than by the user. For example, using the available beach front (user input), the toolbox would calculate the number of conventional vertical wells and production that could be achieved on the basis of an estimate of well productivity (default provided by the toolbox, but adjustable by the user), well spacing (default provided by the toolbox, but adjustable by the user), redundancy (default provided by the toolbox, but adjustable by the user), etc. If the resultant production is less than required to match or exceed the design capacity of the desalination plant, then the technology would be flagged as unfeasible. The toolbox should perform similar calculations and provide guidance for input parameters for all the other SSIs. • To evaluate number of units and land take per unit (beach front and area), one would need to know the capacity per each type of unit and land take per unit for each intake option. Using vertical wells as an example, given a required capacity (+/- a safety factor) and well capacity (gallons per minute/well), the number of wells could be calculated and given a well spacing and well pad area, the total land take could be calculated. This information would be needed for each SSI option. There might be a default value and option to enter a site-specific estimated value.	Number of units will be removed as an input and instead calculated from other inputs.
18	Guidance for the input on "Land per Unit (Linear Beach Front)" is needed, or this could be calculated (see above bullet).	See previous response.

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19	For the required input "Significant Wave Height," include additional sub-input like "Wave Period" and "Wave Direction." This information would be used to assess the individual SSIs. However: • The initial thought was to input several wave parameters to help assess beach dynamics, but this could be simplified if the user replies to the few questions (see next sub-bullet), which should help in determining the dynamics of the beach. • This could be simplified by entering the typical significant wave height and peak wave period at the depth of closure. The depth of closure is the depth beyond which sediment transport or bottom changes are negligible. Because a seabed infiltration gallery or the seaward end of a water tunnel would be constructed in this area, the wave height could make construction a challenge.	Response pending further information from the panel.
20	The Panel recommends using turbidity (nephelometric turbidity units [NTU]) rather than silt density index (SDI) as an input. • Turbidity will tell you how much silt is in the water and if it will cause plugging of a seabed infiltration system. • Use the Slow Sand Filter Manual as reference to develop a threshold for turbidity (i.e., 50 NTU is the maximum value available for a slow sand filter). • SDI is not a measure of what will cause the fatal flaw because it cannot be related to the operation of the intake, but the surface water reverse osmosis process. As discussed below with reference to Criteria 15, all SSI types are capable of producing low SDI water and there is no one preferred option in this respected. A more important issue is the sensitivity of the intake to turbidity, which would be greatest for gallery type systems.	Comment will be incorporated. NTU will be added as a criteria in the Operation (Intake) section. SDI will be kept as a criteria for Operation (Treatment) section.
21	The beach needs to be characterized; therefore, the Panel suggests questions like: • Is the beach artificial? • If the beach is artificial, how often is it nourished? • What is the beach width at mean higher high water (MHHW)? • What is the beach top elevation (relative to some common datum used throughout)? • What is the beach slope? • What is the depth of closure (depth beyond which there is no significant sediment transport or bottom changes)?	Response pending further information from the panel.
22	"Depth to bedrock" (challenge: project proponents will not be drilling into bedrock to put in a structure like a beach gallery).	Response pending further information from the panel.
23	"Erosion rate and/or return time for nourishment" (challenge: beach stability is important as it impacts the intake structure most). "Erosion rate" (e.g., in feet per year) may be difficult to determine. In any case, using the erosion rate with the beach width an estimate of the "life" of the beach could be computed (e.g., how many years until no beach or nourishment is required). This set of questions/answers should allow a determination as to how active or dynamic the beach is and factor that in in the scoring later, without trying to figure this out through wave conditions. The "rate of change of beach width over 30 years" should be removed, and replaced by the "erosion rate," which should be determined from measurements or literature. No estimate of "rate of change of beach width over 30 years" can be made from aerial photos alone (i.e., photos may not be available for 30 years, the beach may have been nourished, structures are installed, and the beach width depends on the tide, a photo may be taken at high tide showing a narrow beach and vice versa). While the analysis of photos to determine erosion rates is valid, it requires a level of analysis that is beyond what the typical user of the toolbox could do. Therefore, the Panel suggests the user input estimates made by others and published in the literature or reports by agencies. This refers to Challenge 13 (protection from erosion or scour), too.	We propose to address this as a beach stability term instead of erosion. We have requested additional input from the panel on qualifying beach stability (see response to comment #21).
24	Water levels relative to a common datum (e.g., NAVD88) used throughout should be included. For example: • What is the 100-year total water level (TWL)? • What is the MHHW? • What is the mean lower low water (MLLW)? • What is the 100-year TWL by mid-century (to account for the life of the facility [e.g., 30 to 40 years] and sea level rise due to climate change)? These water levels should be used to assess the challenge, feasibility, and other aspects of beach-based SSIs. At the same time, the elevation of the land where facilities could be installed should be defined, such as: • What is the elevation of the land beyond the beach where components of SSIs could be constructed?	Response pending further information from the panel.
25	Requirements for the seven SSI options are needed. That is, the tool can make background calculations based on user inputs and values provided within the tool, like productivity, spacing, required area, and redundancy. Reasonable default values (or a range of values) are needed to help provide guidance on which well will work and how	Default values will be provided, with the option for user override.

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	many wells are needed. There should be an override option in case the user has more specific information available.	
26	There is a large variety of coastal features to consider for Fatal Flaw #1 (land type makes construction of SSI infeasible). For example: Beach, Estuary, Bay, Wetland, Cliff, Bluff, Inlet, Lagoon, Reef, Flood Plain, Dune, Spit, etc. These could combine to define a specific coast type that may or may not be suitable for a particular SSI. For example, a beach could be in a bay and thought to be protected, but if the bay is like Santa Monica Bay, the location on the bay would be important in determining if the SSI would be exposed to large waves. A beach could be backed by a cliff or bluff, or be on a spit, and the beach may be fronted by a reef. All these scenarios would need to be defined if a flaw to a particular SSI is to be determined.	Response pending further information from the panel.
27	The Panel feels that reference to CEQA in Fatal Flaw #4 is too California-specific and may be speculative at this stage of the review. The Panel recommends that WBMWD use a more general description (such as “state environmental review” or “regulatory review”). CEQA could then be referenced as an example. In addition, regulatory approval varies by intake type. A type-by-type evaluation of intakes will be needed based on state requirements.	The CEQA fatal flaw will be removed.
28	The Panel recommends including a fatal flaw that relates to sea level and/or elevation of the land. This effort may include defining what land elevation is not acceptable and where. Also, factor in flooding events and sea level rise, such as the 100-year flood and SLR due to climate change by mid-century or hurricane surge analysis for parts of the United States.	Issues of sea level rise or flooding are mitigatable and therefore they will not be included as fatal flaws.
29	Regarding Fatal Flaw #2 (insufficient beach front available to construct SSI): How is this computed and who computes it? Background calculations per user input and toolbox defaults could be used to compute this to determine if this is a fatal flaw or not.	More information will be provided and default values will be provided with the option for user override.
30	Similar for Fatal Flaw #3 (insufficient land available to construct SSI) and the proposed Fatal Flaw related to water level. If the top elevation of the beach is below the 100-year TWL, then beach-based SSIs like vertical well beach structures may not be a good idea.	See response to #28.
31	Challenge #5 (limited area for drilling equipment). This challenge only deals with the staging area for drilling, but what about other staging areas for other land use considerations? A beach gallery will take up more space than a well. An offshore gallery may require the construction of a trestle that could impact the beach for months or years.	This criteria will be expanded to include all staging requirements.
32	Challenge #8 (wave limit for construction). Use two options instead of three. The two options include: less than 3 feet (zero points, feasible) and greater than 3 feet (2 points, unfeasible, too expensive, significant construction downtime). For Beach Infiltration Gallery, note that waves break as a function of depth with a ratio of height at breaking = 0.78 x depth, so the depth at the seaward end of the beach infiltration gallery will control the wave height at that location. Furthermore, a cofferdam may be built to protect/isolate the construction area from the waves (in which case waves would not be relevant).	Scoring system will be changed for this criteria (though we will use the term "challenge" instead of "feasibility"). Agreed that a coffer dam would resolve the wave issue, hence the wave height being a challenge rather than a fatal flaw. The ratio will be provided by the tool to inform the user for input. For beach gallery, it will be possible to estimate the wave height by multiplying the depth at the seaward end of the beach gallery by 0.78.
33	Challenge #9 (depth to seabed). The Panel recommends adding the phrase “at planned construction site.” Note that greater than 35 feet is not feasible; the Matrix cites 50 feet for slant wells.	Comment will be incorporated. Should not apply to slant wells.
34	The Panel noticed an inconsistency in the scoring with Challenge #10 (land type). For example, for radial collectors, a rocky coastline is considered a fatal flaw, while it is rated a (1) in Challenge 10. Cliffs are also listed as (2) and a fatal flaw.	This will be corrected.
35	Challenge #12 (protection against sea level rise). Specify 30 years from what date (likely from the initiation of construction, which could reach to 40 years or greater from the time of project initiation). The SLR projection should account for the planning/design period, the construction period, and the lifetime of the facility. Refer to SLR projections by the National Research Council for California, Oregon, and Washington.	Will clarify that it is 40 years from project initiation. The NRC study is cited in the reference.
36	Challenge #13 (protection from erosion or scour). Looking at historical aerial photos is reasonable, but it is also important to consider beach nourishment. Maybe this challenge should be redesigned to consider whether it is a stable or unstable beach. An important criteria would be if the beach needs nourishment (if it does, it is an eroding beach and would score a 2). Conversely, if the beach is receiving too much nourishment, the site will end up stranded. Also, see the discussion in Section 3.3 (List of Inputs) on “Erosion rate and/or return time for nourishment.”	See response to #23.
37	Challenge #14 (clogging). This challenge is unlikely to be useful for screening due to a lack of information. Because more information is needed, it might be moved to Level 2. Alternatively, this challenge could be called “geochemical stability,” with SSI rates based on the likelihood of mixing of waters with different chemistries (particularly redox conditions). Gallery types systems would rank (0), whereas vertical wells would receive a (2) and perhaps other types a (1).	If the user has no information on any of the parameters (saturation index, sedimentation rate or turbidity) the proposed default values will be used for each SSI, but there would be a flag for uncertainty. More information can be added during level 2 and 3.

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38	Challenge #15 (fouling). Replace this challenge with source water turbidity sensitivity. As previously noted, all SSI types can potentially provide very low SDI water. Thresholds will be needed for seabed and beach infiltration galleries.	Comment will be incorporated. NTU will be included as a criteria in the Operation (Intake) section. SDI will be kept as a criteria for Operation (Treatment) section.
39	Challenge #16 (poor feedwater requiring additional permits). How will this challenge be practically applied in the absence of test well data? The SSIs would not differ from one another based on these criteria, and data will be hard to obtain. Can this be removed from the Guidance Manual, or does it belong in Level 2?	If the user has no information on this, it will rank as a zero, but there would be a flag for uncertainty. More information can be added during level 2 and 3.
40	Challenges #17-20. Why are these environmental challenges being considered when the guidance is focused on technical feasibility and not environmental feasibility? Also, these types of inputs need to be "well-type specific" and not generic inputs. However, it was noted that these only flag negative conditions (only scores of 2) and might still be worth considering in the Guidance Manual. In addition, remove references to CEQA.	Environmental Challenges category will be removed. Challenges in this category that are technical in nature (i.e. pumping) will remain, but be moved to a different category.
41	Challenge #20 (contaminant plumes). Horizontal wells under the seabed will not be affected by landward contamination. It should be "not applicable."	Agreed. Change will be made.
42	Challenges #21 and #22. It was pointed out that precedents as far as capacity and units may not be of great value as SSIs tend to have a modular design and are readily scalable. As a hypothetical example, the largest beach gallery capacity to date is, say, 5 million gallons per day (MGD), which is not really a negative when considering a 10-MGD system, as there is no reason why the former could not have been made larger. Perhaps a more useful criterion is the number of (successful) operational systems with a capacity of 1 or 5 MGD or greater.	Scaling up significantly will inherently create some uncertainty and therefore risk.
43	In either the Risk section or Operations section, WBMWD should add challenge criteria "Maintainability." The input would be system-type specific, focusing on whether the user can readily and cost-effectively maintain these systems.	General ease of maintenance will be added in "operations" category
44	Add "Practical Ability to Pilot Test" as a challenge in the Risk Section to consider economics. For example, it is relatively inexpensive to pilot test a vertical well (Score = 0), versus an off-shore gallery, water tunnel, or radial collector system (Score = 2), which can be impractical (i.e., too expensive) to pilot test. Other SSI types would be intermediate.	Practical ability to Pilot Test will be added under "risk" category.
45	The Panel would like to note that higher scores, traditionally, represent the better option. Perhaps WBMWD should consider reversing the scoring system so that zero is "highly challenging" and 2 is "not challenging/slightly challenging."	Higher score means higher challenge. It could be confusing either way, change is not considered necessary.
46	A single weight should be provided for each Challenge in the Scoring Matrix. Currently, weights are listed for each SSI. That is, Challenge "Area available for drilling" should be weighted "1" for each SSI. This change would simplify the table/spreadsheet. After the "Challenge" column, add another column on "weight" and then include scores.	Weights depend on the SSI.
47	Is the "Summary of Max Scores for Each SSI" showing the weighted scores? It needs to be clear.	This will be clarified.
48	Thresholds can be dealt with qualitatively. However, there is a need to include an interpretation of the normalized score.	More explanation of the normalized score will be provided.
49	In the flow chart, the purple box with "Refine Site Characteristics" should automatically move to "Apply Feasibility Matrix Challenges." See the modified flow chart in Appendix E for the Panel's edits.	No, it needs to go back to evaluate fatal flaws, because refined information may cause an SSI to become disqualified when it was not earlier.
50	If a SSI has a fatal flaw, then it would logically no longer be considered. Hence, there is no need for additional Level 2 and 3 testing.	Yes, that was the intention. Wording will be clarified to make sure that is clear.
51	The Panel notes that the Guidance focuses only on technical feasibility. Before the Level 2 and 3 analyses, the Guidance Manual should point users towards evaluating for environmental and economic challenges to assess whether the options should be further considered. It is strongly suggested that it be recommended that an initial economic and regulatory analysis be performed before proceeding to field testing (i.e., if it is clear that an option would be too expensive or could never be permitted, than it makes no sense to do any testing).	See response to comment #5.
52	The Panel would like a better description of the value added by Level 2 and 3.	More description will be provided.
53	The Panel recommends separating the Level 2 and Level 3 information into different tables in the Matrix, including separating them in the flow chart (see Appendix E). Once they are separated, be more specific and individualize the information provided.	This comment will be incorporated.
54	Level 3 would include constructing and operating a pilot test well as a challenge.	The practicality of pilot testing will be added as a challenge.

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	Warren Teitz of Metropolitan Water District of Southern California congratulated WBMWD for taking a leadership role in developing a new water supply for the State of California. WBMWD took a leadership role with recycling, and now they are doing so with desalination. The work that this Panel is doing is very important and will help agencies in California wrestle with the issue of subsurface intakes. Panel Response: Noted.	No recommended action.
	Dana Murray of Heal The Bay works with marine and coastal environmental issues in California. She provided the following questions for consideration: • Will this guidance be undertaken for open ocean intakes as well? Can you integrate open ocean intakes into the SSI Guidance Manual effort to determine the best options for different sites? • How will you allow for adjustments when looking at the challenges? What feedback and/or input will you consider? • Will you look at the impact on coastal and marine spatial planning in California? • Who will undertake quality assurance/quality control to verify the accuracy of inputs? Panel Response: These questions should be addressed by WBMWD as they are not a part of the Panel review of the proposed framework of the SSI Guidance Manual.	No recommended action.
	Richard Bell of the Municipal Water District of Orange County (MWDOC) thanked WBMWD for the leadership and great work they have been doing for years. This is a neat process and great tool. He noted that MWDOC constructed a slant well several years ago, and wanted to ask if mitigation or design protective measures were considered as part of the SSI Guidance Manual. For example, putting in a well head on a beach may involve dealing with liquefaction, so protective measures may be needed against earthquakes. Another issue that can come up long after a project is built is the listing of endangered species in your site area. He asked how we can work with Fish and Game to mitigate these issues. He also noted issues pertaining to the draw of water and water rights, and cautioned to not just look at required capacity but rather what the resource can produce. Panel Response: Mr. Bell is encouraged to submit written comments with additional detail.	No recommended action.
	Jeff Barry of GSI Water Solutions has been involved in large projects like this, including evaluating feasibility. He suggested that WBMWD consider creating “off ramps” for people going through the feasibility process (that is, places to go where you can identify fatal flaws early). He suggested setting up the process in tiers, which can help users eliminate options earlier in the process. Panel Response: Noted.	No recommended action.
	John Loveland of Poseidon congratulated WBMWD for undertaking this process. He noted that Poseidon has been engaged in a similar collaborative process with the California Coastal Commission and has vetted most of the issues spoken about today. They have worked on their own process for 18 months and have published a feasibility study. He also noted that members of the Panel and technical project team have been drawn from Poseidon’s own expert panel. Keep this transparent, he stated, because WBMWD may receive a lot of questions on their process, as Poseidon did. In response, Jeff Mosher of NWRI acknowledged that Poseidon’s effort had a specific project site, but that WBMWD’s effort is more of a general project to develop a screening tool that has wide use throughout the United States. Mosher also acknowledged that some of the same experts were drawn from Poseidon’s project and are using their knowledge to inform WBMWD’s project. Panel Response: Noted.	No recommended action.
	Tom Seacord of Carollo Engineers noted that the State Water Resources Control Board is finalizing amendments to the California Ocean Plan. He wondered if the manual would be flexible enough to insert future inputs based on new information from the State Board’s amendment plan. Diane Gatza of WBMWD responded that they are following the State Board process closely and if new criteria come out before the Guidance Manual is finalized, then it can be included in this effort. Seacord then asked if there is a way to include additional inputs or fatal flaws once the Guidance Manual is finalized. Gatza replied that it is a great comment that requires further consideration. Panel Response: Noted.	No recommended action.

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	Tom Luster of the California Coastal Commission (see panel report for full comments. Too long to include here) Panel Response: The Panel agrees that qualifying the use of the tool when it is used by a project proponent in their planning process would be a benefit for users and those reviewing the results. A significant amount of work will be put into completing Level 1 of the tool to understand the location and production capability of each SSI. As a result, it would be beneficial for the results to be useful for regulatory agencies. However, the tool results should be considered in the context that the tool is an initial screening/guidance tool. One suggestion is that project proponents should review the Level 1 results with regulatory agencies to get comments prior to eliminating any SSIs from considerations and before embarking on to Level 2. The Panel recognizes the benefits of SSIs and it is assumed that a tool user would also understand the benefits. As a result, the tool would not need to highlight these benefits versus a conventional open ocean intake. Some of these concerns can be addressed in the description/narrative for the tool. The Panel agrees that the use of CEQA be removed from the Matrix as described in the Panel's responses. In addition, the Panel made specific comments on components of the Matrix, including "Fatal Flaws," "Challenge Ranking," and "Scoring Ranking," so that the tool reflects current experience and can provide reasonable results.	No recommended action beyond the original comments from the panel.
	Mark Williams, Ph.D., P.E., of GEOSCIENCE Support Services, Inc., submitted the following comments: FATAL FLAWS: 1. The inputs and fatal flaws are too simplistic and cannot be generally applied to all SSI and all sites. For example, to reject a site because it lies on a cliff is not sufficient as the site may be engineered to be acceptable (e.g., Marina Coast). Many of the proposed fatal flaw determinations listed cannot be practically evaluated to any reliable extent at this early stage and may be more appropriately evaluated during later (Level 2 or 3) evaluations. Panel Response: The tool is intended as an initial screening tool. In addition, the site-specific nature of each alternative would need to be reflected in the use of the tool. As such, the Panel agrees that potential engineering solutions to allow for specific SSIs to be viable should be a part of the process. In addition, if the tool is made too complex by covering many details it could become problematic to implement. 2. There is no theoretical upper limit of the yield and sustainability of slant wells or some of the other SSI types used as a source of feed water supply to ocean desalination plants. Research and field testing over the past 9 years suggest that slant wells extracting water from subsea alluvial aquifers can provide a high yielding and long-lasting sustainable water supply when designed, constructed, and maintained properly. Furthermore, the total yield is a function of scale, and the reliability is guaranteed by the ocean source. Panel Response: WBMWD and the Project Team should consider this comment.	Expanded explanation of objective of the tool will help to address this--- as suggested by some of the Panel's comments. The tool does not put an upper limit to the yield of slant wells.
	Mark Williams, Ph.D, P.E of GEOSCIENCE Support Services, Inc. 1. Many of the Significant Challenges for Construction are not relevant at all or are not relevant at this preliminary screening stage. For example, in Monterey and Dana Point projects, drilling footprints were all well under 10,000 square feet with staging nearby the site. Access and construction were all challenging, but certainly did not prevent successful construction of the two projects. This will be the case, to some extent, for most coastal sites. Panel Response: The tool is intended to evaluate the feasibly of SSI options for the proposed full-scale project.	No recommended action.
	Mark Williams, Ph.D, P.E of GEOSCIENCE Support Services, Inc. 2. It does not make sense to have such general statements in this section. It appears that the authors have selected a handful of topics and tried to apply to all SSI types and all site conditions. Potential subsurface intakes are quite site-specific and subject to a number of factors. These projects usually have high visibility with a good deal of public attention. As such, siting considerations need to consider a number of factors other than just feed water production and proximity to the desalination plant. For example, along the coast of California, these factors include the normal permitting land acquisition and access factors, but are also dependent upon a number of environmental and operational factors, which if not complied with, could prohibit the project altogether. For example, many of these projects are tied to a maximum percentage of feed water derived from inland water supplies, which if not met, may require expensive mitigation or provision of supplemental supplies, all of which add to	We agree with some of this comment. We agree that the ratio of seawater and inland groundwater flow to an SSI is site-specific. As indicated in many cases this influences cost, but not technical feasibility. Evaluation of this when needed could be a component of Level 2 or 3 analysis. We will include this as an informational note.

#	Panel Comment	Response to Comment
	the cost of supplied desalination product water. Panel Response: WBMWD and the Project Team should consider this comment.	
	Mark Williams, Ph.D, P.E of GEOSCIENCE Support Services, Inc. 3. Ranney-type collector wells have lateral lengths typically limited to approximately 46 meters or less. They also may draw a high percentage of recharge from inland supplies and require construction of a large diameter caisson, which is visually offensive in a beach environment. Horizontal directionally drilled wells could potentially be used for subsurface supply; however, the main disadvantage is the inability to place an engineered artificial filter pack around the well screen, which may result in clogging and limited well production in fine-grained alluvial formations. Panel Response: WBMWD and the Project Team should consider this comment.	Agree. Comment noted. We will include as information in Tech Memo on technology overview.
	Mark Williams, Ph.D, P.E of GEOSCIENCE Support Services, Inc. 1. You cannot just select a range of aquifer parameters as a criteria for discrediting a subsurface intake. Groundwater modeling of site-specific areas and for site-specific feedwater supplies needs to be part of the selection. To say that the transmissivity has to be a certain value is pointless unless you consider other factors, specifically benthic zone leakance values. Panel Response: WBMWD and the Project Team should consider this comment.	We agree that site specific Level 2 and 3 evaluation, including groundwater modeling, can be conducted to refine feasibility assessment of an SSI. We agree that conductance (leakance) of the interval between the SSI collector and the sea is an important factor. This is influenced by both as thickness and vertical hydraulic conductivity of this interval (including the sea floor). We will emphasize and clarify this issue.
	Mark Williams, Ph.D, P.E of GEOSCIENCE Support Services, Inc. 2. To maintain feed water production, planned rehabilitation should be performed with all subsurface intake types based on efficiency and yield decline. All wells (vertical and angled) need redevelopment from time to time to maintain performance. This periodic redevelopment typically consists of mechanical and/or chemical redevelopment using the same “tried and true” methods developed in the water well industry for vertical wells over the past 70 years. As access to the wellhead area is required, provision must be made during siting to minimize disturbance during routine maintenance. Panel Response: WBMWD and the Project Team should consider this comment.	Comment noted. Added a criteria “Ease of maintenance” as also suggested by the Panel. We will add discussion, also in the technology overview memo companion document.
	Mark Williams, Ph.D, P.E of GEOSCIENCE Support Services, Inc. 3. As a general rule, with all wells, when well efficiencies decline to 50 percent of the maximum value (at the design production rate), it is a good idea to take the well out of service and perform a video inspection and rehabilitation plan. Based on limited data from the Dana Point Test Slant Well, it is expected that in wells properly designed, developed, and consisting of corrosion resistant steels, the frequency between well rehabilitation would be on the order of 3 to 5 years. However, depending on other constituents in the groundwater (e.g., iron and manganese), rehabilitation frequency may vary. Panel Response: WBMWD and the Project Team should consider this comment.	Agreed. Comment noted.