

List of Inputs

West Basin

Required Inputs	Unit	Number of inputs	Input Required for Criteria #
Land type (beach, bay, estuary, cliffs, rocky coastline)	beach, bay, estuary, cliffs, rocky coastline	1 per project	1, 11
Required Capacity	MGD	1 per project	2, 3, 19, 21
Land take per unit (linear beach front)	ft	1 per SSI	2, 3
Land take per unit (area of beach front)	sf	1 per SSI	
Number of units	no.	1 per SSI	2, 3, 22
Available beach front	ft	1 per project	2
Available land (offshore and onshore)	acre	1 per project	3
CEQA approved?	Y/N	1 per SSI	4
Available area for drilling	sf	1 per project	5
Topography of the construction zone	flat/moderately uneven/uneven	1 per project	7
Slope of the construction zone	high slope/moderate slope/low slope	1 per project	7
Significant wave height	ft	1 per project	8, 14
Depth to seabed	ft	1 per project	9
Transmissivity	gpd/ft	1 per SSI	11
Overlying conductance	1/d	1 per SSI	11
SSI infrastructure is located in 30 year potentially impacted area and is below the 30 year predicted sea level rise	Y/N	1 per project	12
Rate of change of beach width over 30 years (based on historical aerial)	%	1 per project	13
Saturation Index of selected precipitates	none	1 per project	14
Sedimentation Rate	mm/yr	1 per project	14
Silt Density Index	none	1 per SSI	15
Feedwater will be considered extremely impaired source by DDW	Y/N	1 per project	16
Protected species/habitats present	Y/N	1 per project	17
Potential for conflict with existing land use	Y/N	1 per SSI	18
Existing/planned production rate of nearby aquifer	mgd	1 per project	19
Presence of contaminant plume(s) in the vicinity	Y/N	1 per project	20

**Draft SSI Feasibility Framework
Level 1
West Basin**

FATAL FLAWS

ID	Fatal Flaw	Required Inputs	Comments	Vertical Wells		Slant Wells		Radial Collectors (Ranney Wells)		Horizontal Wells		Beach Infiltration Gallery		Seabed Infiltration Gallery		Water Tunnel		References	
				SSI specific threshold	SSI specific threshold	SSI specific threshold	SSI specific threshold	SSI specific threshold	SSI specific threshold	SSI specific threshold	SSI specific threshold	SSI specific threshold	SSI specific threshold	SSI specific threshold	SSI specific threshold				
1	Land type makes construction of SSI infeasible	Land type (beach, bay, estuary, cliffs, rocky coastline)		Rocky coastline (shallow bedrock)	Cliffs	Rocky coastline (shallow bedrock)	Cliff			Cliff, rocky coastline	None	None						1	
2	Not sufficient beach front available to construct SSI	Required capacity, Land take per unit, number of units needed, available beach front		Length of beach front needed for construction of SSI is >80% of available beach front	Length of beach front needed for construction of SSI is >80% of available beach front	Length of beach front needed for construction of SSI is >80% of available beach front	Length of beach front needed for construction of SSI is >80% of available beach front	Length of beach front needed for construction of SSI is >80% of available beach front	Length of beach front needed for construction of SSI is >80% of available beach front	Length of beach front needed for construction of SSI is >80% of available beach front	not applicable	not applicable						2, 3, 18, 19, 22, 23, 26, 33, 34, 45, 49	
3	Not sufficient land (onshore or offshore) available to construct SSI	Required capacity, Land take per unit, number of units needed, available land		Surface area needed for total # of units (onshore and offshore) is > 80% of available area	Surface area needed for total # of units (onshore and offshore) is > 80% of available area	Surface area needed for total # of units (onshore and offshore) is > 80% of available area	Surface area needed for total # of units (onshore and offshore) is > 80% of available area	Surface area needed for total # of units (onshore and offshore) is > 80% of available area	Surface area needed for total # of units (onshore and offshore) is > 80% of available area	Surface area needed for total # of units (onshore and offshore) is > 80% of available area	Surface area needed for total # of units (onshore and offshore) is > 80% of available area	Surface area needed for total # of units (onshore and offshore) is > 80% of available area	Surface area needed for total # of units (onshore and offshore) is > 80% of available area	Surface area needed for total # of units (onshore and offshore) is > 80% of available area	Surface area needed for total # of units (onshore and offshore) is > 80% of available area	Surface area needed for total # of units (onshore and offshore) is > 80% of available area	Surface area needed for total # of units (onshore and offshore) is > 80% of available area	Surface area needed for total # of units (onshore and offshore) is > 80% of available area	3
4	SSI project will not be approved through CEQA	CEQA analysis		SSI cannot be approved through CEQA	SSI cannot be approved through CEQA	SSI cannot be approved through CEQA	SSI cannot be approved through CEQA	SSI cannot be approved through CEQA	SSI cannot be approved through CEQA	SSI cannot be approved through CEQA	SSI cannot be approved through CEQA	SSI cannot be approved through CEQA	SSI cannot be approved through CEQA	SSI cannot be approved through CEQA	SSI cannot be approved through CEQA	SSI cannot be approved through CEQA	SSI cannot be approved through CEQA	6	

**Draft SSI Feasibility Framework
Level 1
West Basin**

SIGNIFICANT CHALLENGES SCORING (0=Not challenging/slightly challenging, 1=Moderately challenging, 2=Highly challenging)												
ID	Challenge	Required Inputs	Comment	Vertical Wells	Slant Wells	Radial Collectors (Ranney Wells)	Horizontal Wells	Beach Infiltration Gallery	Seabed Infiltration Gallery	Water Tunnel	References	
5	Limited area available for drilling equipment	Available area (in square feet), number of wells	Actual area required depends on drilling method.	Available Area per well to drill is: < 10,000 ft ² (2) 10,000 – 50,000 ft ² (1) > 50,000 ft ² (0)	Available Area per well to drill is: < 10,000 ft ² (2) 10,000 – 50,000 ft ² (1) > 50,000 ft ² (0)	Available Area per well to drill is: < 10,000 ft ² (2) 10,000 – 50,000 ft ² (1) > 50,000 ft ² (0)	Available Area per well to drill is: < 10,000 ft ² (2) 10,000 – 50,000 ft ² (1) > 50,000 ft ² (0)	Available Area per well to drill: NA	Available Area per well to drill: NA	Available Area per well to drill: NA	35	
6	General complexity of construction	none required		General Construction Complexity (in any settings): Assume Low for all cases (0)	General Construction Complexity (in any settings): Assume Medium for all cases (1)	General Construction Complexity (in any settings): Assume Medium for all cases (1)	General Construction Complexity (in any settings): Assume Medium for all cases (1)	General Construction Complexity (in any settings): Assume Medium for all cases (1)	General Construction Complexity (in any settings): Assume High for all cases (2)	General Construction Complexity (in any settings): Assume High for all cases (2)	20, 35, 39, 46, 51, 52	
7	Uneven topography will make construction challenging	Topography (highly uneven, moderately uneven, flat), slope		Topography: Highly uneven (2) Moderately Uneven (1) Flat (0)	Topography: Highly uneven (2) Moderately Uneven (1) Flat (0)	Topography: Highly uneven (2) Moderately Uneven (1) Flat (0)	Topography: Highly uneven (2) Moderately Uneven (1) Flat (0)	Slope in the surf zone: High (2) Medium (1) Low (0)	Slope of the seabed: High (2) Medium (1) Low (0)	Slopes/Topography: NA		
8	Wave energy will make construction challenging	Significant wave height, Hs (in feet).	Hs is average of highest 1/3 of wave heights. See US Army Corps of Engineers Wave Information.	Wave energy: NA	Wave energy: NA	Wave energy: NA	Wave energy: NA	Energy in the breaking wave zone is (based on significant wave height Hs): High (> 9 ft) (2) Medium (3 ft - 9 ft) (1) Low (< 3 ft) (0)	Energy in the construction zone is (based on significant wave height Hs): High (> 9 ft) (2) Medium (3 ft - 9 ft) (1) Low (< 3 ft) (0)	Only applies if offshore construction is necessary. Energy in the construction zone is (based on significant wave height Hs): High (> 9 ft) (2) Medium (3 ft - 9 ft) (1) Low (< 3 ft) (0)	53	
9	Depth to seabed will make construction challenging	Depth to seabed		Depth to seabed: NA	Depth to seabed: NA	Depth to seabed: NA	Depth to seabed: NA	Depth to seabed: NA	Depth to seabed: NA	Depth to seabed: > 50 ft (2) 15 - 50 ft (1) < 15 ft (0)	Only applies if offshore construction is necessary. Depth to seabed: > 50 ft (2) 15 - 50 ft (1) < 15 ft (0)	52
10	Land type will make construction challenging	Land type (beach, bay, estuary, cliffs, rocky coastline)		Land type: Cliff (2)	Land Type: Cliff (2) Rocky coastline (1)	Land Type: Cliff (2) Rocky coastline (1)	Land Type: Cliff (2) Rocky coastline (1)	Land Type: NA	Land Type: NA	Land Type: NA		

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SIGNIFICANT CHALLENGES SCORING (0=Not challenging/slightly challenging, 1=Moderately challenging, 2=Highly challenging)												
ID	Challenge	Required Inputs	Comment	Vertical Wells	Slant Wells	Radial Collectors (Ranney Wells)	Horizontal Wells	Beach Infiltration Gallery	Seabed Infiltration Gallery	Water Tunnel	References	
11	Geologic conditions will limit intake rate	Transmissivity of SSI intake interval (aquifer: hydraulic conductivity and thickness), and hydraulic conductance (K/b') of intervening material between the the SSI intake interval and the sea (vertical hydraulic conductivity divided by thickness). Reference 22	The highest score in any of the subcriteria will be applied as the score for the criteria Technical challenges cannot be overcome therefore a conservative scoring system is used here with the highest score applied for the criteria	Transmissivity: > 88,000 gpd/ft (11,764 ft ² /d) (0) 25,000 gpd/ft to 88,000 gpd/ft (1) < 25,000 gpd/ft (2)	Transmissivity: > 88,000 gpd/ft (11,764 ft ² /d) (0) 25,000 gpd/ft to 88,000 gpd/ft (1) < 25,000 gpd/ft (2)	Transmissivity: > 88,000 gpd/ft (11,764 ft ² /d) (0) 25,000 gpd/ft to 88,000 gpd/ft (1) < 25,000 gpd/ft (2)	Transmissivity: > 88,000 gpd/ft (11,764 ft ² /d) (0) 25,000 gpd/ft to 88,000 gpd/ft (1) < 25,000 gpd/ft (2)	NA for engineered fill	NA for engineered fill	Transmissivity: > 88,000 gpd/ft (11,764 ft ² /d) (0) 25,000 gpd/ft to 88,000 gpd/ft (1) < 25,000 gpd/ft (2)	22	
				Overlying Conductance [units of (ft/d)(1/ft) = 1/day] >10 (0) 1 to 10 (1) <1 (2)	Overlying Conductance [units of (ft/d)(1/ft) = 1/day] >10 (0) 1 to 10 (1) <1 (2)	Overlying Conductance [units of (ft/d)(1/ft) = 1/day] >10 (0) 1 to 10 (1) <1 (2)	Overlying Conductance [units of (ft/d)(1/ft) = 1/day] >10 (0) 1 to 10 (1) <1 (2)	NA for engineered fill	NA for engineered fill	Overlying Conductance [units of (ft/d)(1/ft) = 1/day] >10 (0) 1 to 10 (1) <1 (2)	7,8, 21, 27, 36, 37, 38, 44, 47	
12	Significant measures will be required to protect SSI against anticipated sea level rise	SSI infrastructure is located in 30 year potentially impacted area and is below the 30 year predicted sea level rise (Y/N)	Weighting of scoring (see weighting matrix) accounts for relative importance of sea level rise for different SSIs (e.g. sea level rise is more important for vertical wells on the beach than for horizontal wells, which usually would start further back from the sea at a higher elevation).	Vulnerability to sea level rise is Low = SSI infrastructure is not located in 30 year potentially impacted area and/or is above the 30 year predicted sea level rise (0) High = SSI infrastructure is located in 30 year potentially impacted area and is below the 30 year predicted sea level rise (2)	Vulnerability to sea level rise is Low = SSI infrastructure is not located in 30 year potentially impacted area and/or is above the 30 year predicted sea level rise (0) High = SSI infrastructure is located in 30 year potentially impacted area and is below the 30 year predicted sea level rise (2)	Vulnerability to sea level rise is Low = SSI infrastructure is not located in 30 year potentially impacted area and/or is above the 30 year predicted sea level rise (0) High = SSI infrastructure is located in 30 year potentially impacted area and is below the 30 year predicted sea level rise (2)	Vulnerability to sea level rise is Low = SSI infrastructure is not located in 30 year potentially impacted area and/or is above the 30 year predicted sea level rise (0) High = SSI infrastructure is located in 30 year potentially impacted area and is below the 30 year predicted sea level rise (2)	Vulnerability to sea level rise is Low = SSI infrastructure is not located in 30 year potentially impacted area and/or is above the 30 year predicted sea level rise (0) High = SSI infrastructure is located in 30 year potentially impacted area and is below the 30 year predicted sea level rise (2)	not applicable	not applicable	30, 42, 54, 58, 59, 60	
13	Significant measures will be required to protect or restore intake works from erosion or scour.	Rate of change of beach width over time Significant wave height (ft)	The highest score in any of the subcriteria will be applied as the score for the criteria. Weighting of scoring (see scoring worksheet) accounts for relative importance of this criteria for different SSIs (e.g. erosion/scouring is more important for horizontal wells, which screen could be exposed following significant erosion, than for vertical wells).	Based on historical aerial photos, rate of beach erosion is Low = unnoticeable change of coastline (< 10% of beach width over 30 years) between historical photos and present (0) Medium = noticeable change (10% - 25% of beach width over 30 years) of coastline between historical photos and present (1) High = significant change (> 25% of beach width over 30 years) of coastline between historical photos and present (2)	Based on historical aerial photos, rate of beach erosion is Low = unnoticeable change of coastline (< 10% of beach width over 30 years) between historical photos and present (0) Medium = noticeable change (10% - 25% of beach width over 30 years) of coastline between historical photos and present (1) High = significant change (> 25% of beach width over 30 years) of coastline between historical photos and present (2)	Based on historical aerial photos, rate of beach erosion is Low = unnoticeable change of coastline (< 10% of beach width over 30 years) between historical photos and present (0) Medium = noticeable change (10% - 25% of beach width over 30 years) of coastline between historical photos and present (1) High = significant change (> 25% of beach width over 30 years) of coastline between historical photos and present (2)	Based on historical aerial photos, rate of beach erosion is Low = unnoticeable change of coastline (< 10% of beach width over 30 years) between historical photos and present (0) Medium = noticeable change (10% - 25% of beach width over 30 years) of coastline between historical photos and present (1) High = significant change (> 25% of beach width over 30 years) of coastline between historical photos and present (2)	Based on historical aerial photos, rate of beach erosion is Low = unnoticeable change of coastline (< 10% of beach width over 30 years) between historical photos and present (0) Medium = noticeable change (10% - 25% of beach width over 30 years) of coastline between historical photos and present (1) High = significant change (> 25% of beach width over 30 years) of coastline between historical photos and present (2)	Based on historical aerial photos, rate of beach erosion is Low = unnoticeable change of coastline (< 10% of beach width over 30 years) between historical photos and present (0) Medium = noticeable change (10% - 25% of beach width over 30 years) of coastline between historical photos and present (1) High = significant change (> 25% of beach width over 30 years) of coastline between historical photos and present (2)	Not Applicable	Not Applicable	41
				Potential for scouring of the seabed is: NA	Potential for scouring of the seabed is: NA	Potential for scouring of the seabed is: NA	Scour potential is related to wave energy and significant wave height (Hs): High (> 9 ft) (2) Medium (3 ft< x < 9 ft) (1) Low (< 3 ft) (0)	Scour potential is related to wave energy and significant wave height (Hs): High (> 9 ft) (2) Medium (3 ft< x < 9 ft) (1) Low (< 3 ft) (0)	Scour potential is related to wave energy and significant wave height (Hs): High (> 9 ft) (2) Medium (3 ft< x < 9 ft) (1) Low (< 3 ft) (0)	Potential for scouring of the seabed is: NA	53	
14	Characteristics of feedwater and potential mixing are conducive to precipitating materials that will cause frequent and significant clogging of intake works	Saturation Index for manganese oxides, iron oxides, calcium carbonate [NEED TO DEFINE PRECIPITATES TO CONSIDER] Sedimentation Rate	The highest score in any of the subcriteria will be applied as the score for the criteria.	potential for materials to precipitate out of feedwater and clog intake works is (based on Saturation Index (SI) for manganese oxides, iron oxides, calcium carbonate) High = SI > 1 (2) Moderate= 0 < SI < 1 (1) Low = SI < 0 (0)	potential for materials to precipitate out of feedwater and clog intake works is (based on Saturation Index (SI) for manganese oxides, iron oxides, calcium carbonate) High = SI > 1 (2) Moderate= 0 < SI < 1 (1) Low = SI < 0 (0)	potential for materials to precipitate out of feedwater and clog intake works is (based on Saturation Index (SI) for manganese oxides, iron oxides, calcium carbonate) High = SI > 1 (2) Moderate= 0 < SI < 1 (1) Low = SI < 0 (0)	potential for materials to precipitate out of feedwater and clog intake works is (based on Saturation Index (SI) for manganese oxides, iron oxides, calcium carbonate) High = SI > 1 (2) Moderate= 0 < SI < 1 (1) Low = SI < 0 (0)	not applicable	not applicable	potential for materials to precipitate out of feedwater and clog intake works is (based on Saturation Index (SI) for manganese oxides, iron oxides, calcium carbonate) High = SI > 1 (2) Moderate= 0 < SI < 1 (1) Low = SI < 0 (0)	12, 24, 55, 56, 57	
				Sedimentation rate: NA	Sedimentation rate: NA	Sedimentation rate: NA	Sedimentation Rate: < 1 mm/yr (0) 1-5 mm/yr (1) >5 mm/yr (2)	Sedimentation Rate: < 1 mm/yr (0) 1-5 mm/yr (1) >5 mm/yr (2)	Sedimentation Rate: < 1 mm/yr (0) 1-5 mm/yr (1) >5 mm/yr (2)	Sedimentation rate: NA	31,32, 43, 55, 61	

**Draft SSI Feasibility Framework
Level 1
West Basin**

SIGNIFICANT CHALLENGES SCORING (0=Not challenging/slightly challenging, 1=Moderately challenging, 2=Highly challenging)												
ID	Challenge	Required Inputs	Comment	Vertical Wells	Slant Wells	Radial Collectors (Ranney Wells)	Horizontal Wells	Beach Infiltration Gallery	Seabed Infiltration Gallery	Water Tunnel	References	
15	Water quality issues likely to cause frequent and significant fouling of treatment works	Silt Density Index (SDI)		Silt Density Index of feedwater (SDI15) is SDI < 2 (0) 2 < SDI < 5 (1) SDI > 5 (2)	Silt Density Index of feedwater (SDI15) is SDI < 2 (0) 2 < SDI < 5 (1) SDI > 5 (2)	Silt Density Index of feedwater (SDI15) is SDI < 2 (0) 2 < SDI < 5 (1) SDI > 5 (2)	Silt Density Index of feedwater (SDI15) is SDI < 2 (0) 2 < SDI < 5 (1) SDI > 5 (2)	Silt Density Index of feedwater (SDI15) is SDI < 2 (0) 2 < SDI < 5 (1) SDI > 5 (2)	Silt Density Index of feedwater (SDI15) is SDI < 2 (0) 2 < SDI < 5 (1) SDI > 5 (2)	Silt Density Index of feedwater (SDI15) is SDI < 2 (0) 2 < SDI < 5 (1) SDI > 5 (2)	Silt Density Index of feedwater (SDI15) is SDI < 2 (0) 2 < SDI < 5 (1) SDI > 5 (2)	14, 15, 16, 17
16	Potential for poor feedwater quality to impose additional permitting requirements in order to be used as a sourcewater for drinking water	Chemicals in feedwater exceed 10 times an MCL or action level (AL) based on chronic health effects (Y/N) Chemicals in feedwater exceed 3 times an MCL or AL based on acute health effects (Y/N) Feedwater is a surface water that requires more than 4 log Giardia/5 log virus reduction (Y/N) Feedwater is extremely threatened with contamination due to proximity to known contaminating activities (Y/N) Feedwater contains a mixture of contaminants of health concern (Y/N) Feedwater is designed to intercept known contaminants of health concern (Y/N)	Not considering seawater constituents such as chloride. DDW (Division of Drinking Water) definition of extremely impaired source: -exceeds 10 times an MCL or action level (AL) based on chronic health effects, -exceeds 3 times an MCL or AL based on acute health effects, -is a surface water that requires more than 4 log Giardia/5 log virus reduction, -is extremely threatened with contamination due to proximity to known contaminating activities -contains a mixture of contaminants of health concern -is designed to intercept known contaminants of health concern.	Feedwater meets at least one of the criteria listed by DDW for extremely impaired source (2) Feedwater would not be considered an extremely impaired source per DDW (Division of Drinking Water) standards (0)	Feedwater meet at least one of the criteria listed by DDW for extremely impaired source (2) Feedwater would not be considered an extremely impaired source per DDW (Division of Drinking Water) standards (0)	Feedwater meet at least one of the criteria listed by DDW for extremely impaired source (2) Feedwater would not be considered an extremely impaired source per DDW (Division of Drinking Water) standards (0)	Feedwater meet at least one of the criteria listed by DDW for extremely impaired source (2) Feedwater would not be considered an extremely impaired source per DDW (Division of Drinking Water) standards (0)	Feedwater meet at least one of the criteria listed by DDW for extremely impaired source (2) Feedwater would not be considered an extremely impaired source per DDW (Division of Drinking Water) standards (0)	Feedwater meet at least one of the criteria listed by DDW for extremely impaired source (2) Feedwater would not be considered an extremely impaired source per DDW (Division of Drinking Water) standards (0)	Feedwater meet at least one of the criteria listed by DDW for extremely impaired source (2) Feedwater would not be considered an extremely impaired source per DDW (Division of Drinking Water) standards (0)	Feedwater meet at least one of the criteria listed by DDW for extremely impaired source (2) Feedwater would not be considered an extremely impaired source per DDW (Division of Drinking Water) standards (0)	9
17	Potential impact to protected species or habitats will make CEQA approval challenging	Is(are) protected species/habitat(s) present at the proposed site (Y/N)		There is (are) protected species/habitat(s) at the proposed site (2)	There is (are) protected species/habitat(s) at the proposed site (2)	There is (are) protected species/habitat(s) at the proposed site (2)	There is (are) protected species/habitat(s) at the proposed site (2)	There is (are) protected species/habitat(s) at the proposed site (2)	There is (are) protected species/habitat(s) at the proposed site (2)	There is (are) protected species/habitat(s) at the proposed site (2)	There is (are) protected species/habitat(s) at the proposed site (2)	
18	Potential to conflict with existing land use will make CEQA approval process challenging	Is there a potential for the SSI conflict with existing land use? (Y/N)		There is a potential for the SSI to conflict with existing land use (2)	There is a potential for the SSI to conflict with existing land use (2)	There is a potential for the SSI to conflict with existing land use (2)	There is a potential for the SSI to conflict with existing land use (2)	There is a potential for the SSI to conflict with existing land use (2)	There is a potential for the SSI to conflict with existing land use (2)	There is a potential for the SSI to conflict with existing land use (2)	There is a potential for the SSI to conflict with existing land use (2)	4
19	Potential to disrupt existing/planned groundwater pumping or injection will make CEQA approval challenging	Required capacity of SSI, existing/planned production rate of nearby aquifer	Required capacity of SSI of 45% was considered fatal flaw in ISTAP Report	Required capacity of SSI is >= 25% of total existing/planned production from same aquifer (2)	Required capacity of SSI is >= 25% of total existing/planned production from same aquifer (2)	Required capacity of SSI is >= 25% of total existing/planned production from same aquifer (2)	Required capacity of SSI is >= 25% of total existing/planned production from same aquifer (2)	NA	NA	NA	NA	5
20	Potential to mobilize contaminant plumes will make CEQA approval challenging	Are there contaminant plumes in the vicinity of the SSI? (Y/N)		There are existing contaminant plumes in the vicinity (5000 ft) of the SSI (2)	There are existing contaminant plumes in the vicinity (5000 ft) of the SSI (2)	There are existing contaminant plumes in the vicinity (5000 ft) of the SSI (2)	There are existing contaminant plumes in the vicinity (5000 ft) of the SSI (2)	NA	NA	NA	NA	
21	Lack of demonstrated success of SSI in similar setting to produce a similar capacity imposes significant risk and design challenges to the project	Required capacity		An SSI system exists that has produced X% of required capacity x > 100% (0) 50% < x < 100% (1) x < 50% (2)	An SSI system exists that has produced X% of required capacity x > 100% (0) 50% < x < 100% (1) x < 50% (2)	An SSI system exists that has produced X% of required capacity x > 100% (0) 50% < x < 100% (1) x < 50% (2)	An SSI system exists that has produced X% of required capacity x > 100% (0) 50% < x < 100% (1) x < 50% (2)	An SSI system exists that has produced X% of required capacity x > 100% (0) 50% < x < 100% (1) x < 50% (2)	An SSI system exists that has produced X% of required capacity x > 100% (0) 50% < x < 100% (1) x < 50% (2)	An SSI system exists that has produced X% of required capacity x > 100% (0) 50% < x < 100% (1) x < 50% (2)	An SSI system exists that has produced X% of required capacity x > 100% (0) 50% < x < 100% (1) x < 50% (2)	10, 11, 13, 25, 28, 40, 48, 50
22		Number of units		An SSI system exists with X% of the required number of SSI units x > 100% (0) 50% < x < 100% (1) x < 50% (2)	An SSI system exists with X% of the required number of SSI units x > 100% (0) 50% < x < 100% (1) x < 50% (2)	An SSI system exists with X% of the required number of SSI units x > 100% (0) 50% < x < 100% (1) x < 50% (2)	An SSI system exists with X% of the required number of SSI units x > 100% (0) 50% < x < 100% (1) x < 50% (2)	An SSI system exists with X% of the required gallery area. x > 100% (0) 50% < x < 100% (1) x < 50% (2)	An SSI system exists with X% of the required gallery area. x > 100% (0) 50% < x < 100% (1) x < 50% (2)	An SSI system exists with X% of the required number of SSI units x > 100% (0) 50% < x < 100% (1) x < 50% (2)	An SSI system exists with X% of the required number of SSI units x > 100% (0) 50% < x < 100% (1) x < 50% (2)	10, 13, 25, 29, 40, 37, 50

Notes
 SSI = Subsurface Intake
 CEQA = California Environmental Quality Act
 Hs = significant wave height (Hs), which is the average of the highest one third of wave heights for 30 year record
 SI = Saturation Index
 mm/yr = millimeter per year
 MCL = Maximum Contaminant Level
 AL = Action Level

The scoring matrix below generates a single score for each SSI for each of the challenge categories. The weighting accounts for relative importance of specific criteria to different SSIs. For instance a higher weight is used for the clogging criteria for SSI's which are difficult to maintenance (e.g. higher weight for horizontal wells than for vertical wells).

The raw score for each category is obtained by multiplying the score entered in the feasibility matrix with the corresponding weight below and summing the scores for each category.

The normalized scores allow for clear comparison across SSIs and challenge categories. They are calculated by dividing the raw for each category by the maximum possible score for that category for each SSI and multiplying by 5. For example a score of 6 for construction for vertical well corresponds to a normalized rating of 5, a score of 3 to a normalized rating of 2.5 and a score of 1 to a normalized rating of 0.8.

The total normalized score for each SSI is obtained by summing the normalized scores for each category; a total normalized score of 25 being the most challenging. All normalized scores are shown on the "Normalized Scoring Results" tab

SSI's that are eliminated due to a fatal flaw do not receive a challenge score because they are considered infeasible.

SSI Significant Challenge Raw Score Calculation Matrix																
ID	Category	Challenge	Vertical Wells		Slant Wells		Radial Collectors (Ranney Wells)		Horizontal Wells		Beach Infiltration Gallery		Seabed Infiltration Gallery		Water Tunnel	
			Weight	Score	Weight	Score	Weight	Score	Weight	Score	Weight	Score	Weight	Score	Weight	Score
5	Construction	Area available for drilling	1		1		1		1		0		0		0	
6		General complexity	1		1		1		1		1		1		1	
7		Topography	1		1		1		1		1		1		0	
8		Wave energy	0		0		0		0		1		0		1	
9		Depth to seabed	1		0		0		0		0		1		1	
10		Land type	1		1		1		1		0		0		0	
Raw Score																
11	Operation (Intake)	Geologic conditions	2		2		2		2		2		2		2	
12		Sea level rise	2		1		2		1		0		0		0	
13		Erosion/scouring issues	1		2		2		2		2		2		0	
14		Clogging Issue	1		1		1		2		1		2		2	
Raw Score																
15	Operation (Treatment)	Feedwater quality	2		2		2		2		2		2		2	
16		Division of Drinking Water Requirements	1		1		1		1		1		1		1	
Raw Score																
17	Potential Environmental Impacts	Protected species	1		1		1		1		1		1		1	
18		Existing land use	1		1		1		1		1		1		1	
19		Existing Pumping	1		1		1		1		0		0		0	
20		Contaminant plumes	1		1		1		1		0		0		0	
Raw Score																
21	Risk (Uncertainty)	Demonstrated examples (Capacity)	1		1		1		1		1		1		1	
22		Demonstrated examples (# of units)	1		1		1		1		1		1		1	
Raw Score																

Summary of Max Scores for each SSI							
	Vertical Wells	Slant Wells	Radial Collectors	Horizontal Wells	Beach	Seabed	Water Tunnel
Construction	6	7	7	7	5	6	6
Operation (Intake)	12	12	14	14	10	12	8
Operation (Treatment)	6	6	6	6	6	6	6
Potential Impacts	8	8	8	8	4	4	4
Risk	4	4	4	4	4	4	4
Totals (max score)	36	37	39	39	29	32	28

DRAFT SSI Feasibility Framework
Normalized Challenge Score
West Basin

Normalized Challenge Score 0=least challenging 5=most challenging							
	Vertical Wells	Slant Wells	Radial Collectors (Raney Wells)	Horizontal Wells	Beach Infiltration Gallery	Seabed Infiltration Gallery	Water Tunnel
Construction							
Operation (Intake)							
Operation (Treatment)							
Potential Impacts							
Risk							
Totals (25 = most challenging)							
Reason for infeasibility							

**Draft SSI Feasibility Framework
Level 2 and 3 Analyses
West Basin**

FATAL FLAWS

ID	Fatal Flaw	Required Inputs	Vertical Wells	Slant Wells	Radial Collectors (Ranney Wells)	Horizontal Wells	Beach Infiltration Gallery	Seabed Infiltration Gallery	Water Tunnel
			Tests/Analysis	Tests/Analysis	Tests/Analysis	Tests/Analysis	Tests/Analysis	Tests/Analysis	Recommended Test/Analysis
1	Land type makes construction of SSI infeasible	Land type (beach, bay, estuary, cliffs, rocky coastline)	No additional tests/analyses required	No additional tests/analyses required	No additional tests/analyses required	No additional tests/analyses required	No additional tests/analyses required	No additional tests/analyses required	No additional tests/analyses required
2	Not sufficient beach front available to construct SSI	Required capacity, Land take per unit, number of units needed, available beach front	Level 2: Characterization of Subsurface Geometry and Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests) Hydraulic Calculations/Groundwater Modeling. Review of site-specific potential SSI construction requirements. Level 3. Installation and pilot testing.	Level 2: Characterization of Subsurface Geometry and Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests) Hydraulic Calculations/Groundwater Modeling. Review of site-specific potential SSI construction requirements. Level 3. Installation and pilot testing.	Level 2: Characterization of Subsurface Geometry and Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests) Hydraulic Calculations/Groundwater Modeling. Review of site-specific potential SSI construction requirements. Level 3. Installation and pilot testing.	Level 2: Characterization of Subsurface Geometry and Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests) Hydraulic Calculations/Groundwater Modeling. Review of site-specific potential SSI construction requirements. Level 3. Installation and pilot testing.	Level 2: Characterization of Subsurface Geometry and Hydraulic Properties. Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing) Hydraulic Calculations. Review of site-specific potential SSI construction requirements. Level 3. Installation and pilot testing.	NA if using engineered fill, but if using existing seafloor sediment the following apply Level 2: Characterization of Subsurface Geometry and Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing) Hydraulic Calculations/Groundwater Modeling. Review of site-specific potential SSI construction requirements. Level 3. Installation and pilot testing.	Level 2: Characterization of Subsurface Geometry and Hydraulic Properties. Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing) Hydraulic Calculations. Review of site-specific potential SSI construction requirements. Level 3. Installation and pilot testing.
3	Not sufficient land (onshore or offshore) available to construct SSI	Required Capacity, Land take per unit, number of units needed, available land	Level 2: Characterization of Subsurface Geometry and Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests) Hydraulic Calculations/Groundwater Modeling. Review of site-specific potential SSI construction requirements. Level 3. Installation and pilot testing.	Level 2: Characterization of Subsurface Geometry and Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests) Hydraulic Calculations/Groundwater Modeling. Review of site-specific potential SSI construction requirements. Level 3. Installation and pilot testing.	Level 2: Characterization of Subsurface Geometry and Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests) Hydraulic Calculations/Groundwater Modeling. Review of site-specific potential SSI construction requirements. Level 3. Installation and pilot testing.	Level 2: Characterization of Subsurface Geometry and Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests) Hydraulic Calculations/Groundwater Modeling. Review of site-specific potential SSI construction requirements. Level 3. Installation and pilot testing.	Level 2: Characterization of Subsurface Geometry and Hydraulic Properties. Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing) Hydraulic Calculations. Review of site-specific potential SSI construction requirements. Level 3. Installation and pilot testing.	Level 2: Characterization of Subsurface Geometry and Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing) Hydraulic Calculations. Review of site-specific potential SSI construction requirements. Level 3. Installation and pilot testing.	Level 2: Characterization of Subsurface Geometry and Hydraulic Properties. Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing) Hydraulic Calculations. Review of site-specific potential SSI construction requirements. Level 3. Installation and pilot testing.
4	SSI project will not be approved through	CEQA analysis	see CEQA section below	see CEQA section below	see CEQA section below	see CEQA section below	see CEQA section below	see CEQA section below	see CEQA section below

Draft SSI Feasibility Framework
Level 2 and 3 Analyses
West Basin

SIGNIFICANT CHALLENGES										
ID	Challenge	Required Inputs	Vert Wells Tests/Analysis	Slant Wells Tests/Analysis	Radial Collectors (Ranney Wells) Tests/Analysis	Horizontal Wells Tests/Analysis	Beach Infiltration Gallery Tests/Analysis	Seabed Infiltration Gallery Tests/Analysis	Water Tunnel Recommended Test/Analysis	
5-11	Construction	Limited area available for drilling equipment	Available area (in square feet), number of wells	No additional tests/analyses required	No additional tests/analyses required	No additional tests/analyses required	No additional tests/analyses required	No additional tests/analyses required	No additional tests/analyses required	No additional tests/analyses required
		General complexity of construction	none required	General Construction Complexity (in any settings): No additional tests/analyses required	General Construction Complexity (in any settings): No additional tests/analyses required	General Construction Complexity (in any settings): No additional tests/analyses required	General Construction Complexity (in any settings): No additional tests/analyses required	General Construction Complexity (in any settings): No additional tests/analyses required	General Construction Complexity (in any settings): No additional tests/analyses required	General Construction Complexity (in any settings): No additional tests/analyses required
		Uneven topography will make construction challenging	Topography (highly uneven, moderately uneven, flat)	Topography: Level 2: preliminary design assessment	Topography: Level 2: preliminary design assessment	Topography: Level 2: preliminary design assessment	Topography: Level 2: preliminary design assessment	Slope in the surf zone: Level 2: preliminary design assessment	Slope of the seabed: Level 2: preliminary design assessment. Geophysical bathymetric survey	Topography/Slope: NA
		Wave energy will make construction challenging	Significant wave height. Hs (in feet). Hs is average of highest 1/3 of wave heights. See US Army Corps of Engineers Wave Information.	Wave energy: NA	Wave energy: NA	Wave energy: NA	Wave energy: NA	Wave energy: Level 2: preliminary design assessment. Historical Aerial Photo survey. Compilation and review of USACOE & NOAA data etc. Level 3: Coastal Evolution Modeling	Wave energy: Level 2: preliminary design assessment. Historical Aerial Photo survey. Compilation and review of USACOE & NOAA data etc. Level 3: Coastal Evolution Modeling	Wave energy (Only applies if offshore construction is necessary) Level 2: preliminary design assessment. Historical Aerial Photo survey. Compilation and review of USACOE and NOAA data etc. Level 3: Coastal Evolution Modeling
		Depth to seabed will make construction challenging	Depth to seabed	Depth to seabed: NA	Depth to seabed: NA.	Depth to seabed: NA.	Depth to seabed: NA.	Depth to seabed: NA.	Depth to seabed: Level 2 & 3. Review bathymetric data. Geophysical bathymetric survey	Depth to seabed (Only applies if offshore construction is necessary): Level 2 & 3. Review bathymetric data. Geophysical bathymetric survey
		Land type will make construction challenging	Land type (beach, bay, estuary, cliffs, rocky coastline)	Land type: No additional tests/analyses required	Land type: No additional tests/analyses required	Land type: No additional tests/analyses required	Land type: No additional tests/analyses required	Land type: NA	Land type: NA	Land type: NA
12-15	Operation (Intake)	Geologic conditions will limit intake rate	Hydraulic conductivity, aquifer type, (confined, semi-confined, unconfined), sediment thickness	Transmissivity: Level 2 & 3: Characterization of Subsurface Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests)	Transmissivity: Level 2 & 3: Characterization of Subsurface Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests)	Transmissivity: Level 2 & 3: Characterization of Subsurface Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests)	Transmissivity: Level 2 & 3: Characterization of Subsurface Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests)	Transmissivity: NA if engineered fill.	Transmissivity: NA if engineered fill.	Transmissivity: Level 2 & 3: Characterization of Subsurface Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing). Correlation between on and offshore stratigraphy hydraulic properties.
			Overlying Conductance [units of (ft/d)(1/ft) = 1/day] Level 2 & 3: Characterization of Subsurface Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. borings, laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests, geophysical surveys)	Overlying Conductance [units of (ft/d)(1/ft) = 1/day] Level 2 & 3: Characterization of Subsurface Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. borings, laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests, geophysical surveys)	Overlying Conductance [units of (ft/d)(1/ft) = 1/day] Level 2 & 3: Characterization of Subsurface Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. borings, laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests, geophysical surveys)	Overlying Conductance [units of (ft/d)(1/ft) = 1/day] Level 2 & 3: Characterization of Subsurface Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. borings, laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests, geophysical surveys)	Overlying Conductance: NA if engineered fill.	Overlying Conductance: NA if engineered fill.	Overlying Conductance [units of (ft/d)(1/ft) = 1/day] Level 2 & 3: Characterization of Subsurface Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. borings, laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests, geophysical surveys)	
		SSI infrastructure would be located in 30 year potentially impacted area (Y/N) SSI infrastructure would be located above 30 year predicted sea level rise (Y/N)	No additional tests/analyses required	No additional tests/analyses required	No additional tests/analyses required	No additional tests/analyses required	No additional tests/analyses required	No additional tests/analyses required	No additional tests/analyses required	No additional tests/analyses required
14	Significant measures will be required to protect or restore intake works from erosion or scour.	Rate of change of beach width over time	Rate of erosion No additional tests/analyses required	Rate of erosion No additional tests/analyses required	Rate of erosion No additional tests/analyses required	Rate of erosion No additional tests/analyses required	Rate of erosion No additional tests/analyses required	Rate of erosion No additional tests/analyses required	Rate of erosion No additional tests/analyses required	Rate of erosion No additional tests/analyses required
		Wave energy	Potential for scouring of the seabed: NA	Potential for scouring of the seabed: NA	Potential for scouring of the seabed: NA	Potential for scouring of the seabed: Level 2: Historical Aerial Photo Survey. Compilation and review of NOAA data etc. Level 3: Coastal Evolution Model	Potential for scouring of the seabed: Level 2: Historical Aerial Photo Survey. Compilation and review of NOAA data etc. Level 3: Coastal Evolution Model	Potential for scouring of the seabed: Level 2: Historical Aerial Photo Survey. Compilation and review of NOAA data etc. Level 3: Coastal Evolution Model	Potential for scouring of the seabed is: NA	
15	Characteristics of feedwater and potential mixing are conducive to precipitating materials that will cause frequent and significant clogging of intake works	Saturation Index for manganeses oxides, iron oxides, calcium carbonate [NEED TO DEFINE PRECIPITATES TO CONSIDER]	Saturation Index (SI) Level 2: Geophysical Surveys. Groundwater samples and chemical analysis. Geochemical modeling. Level 3: Pilot testing and chemical analyses. Advanced geochemical modeling.	Saturation Index (SI) Level 2: Geophysical Surveys. Groundwater samples and chemical analysis. Geochemical modeling. Level 3: Pilot testing and chemical analyses. Advanced geochemical modeling.	Saturation Index (SI) Level 2: Geophysical Surveys. Groundwater samples and chemical analysis. Geochemical modeling. Level 3: Pilot testing and chemical analyses. Advanced geochemical modeling.	Saturation Index (SI) Level 2: Geophysical Surveys. Groundwater samples and chemical analysis. Geochemical modeling. Level 3: Pilot testing and chemical analyses. Advanced geochemical modeling.	Potential for materials to precipitate out of NA	Potential for materials to precipitate out of NA	Saturation Index (SI) Level 2: Geophysical Surveys. Groundwater samples and chemical analysis. Geochemical modeling. Level 3: Pilot testing and chemical analyses. Advanced geochemical modeling.	
		Sedimentation Rate	Sedimentation rate: NA	Sedimentation rate: NA	Sedimentation rate: NA	Sedimentation rate: Level 2: Borings and dating of seafloor sediment profile Level 3: Coastal Evolution Model	Sedimentation rate: Level 2: Borings and dating of seafloor sediment profile Level 3: Coastal Evolution Model	Sedimentation rate: Level 2: Borings and dating of seafloor sediment profile Level 3: Coastal Evolution Model	Sedimentation rate: NA	

Draft SSI Feasibility Framework
 Level 2 and 3 Analyses
 West Basin

SIGNIFICANT CHALLENGES										
ID	Challenge	Required Inputs	Vert Wells Tests/Analysis	Slant Wells Tests/Analysis	Radial Collectors (Ranney Wells) Tests/Analysis	Horizontal Wells Tests/Analysis	Beach Infiltration Gallery Tests/Analysis	Seabed Infiltration Gallery Tests/Analysis	Water Tunnel Recommended Test/Analysis	
16	Water quality issues likely to cause frequent and significant fouling of treatment works	Silt Density Index (SDI)	Silt Density Index of feedwater (SDI15): Level 2. Sample and analyze groundwater from coastal wells. Level 3. Install well and pilot test.	Silt Density Index of feedwater (SDI15): Level 2. No level 2 tests/analyses available Level 3. Install well and pilot test.	Silt Density Index of feedwater (SDI15): Level 2. No level 2 tests/analyses available Level 3. Install well and pilot test.	Silt Density Index of feedwater (SDI15): Level 2. No level 2 tests/analyses available Level 3. Install well and pilot test.	Silt Density Index of feedwater (SDI15): Level 2. No level 2 tests/analyses available Level 3. Install well and pilot test.	Silt Density Index of feedwater (SDI15): Level 2. No level 2 tests/analyses available Level 3. Install well and pilot test.	Silt Density Index of feedwater (SDI15): Level 2. No level 2 tests/analyses available Level 3. Install well and pilot test.	Silt Density Index of feedwater (SDI15): Level 2. No level 2 tests/analyses available Level 3. Install well and pilot test.
17	Potential for poor feedwater quality to impose additional permitting requirements in order to be used as a sourcewater for drinking water	Chemicals in feedwater exceed 10 times an MCL or action level (AL) based on chronic health effects (Y/N) Chemicals in feedwater exceed 3 times an MCL or AL based on acute health effects (Y/N) Feedwater is a surface water that requires more than 4 log Giardia/5 log virus reduction (Y/N) Feedwater is extremely threatened with contamination due to proximity to known contaminating activities (Y/N) Feedwater contains a mixture of contaminants of health concern (Y/N) Feedwater is designed to intercept known contaminants of health concern (Y/N)	Level 2. Sample and analyze groundwater from coastal wells. Level 3. Install well, pilot test and analyze samples.	Level 2. Sample and analyze groundwater from coastal wells. Level 3. Install well, pilot test and analyze samples.	Level 2. Sample and analyze groundwater from coastal wells. Level 3. Install well, pilot test and analyze samples.	Level 2. Sample and analyze soil from seabed Level 3. Install well, pilot test and analyze samples.	Level 2. Sample and analyze soil from beach Level 3. Install, pilot test and analyze samples.	Level 2. Sample and analyze soil from seabed Level 3. Install, pilot test and analyze samples.	Level 2. Sample and analyze soil from seabed Level 3. Install, pilot test and analyze samples.	Level 2. Sample and analyze soil from seabed Level 3. Install, pilot test and analyze samples.
18	Potential impact to protected species or habitats will make CEQA approval challenging	Is(are) protected species/habitat(s) present at the proposed site (Y/N)	Level 2: Site-specific ecological characterization. Subsurface Geometry and Hydraulic Properties: Grain-Size Analysis/Hydraulic Conductivity/Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests) Hydraulic Calculations/Groundwater Modeling. Review of site-specific potential SSI construction and operation requirements and potential ecological impacts. Level 3: Installation and pilot testing to evaluate potential impact. (e.g. pumping impact to coastal margin wetlands).	Level 2: Site-specific ecological characterization. Subsurface Geometry and Hydraulic Properties: Grain-Size Analysis/Hydraulic Conductivity/Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests) Hydraulic Calculations/Groundwater Modeling. Review of site-specific potential SSI construction and operation requirements and potential ecological impacts. Level 3: Installation and pilot testing to evaluate potential impact. (e.g. pumping impact to coastal margin wetlands).	Level 2: Site-specific ecological characterization. Subsurface Geometry and Hydraulic Properties: Grain-Size Analysis/Hydraulic Conductivity/Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests) Hydraulic Calculations/Groundwater Modeling. Review of site-specific potential SSI construction and operation requirements and potential ecological impacts. Level 3: Installation and pilot testing to evaluate potential impact. (e.g. pumping impact to coastal margin wetlands).	Level 2: Site-specific ecological characterization. Subsurface Geometry and Hydraulic Properties: Grain-Size Analysis/Hydraulic Conductivity/Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests) Hydraulic Calculations/Groundwater Modeling. Review of site-specific potential SSI construction and operation requirements and potential ecological impacts. Level 3: Installation and pilot testing to evaluate potential impact. (e.g. pumping impact to coastal margin wetlands).	Level 2: Site-specific ecological characterization. Subsurface Geometry and Hydraulic Properties: Grain-Size Analysis/Hydraulic Conductivity/Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests) Hydraulic Calculations/Groundwater Modeling. Review of site-specific potential SSI construction and operation requirements and potential ecological impacts. Level 3: Installation and pilot testing to evaluate potential impact.	Level 2: Site-specific ecological characterization. Subsurface Geometry and Hydraulic Properties: Grain-Size Analysis/Hydraulic Conductivity/Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests) Hydraulic Calculations/Groundwater Modeling. Review of site-specific potential SSI construction and operation requirements and potential ecological impacts. Level 3: Installation and pilot testing to evaluate potential impact.	Level 2: Site-specific ecological characterization. Subsurface Geometry and Hydraulic Properties: Grain-Size Analysis/Hydraulic Conductivity/Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests) Hydraulic Calculations/Groundwater Modeling. Review of site-specific potential SSI construction and operation requirements and potential ecological impacts. Level 3: Installation and pilot testing to evaluate potential impact.	Level 2: Site-specific ecological characterization. Subsurface Geometry and Hydraulic Properties: Grain-Size Analysis/Hydraulic Conductivity/Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests) Hydraulic Calculations/Groundwater Modeling. Review of site-specific potential SSI construction and operation requirements and potential ecological impacts. Level 3: Installation and pilot testing of single offshore well to evaluate potential impact
19	Potential to conflict with existing land use will make CEQA approval process challenging	Is there a potential for the SSI conflict with existing land use? (Y/N)	Level 2: Zoning and planning review. Public meetings. Review of site-specific potential SSI construction and operation requirements.	Level 2: Zoning and planning review. Public meetings. Review of site-specific potential SSI construction and operation requirements.	Level 2: Zoning and planning review. Public meetings. Review of site-specific potential SSI construction and operation requirements.	Level 2: Zoning and planning review. Public meetings. Review of site-specific potential SSI construction and operation requirements.	Level 2: Zoning and planning review. Public meetings. Review of site-specific potential SSI construction and operation requirements.	Level 2: Zoning and planning review. Public meetings. Review of site-specific potential SSI construction and operation requirements.	Level 2: Zoning and planning review. Public meetings. Review of site-specific potential SSI construction and operation requirements.	Level 2: Zoning and planning review. Public meetings. Review of site-specific potential SSI construction and operation requirements.
20	Potential to disrupt existing/planned groundwater pumping or injection will make CEQA approval challenging	Required capacity of SSI, existing/planned production rate of nearby aquifer	Level 2: Subsurface Geometry and Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests) Hydraulic Calculations/Groundwater Modeling. Review of existing groundwater pumping or injection in the same basin or aquifer system. Hydraulic Calculations/Groundwater Modeling to evaluate potential impact. Level 3: Pilot test pumping and evaluation of influence.	Level 2: Subsurface Geometry and Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests) Hydraulic Calculations/Groundwater Modeling. Review of existing groundwater pumping or injection in the same basin or aquifer system. Hydraulic Calculations/Groundwater Modeling to evaluate potential impact. Level 3: Pilot test pumping and evaluation of influence.	Level 2: Subsurface Geometry and Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests) Hydraulic Calculations/Groundwater Modeling. Review of existing groundwater pumping or injection in the same basin or aquifer system. Hydraulic Calculations/Groundwater Modeling to evaluate potential impact. Level 3: Pilot test pumping and evaluation of influence.	Level 2: Subsurface Geometry and Hydraulic Properties: Grain-Size Analysis / Hydraulic Conductivity / Transmissivity Testing and Evaluation (e.g. laboratory grain-size analysis and permeability testing, CPT pore pressure dissipation testing, specific capacity, aquifer tests) Hydraulic Calculations/Groundwater Modeling. Review of existing groundwater pumping or injection in the same basin or aquifer system. Hydraulic Calculations/Groundwater Modeling to evaluate potential impact. Level 3: Pilot test pumping and evaluation of influence.	Not applicable	Not applicable	Not applicable	Not applicable
21	Potential to mobilize contaminant plumes will make CEQA approval challenging	Are there contaminant plumes in the vicinity of the SSI? (Y/N)	Level 2: Review of groundwater contamination plume in the same basin or aquifer system. Hydraulic Calculations/Groundwater Modeling to evaluate potential influence of SSI pumping on plume. Level 3: Installation and pilot testing to evaluate potential impact on plume migration	Level 2: Review of groundwater contamination plume in the same basin or aquifer system. Hydraulic Calculations/Groundwater Modeling to evaluate potential influence of SSI pumping on plume. Level 3: Installation and pilot testing to evaluate potential impact on plume migration	Level 2: Review of groundwater contamination plume in the same basin or aquifer system. Hydraulic Calculations/Groundwater Modeling to evaluate potential influence of SSI pumping on plume. Level 3: Installation and pilot testing to evaluate potential impact on plume migration	Level 2: Review of groundwater contamination plume in the same basin or aquifer system. Hydraulic Calculations/Groundwater Modeling to evaluate potential influence of SSI pumping on plume. Level 3: Installation and pilot testing to evaluate potential impact on plume migration	Not applicable	Not applicable	Not applicable	Not applicable
22	Lack of demonstrated success of SSI in similar setting to produce a similar capacity imposes significant risk and design challenges to the project	Required capacity, number of units/area of gallery Use inputs from ID 2 and 3 for required number of units/area	An SSI system exists that has produced the required capacity No additional tests/analysis required An SSI system exists with X% of the required number of SSI units. No additional tests/analyses required	An SSI system exists that has produced the required capacity No additional tests/analysis required An SSI system exists with X% of the required number of SSI units. No additional tests/analyses required	An SSI system exists that has produced the required capacity No additional tests/analysis required An SSI system exists with X% of the required number of SSI units. No additional tests/analyses required	An SSI system exists that has produced the required capacity No additional tests/analysis required An SSI system exists with X% of the required number of SSI units. No additional tests/analyses required	An SSI system exists that has produced the required capacity No additional tests/analysis required An SSI system exists with X% of the required gallery area. No additional tests/analyses required	An SSI system exists that has produced the required capacity No additional tests/analysis required An SSI system exists with X% of the required gallery area. No additional tests/analyses required	An SSI system exists that has produced the required capacity No additional tests/analysis required An SSI system exists with X% of the required number of SSI units. No additional tests/analyses required	An SSI system exists that has produced the required capacity No additional tests/analysis required An SSI system exists with X% of the required number of SSI units. No additional tests/analyses required

Notes
 SSI = Subsurface Intake
 CPT = Cone Penetration Test
 CEQA = California Environmental Quality Act
 NOAA = National Oceanic and Atmospheric Administration
 SI = Saturation Index

References
West Basin

Reference List

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