



Memorandum

Date: March 24, 2010

To: Hasan Abdullah, EBMUD

From: David Fee, URS
Seth Gentzler, PE URS
Fan Lau, URS

Subject: ***Bay Area Regional Desalination Project
Existing Facilities Evaluation Task 3 Submittal: Facility Scenarios – FINAL***

1.0 INTRODUCTION

As proposed under the Bay Area Regional Desalination Project (BARDP) Existing Facilities Evaluation Scope of Work, URS has evaluated existing facilities and assets (i.e., water rights, NPDES permits, incidental take permits) in the vicinity of eastern Contra Costa County that could potentially be utilized by the BARDP. A list of facilities and assets were extracted from documents provided by East Bay Municipal Utility District (EBMUD) and Contra Costa Water District (CCWD), internet resources, and other readily available references. Key pieces of information for each facility and asset were then collected in an inventory, included in this memorandum as Attachment A. Facilities highlighted in green were recommended for further study and are considered to be feasible alternatives for the BARDP. The remaining facilities were either not recommended for immediate study (highlighted in yellow), or else not considered feasible alternatives for the reasons shown in the inventory (highlighted in orange and blue).

This memorandum documents the assumptions, criteria, and analysis used to determine combinations of existing facilities that are most feasible for operation of a desalination plant that maximizes the use of existing facilities to reduce impacts and costs associated with the construction of new facilities.

1.1 STATEMENT OF LIMITATIONS

This memorandum is a preliminary document and is not to be used as the basis for detailed design, construction or remedial action, or as a basis for major capital decisions.

This memorandum has been prepared based on certain key assumptions made by URS which substantially affect the content of this memorandum. These assumptions, although thought to be reasonable and appropriate, may not prove to be true in the future. The scenario development and associated cost implications are conditioned upon these assumptions, which are listed in Section 2.0.

Background information, design basis, and other data have been furnished to URS by EBMUD, CCWD, and third parties, which URS has used in preparing this report. URS has relied on this information as furnished, and is neither responsible for nor has confirmed the accuracy of this information.

2.0 ASSUMPTIONS AND CRITERIA

Assumptions and criteria that pertain to specific types of facilities, such as intakes and conveyance pipelines, are listed in the subsections below. However, in general, the following assumptions apply to this study:

- The study area is eastern Contra Costa County.
- Storage facilities are not considered in the study at this time.

2.1 INTAKE

Selection of potential existing intakes for inclusion in the facility scenarios are based on the following assumptions and criteria:

- The intake must withdraw surface water within the project vicinity (between the San Joaquin River and Suisun Bay in eastern Contra Costa County).
- The intake capacity selected for this study is 25 mgd. This capacity is the approximate one pump intake capacity for the Mallard Slough Intake pump station, which is owned by CCWD, who is a project partner.
- The cost of installing fish screens that conform to U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS), and California Department of Fish and Game (CDFG) criteria will need to be taken into account for potential intakes that are not already in conformance.

Based on the above assumptions and criteria, the intakes listed in Table 2-1 and shown on Figure 2-1 were considered as feasible alternatives. Additional intakes that were evaluated, but not considered feasible for the BARDP are shown in Attachment A.

Table 2-1. Intakes in consideration for BARDP

Intake	Owner	Fish screen conformance	Total capacity	Available capacity
Mallard Slough Intake Pump Station ⁽¹⁾	CCWD	Yes	25 mgd with one pump; 40 mgd with both pumps in operation. Water rights information associated with this intake is listed in Attachment B.	Up to 40 mgd subject to existing water rights, terms and conditions
Mirant Pittsburg Power Plant Intake	Mirant	No	1,561 mgd	Mirant currently operates the intake only 10 days per year; there would be an opportunity to modify the operations and permit for desalination ⁽²⁾

(1) Documentation of CCWD's Mallard Slough water rights are provided in Attachment B

(2) Pending further coordination with Mirant

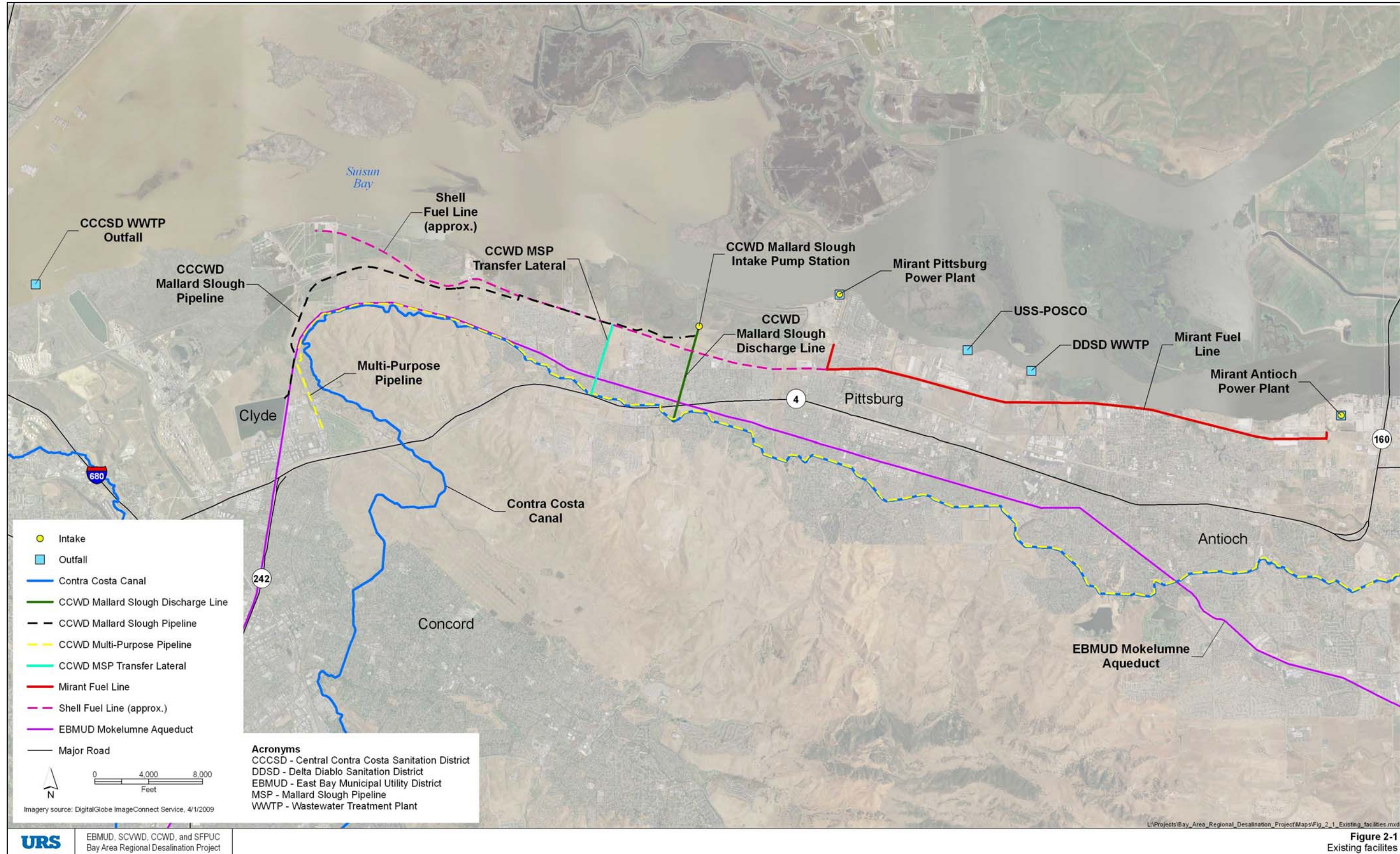


Figure 2-1. Existing facilities

2.2 PLANT SITE

Selection of potential plant sites for inclusion in the facility scenarios are based on the following assumptions and criteria:

- Preliminary information suggest that a 25 mgd desalination plant may require up to 8 acres of land, thus it is assumed that 10 acres would be sufficient for this study.
- The plant site would ideally be located at or in close proximity to a potential intake (see Section 2.1).
- Property ownership is not considered a deciding factor for a plant site, as it is assumed that an agreement could be made with the property owner for the BARDP to purchase the land.
- The cost of land acquisition will need to be taken into account for potential plant sites not currently owned by a BARDP Partner Agency.
- The cost of connecting the plant site to a power source will need to be taken into account for potential plant sites not currently connected.
- The cost of leveling or improving the land will need to be taken into account for potential plant sites that are not already relatively flat or clear.

Based on the above assumptions and criteria, the plant sites listed in Table 2-2 and shown on Figure 2-1 were considered as feasible alternatives.

Table 2-2. Plant sites in consideration for BARDP

Site	Owner	Available area	Power connection
At Mallard Slough Intake Pump Station	CCWD	Limited area owned by CCWD, exact acreage unknown at this time	Yes
At Mirant Pittsburg Power Plant	Mirant	Available area for lease or purchase, exact acreage unknown at this time ⁽¹⁾	Yes
Near Clyde or nearby locations	Unknown	Available area for purchase, exact acreage unknown at this time	Yes

(1) Pending further coordination with Mirant

2.3 PRODUCT WATER CONVEYANCE

Selection of existing facilities for potential product water conveyance for inclusion in the facility scenarios are based on the following assumptions and criteria:

- The conveyance must directly connect or aid in the connection of a potential intake to either the EBMUD conveyance system (via the Mokelumne Aqueduct) or a CCWD conveyance system (e.g., Multi-Purpose Pipeline or Contra Costa Canal).
- It is considered preferable to connect to a treated water conveyance facility, since product water discharged to an untreated conveyance system would require further treatment, resulting in additional treatment costs.
- The conveyance capacity must be at least 20 mgd, as a desalination plant with a 25-mgd intake would generate approximately 20 mgd of product water. Ideally, the unused portion of the conveyance capacity would allow for 20 mgd to be used by the BARDP. However, use records have not yet been made available for this study. Nonetheless, it is assumed that a purchase agreement can be negotiated with the conveyance owner/operator for a share of the conveyance capacity.
- The type of conveyance is not considered a deciding factor, as it is assumed that other types of conveyance facilities (e.g., untreated water, wastewater, fuel) could be converted into a product water

conveyance. The cost of slip-lining a pipeline, or other means of conversion, will need to be taken into account in the cost analysis.

- The condition of the conveyance is not considered a deciding factor, as it is assumed that the conveyance could be rehabilitated, upgraded, or improved for use by the BARDP. The cost of improvements will need to be taken into account.
- If there are existing customers on a treated water conveyance line in consideration for the BARDP, then the costs associated with maintaining service will need to be taken into account.

Based on the above assumptions and criteria, the conveyances listed in Table 2-3 and shown on Figure 2-1 were considered as feasible alternatives.

Table 2-3. Product water conveyances in consideration for BARDP

Treated water conveyance	Owner	Type	Diameter / Material	Total capacity ⁽¹⁾	Available capacity
Mallard Slough Pipeline (MSP)	CCWD	Untreated water	33-inch / steel pipe, cement-lined, cement-coated	38.4 mgd	Unknown at this time; dependent on current customer demand and pipeline condition
Multi-Purpose Pipeline (MPP)	CCWD	Treated water	42-inch / welded steel	62.1 mgd	Detailed analysis required, as capacity depends on season, CCWD system operations and distribution system constraints
Mallard Slough Discharge Line (connecting the Mallard Slough Intake Pump Station to the Contra Costa Canal)	CCWD	Untreated water	36-inch / welded steel	45.7 mgd	Varies seasonally
MSP Transfer Lateral (a.k.a., Nichols Wasteway Lateral)	CCWD	Untreated water	12-inch / PVC	5.1 mgd	Varies depending on season and customer demand

(1) Approximate maximum capacity assuming velocity criteria of 10 ft/s

2.4 REJECT WATER CONVEYANCE

Selection of existing facilities for potential reject water (i.e., brine, backwash, and other wastewater) conveyance for inclusion in the facility scenarios are based on the following assumptions and criteria:

- The conveyance alignment should aid in the connection of a potential plant to a potential outfall. If the conveyance does not directly connect to a potential plant or outfall, the cost of installing a connection (e.g., turnout, pipeline extension, etc.) will need to be taken into account.
- The conveyance capacity must be a minimum of 5 mgd. Ideally, the unused portion of the conveyance capacity would allow for 5 mgd to be used by the BARDP. However, use records have not yet been made available for this study. Nonetheless, it is assumed that a purchase agreement can be negotiated with the conveyance owner/operator for a share of the conveyance capacity.
- Only abandoned or non-critical (i.e., idle) conveyances are considered for reject water discharge. The type of conveyance is not considered a deciding factor, as it is assumed that a non-wastewater (e.g., untreated water, treated water, fuel) conveyance could be converted into a wastewater conveyance. The cost of slip-lining a pipeline, or other means of conversion, will need to be taken into account.
- The condition of the conveyance is not considered a deciding factor, as it is assumed that the conveyance could be rehabilitated, upgraded, or improved for use by the BARDP. The cost of improvements will need to be taken into account.
- If there are existing customers on a conveyance line in consideration for the BARDP, then the costs associated with maintaining service will need to be taken into account.

Based on the above assumptions and criteria, the intakes listed in Table 2-4 and shown in Figure 2-1 were considered as feasible alternative.

Table 2-4. Reject water conveyances in consideration for BARDP

Reject water conveyance	Owner	Type	Diameter	Total capacity	Available capacity
Mirant Fuel Line (idle)	Shell	Fuel	10 inches	3.3 mgd	Currently idle, so total capacity is available
Shell Fuel Line (idle)	Shell (formerly PG&E)	Fuel	16 inches	Unknown at this time	Currently idle, so total capacity is available

2.5 OUTFALL

Selection of potential outfalls for inclusion in the facility scenarios are based on the following assumptions and criteria:

- The outfall must discharge in the vicinity of the project area (between the San Joaquin River and Suisun Bay in eastern Contra Costa County).
- The outfall must have an active National Pollutant Discharge Elimination System (NPDES) permit so as to avoid costs and delays related to permitting.
- The permitted outfall capacity, or discharge, must be at least 5 mgd. Ideally, the unused portion of the outfall capacity would allow for 5 mgd to be used by the BARDP. However, use records have not yet been made available for this study. Nonetheless, it is assumed that a purchase agreement can be negotiated with the intake owner/operator for a share of the outfall.

Based on the above assumptions and criteria, the outfalls listed in Table 2-5 and shown on Figure 2-1 were determined to be feasible.

Table 2-5. Outfalls in consideration for BARDP

Outfall	Owner	NPDES permit	Permitted capacity	Available capacity
Delta Diablo Sanitation District (DDSD) Wastewater Treatment Plant (WWTP) outfall	DDSD	NPDES No. CA0038547 (Order No. R2-2003-0114)	16.5 mgd average dry weather flow (ADWF)	Unknown at this time
Central Contra Costa Sanitation District (CCCSD) WWTP outfall	CCCSD	NPDES No. CA0037648 (Order No. R2-2007-0008)	53.8 mgd ADWF	Unknown at this time
Mirant Pittsburg Power Plant outfall ⁽¹⁾	Mirant	NPDES No. CA0004880 (Order No. R2-2002-0072)	658 mgd annual average flow	Mirant currently operates the outfall only 10 days per year; there would be an opportunity to modify the operations and permit for desalination ⁽²⁾
USS-POSCO processing facility outfall	USS-POSCO	NPDES No. CA0005002 (Order No. R2-2006-0029)	28 mgd	Unknown at this time

(1) The outfall and permitted capacity described in this table correspond to the discharge of once-through cooling water from Units 1 through 6.

(2) Pending further coordination with Mirant

3.0 FACILITY SCENARIOS

Five facility scenarios were developed for this study. The combinations of facilities and their associated advantages and disadvantages are summarized in the tables below. In some scenarios, new facilities would have to be built to take advantage of a certain plant site, intake, or outfall. Each facility scenario is accompanied by a map (see Figures 3-1 through 3-5).

The facility scenarios are numbered by plant site, then by outfall if there is more than one facility scenario per plant site. Thus, each facility scenario with starting with the number 1 corresponds to a plant site at the Mirant Pittsburg Power Plant property adjacent to the Mallard Slough Intake Pump Station. Since there are three such facility scenarios, each of these facility scenarios are also differentiated by a letter corresponding to the different outfalls—A corresponds to the Mirant Pittsburg Power Plant outfall, B corresponds to the DDSD WWTP outfall, and C corresponds to the CCCSD WWTP outfall. There is only one facility scenario with a plant site at Clyde, and this is Facility Scenario 2. Similarly, there is only one facility scenario with a plant site directly at the Mirant Pittsburg Power Plant, and this is Facility Scenario 3.

Table 3-1. Facility Scenario 1A Summary

Facility type	Name	Advantages	Disadvantages
Intake	Mallard Slough Intake Pump Station	Owned/operated by CCWD, a BARDP Partner Agency; fish screens already in conformance; permitted for 25 mgd flow rate	-
Plant site	Mirant Pittsburg Power Plant property	Large acreage adjacent to Mallard Slough Intake Pump Station	Not owned by a BARDP Partner Agency; requires an untreated water conveyance between intake and plant site (see below)
Untreated water conveyance	Approximately 1,400-linear feet (lf) new construction	-	Need to construct new conveyance connecting intake to plant
Product water conveyance(s)	Mallard Slough Discharge Line + MPP	Owned/operated by CCWD, a BARDP Partner Agency; connection to MPP avoids having to re-treat water; potential to reroute to Contra Costa Canal via existing connection with Mallard Slough Discharge Line	Need to connect Mallard Slough Discharge Line to MPP
Reject water conveyance(s)	Shell Fuel Line + approximately 5,700-lf new construction	Currently idle	Not owned/operated by a BARDP Partner Agency; need to construct new conveyances connecting plant to Shell Fuel Line, and connecting Shell Fuel Line to Mirant Pittsburg outfall
Outfall	Mirant Pittsburg Power Plant outfall	Large capacity (658 mgd permitted annual average flow); existing winding channel could be used for reject water mixing	Not owned/operated by a BARDP Partner Agency; reject water discharged upstream of Plant intake.

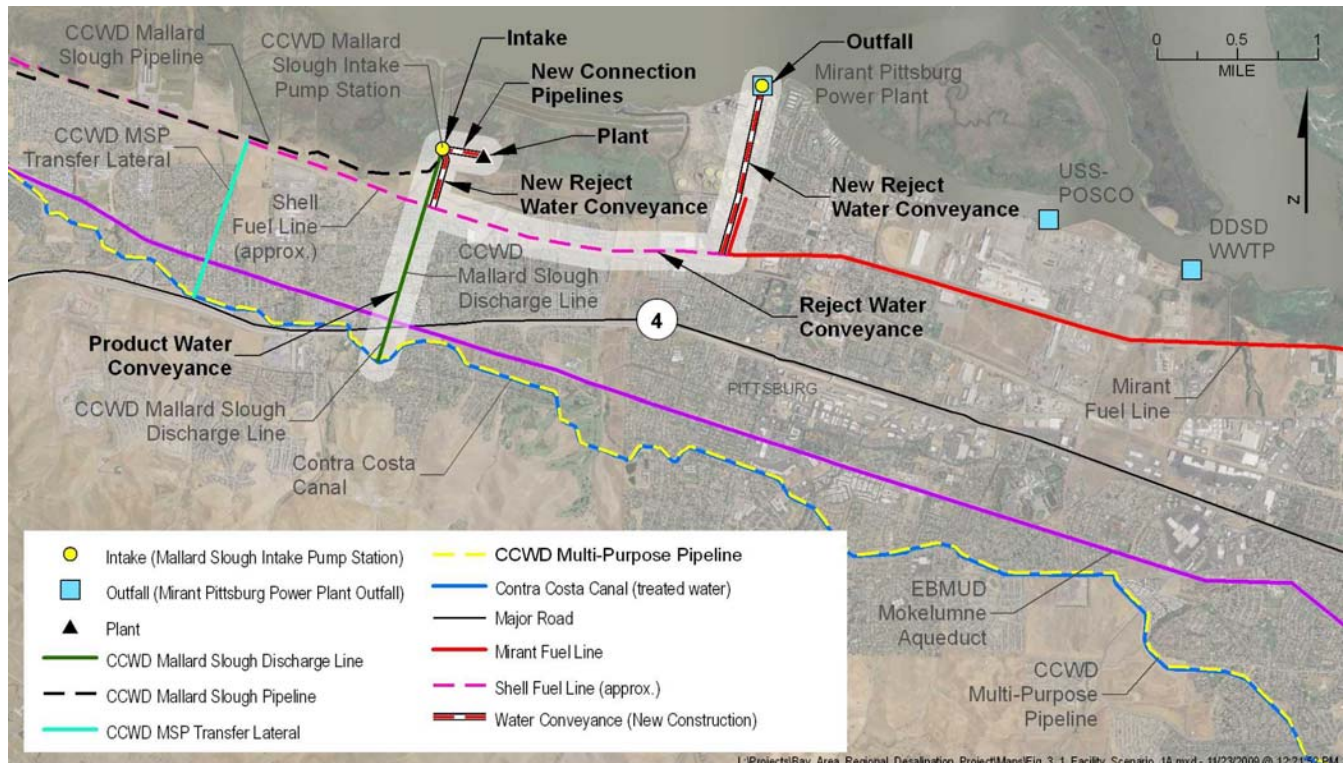


Figure 3-1. Facility Scenario 1A map

Table 3-2. Facility Scenario 1B Summary

Facility type	Name	Advantages	Disadvantages
Intake	Mallard Slough Intake Pump Station	Owned/operated by CCWD, a BARDP Partner Agency; fish screens already in conformance; permitted for 25 mgd flow rate	-
Plant site	Mirant Pittsburg Power Plant property	Large acreage adjacent to Mallard Slough Intake Pump Station	Not owned by a BARDP Partner Agency; requires an untreated water conveyance between intake and plant site (see below)
Untreated water conveyance	Approximately 1,400-lf new construction	-	Need to construct new conveyance connecting intake to plant
Product water conveyance(s)	Mallard Slough Discharge Line + MPP	Owned/operated by CCWD, a BARDP Partner Agency; connection to MPP avoids having to re-treat water; potential to reroute to Contra Costa Canal via existing connection with Mallard Slough Discharge Line	Need to connect Mallard Slough Discharge Line to MPP
Reject water conveyance(s)	Shell Fuel Line + Mirant Fuel Line + approximately 2,400-lf new construction	Both existing lines are currently idle	Existing lines not owned/operated by a BARDP Partner Agency; need to expand capacity of the Mirant Fuel Line and connect it to the Shell Fuel Line to create a continuous conveyance; need to construct new conveyances connecting plant to Shell Fuel Line, and connecting Mirant Fuel Line to Mirant Pittsburg outfall
Outfall	DDSD WWTP outfall	-	Not owned/operated by a BARDP Partner Agency; reject water discharged upstream of Plant intake.

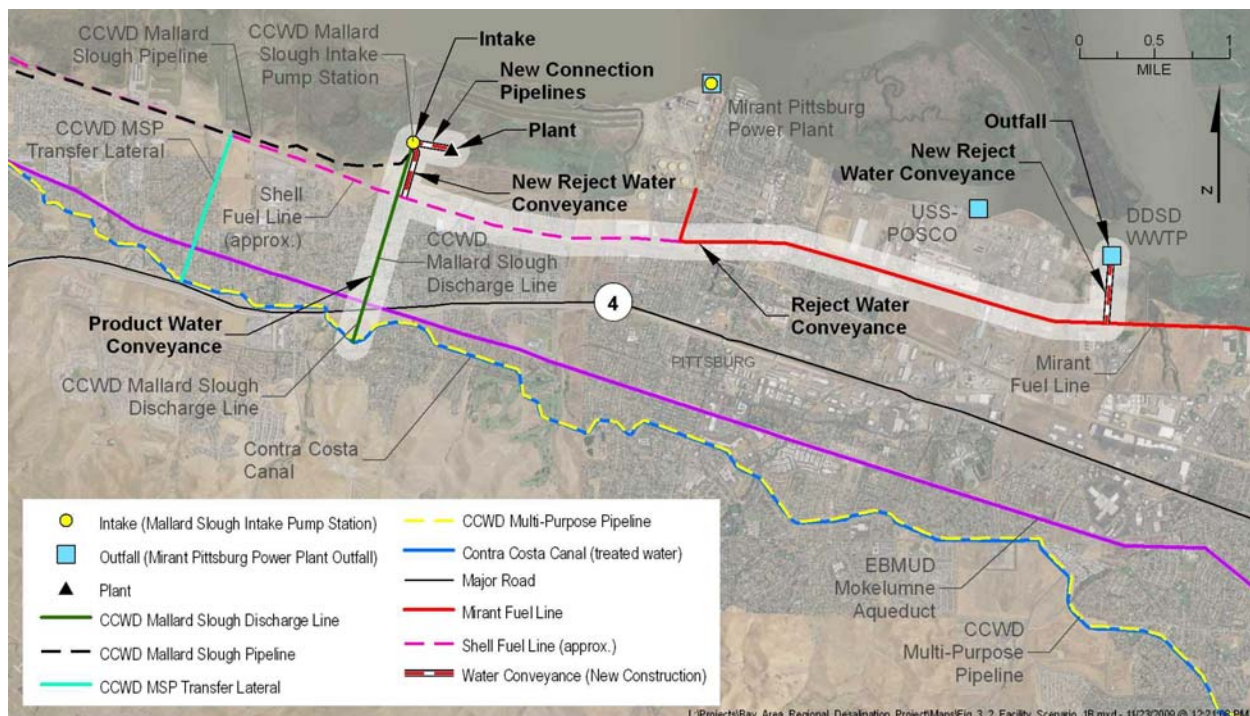


Figure 3-2. Facility Scenario 1B map

Table 3-3. Facility Scenario 1C Summary

Facility type	Name	Advantages	Disadvantages
Intake	Mallard Slough Intake Pump Station	Owned/operated by CCWD, a BARDP Partner Agency; fish screens already in conformance; permitted for 25 mgd flow rate	-
Plant site	Mirant Pittsburg Power Plant property	Large acreage adjacent to Mallard Slough Intake Pump Station	Not owned by a BARDP Partner Agency; requires an untreated water conveyance between intake and plant site (see below)
Untreated water conveyance	Approximately 1,400-lf new construction	-	Need to construct new conveyance connecting intake to plant
Product water conveyance(s)	Mallard Slough Discharge Line + MPP	Owned/operated by CCWD, a BARDP Partner Agency; connection to MPP avoids having to re-treat water; potential to reroute to Contra Costa Canal via existing connection with Mallard Slough Discharge Line	Need to connect Mallard Slough Discharge Line to MPP
Reject water conveyance(s)	Shell Fuel Line + approximately 31,400-lf new construction	Shell Fuel Line currently idle	Shell Fuel Line not owned/operated by a BARDP Partner Agency; need to construct new conveyances connecting plant to Shell Fuel Line, and connecting Shell Fuel Line to CCCSD WWTP outfall
Outfall	CCCSD WWTP outfall	Reject water discharged downstream of the intake	Not owned/operated by a BARDP Partner Agency

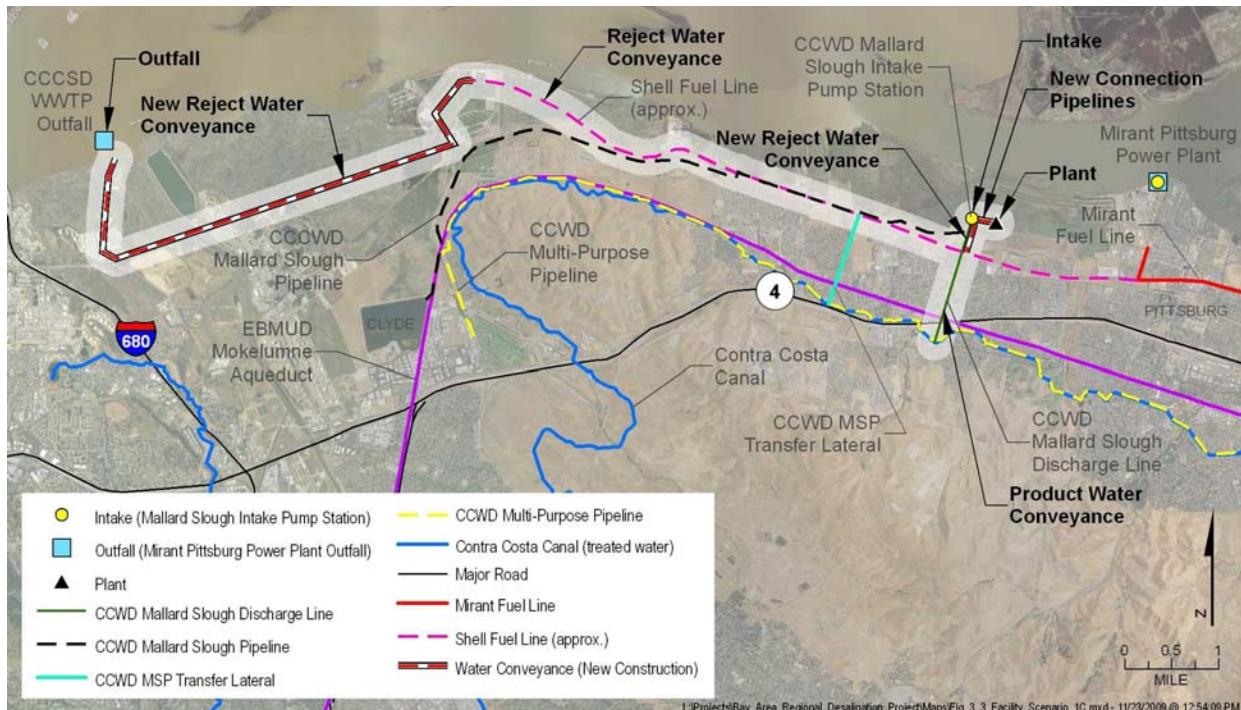


Figure 3-3. Facility Scenario 1C map

Table 3-4. Facility Scenario 2 Summary

Facility type	Name	Advantages	Disadvantages
Intake	Mallard Slough Intake Pump Station	Owned/operated by CCWD, a BARDP Partner Agency; fish screens already in conformance; permitted for 25 mgd flow rate	-
Plant site	Clyde	Power connection close by; Mokelumne Aqueduct and CCWD conveyance facilities converge near site	Requires an untreated water conveyance between intake and plant site (see below); insufficient acreage owned by a BARDP Partner Agency
Untreated water conveyance	Mallard Slough Pipeline	Owned/operated by CCWD, a BARDP Partner Agency	Would require improvements to portions of the line to convey 20 mgd; potable water service to CCWD customer would need to be maintained
Product water conveyance(s)	New connection(s) to existing facilities	Plant would be located in close proximity to Contra Costa Canal, Mokelumne Aqueduct, or MPP, requiring minimal new conveyance facilities	-
Reject water conveyance(s)	Approximately 24,700-lf new construction	-	Need to construct new conveyance connecting plant to CCCSD WWTP outfall
Outfall	CCCSD WWTP outfall	Reject water discharged downstream of the intake	Not owned/operated by a BARDP Partner Agency

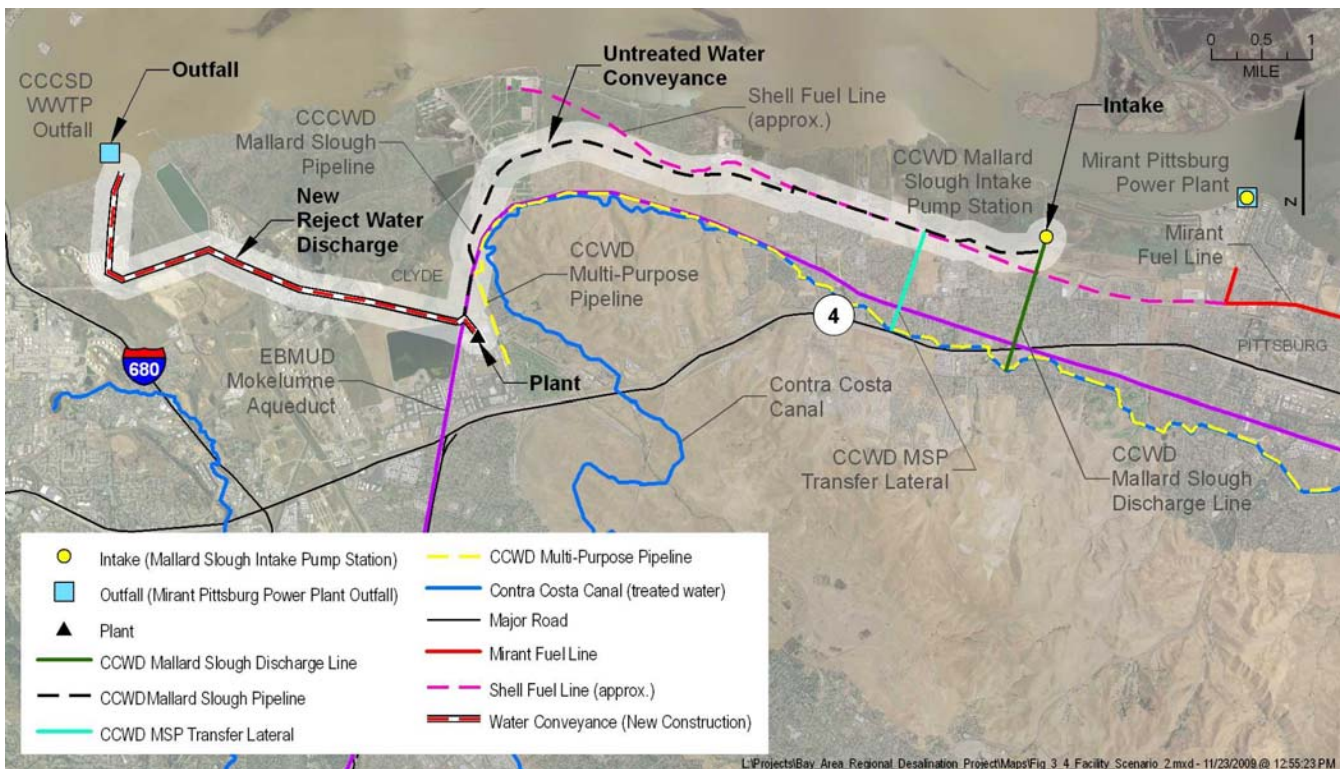


Figure 3-4. Facility Scenario 2 map

Table 3-5. Facility Scenario 3 Summary

Facility type	Name	Advantages	Disadvantages
Intake	Mirant Pittsburg Power Plant intake	Large capacity; could potentially accommodate a 71-mgd desalination plant	Not owned/operated by a BARDP Partner Agency; need to install fish screens and apply for permits (water extraction and intake)
Plant site	Mirant Pittsburg Power Plant	Large acreage	Not owned by a BARDP Partner Agency
Product water conveyance(s)	Approximately 15,400-lf new construction + Mallard Slough Discharge Line + MPP	Existing conveyances owned/operated by CCWD, a BARDP Partner Agency; avoids having to re-treat water; potential to reroute to Contra Costa Canal via existing connection with Mallard Slough Discharge Line	Need to construct new conveyance connecting the Mirant Pittsburg Power Plant intake to Mallard Slough Discharge Line; need to connect Mallard Slough Discharge Line to MPP, potentially eliminating current connection to Contra Costa Canal
Reject water conveyance(s)	Not applicable	Intake and outfall are located at the same site (Mirant Pittsburg Power Plant)	-
Outfall	Mirant Pittsburg Power Plant outfall	No new construction needed to convey reject water to a different site; an existing cooling/mixing canal may be available for BARDP use; large capacity (658 mgd permitted annual average flow) may help minimize impacts of discharge on meeting NDPES requirements	Not owned/operated by a BARDP Partner Agency

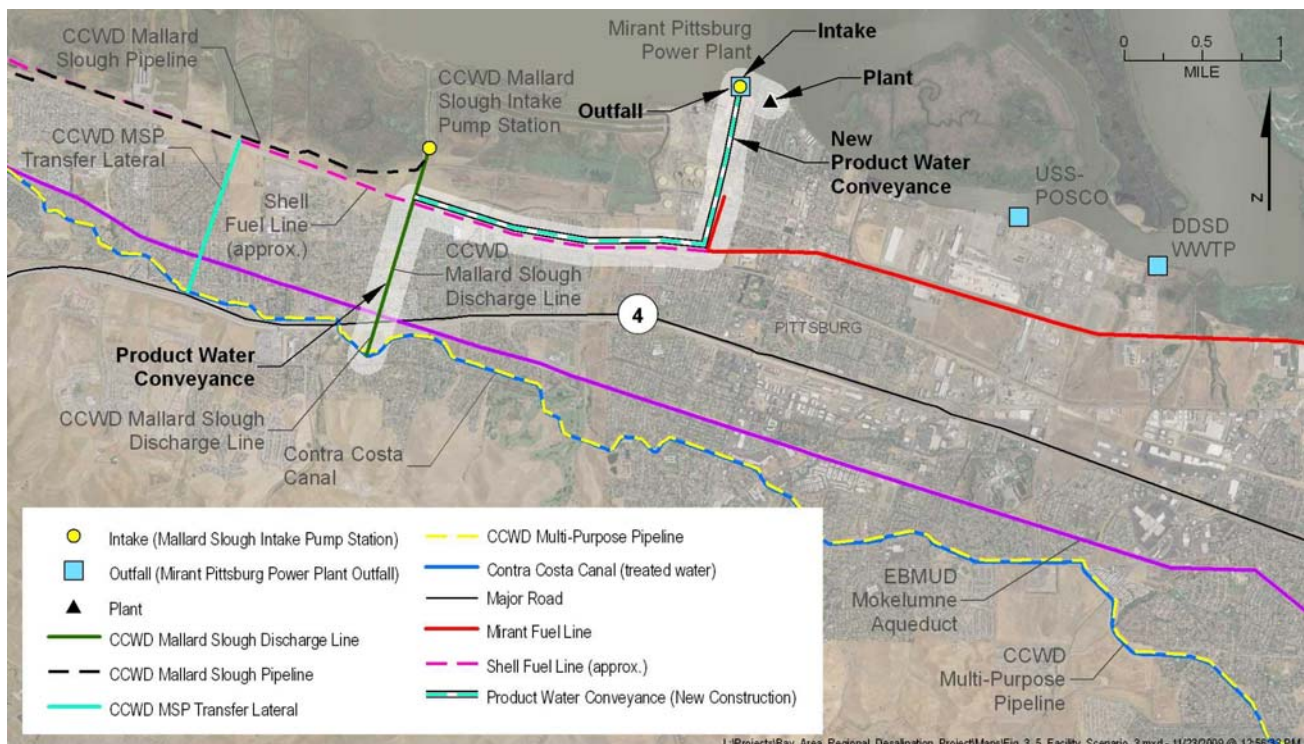


Figure 3-5. Facility Scenario 3 map

4.0 RECOMMENDATIONS FOR FUTURE WORK

Additional information is required to develop a preferred alternative or scenario. We recommend that several tasks be completed as part of the BARDP following this Existing Facilities Evaluation:

1. **Continue information requests:** Coordinate with existing facility owners/operators identified in the facility tables in Section 2. Request that they provide updated information, or else verify assumptions used in this study.
2. **Conduct water quality and hydraulic studies:** Determine if there is sufficient hydraulic mixing and dilution capacity at the outfalls to meet NPDES permit requirements.
3. **Consider other existing facilities:** The USS-POSCO processing facility outfall was not included in the Facility Scenarios described in this study. The BARDP did not initially prioritize this outfall as it had not been considered in previous studies of local or regional desalination plants. However, it may be worth investigating further as an alternative.
4. **Investigate water exchange opportunities:** Existing inter-ties between EBMUD and CCWD may offer opportunities to offset CCWD's demand for Delta water and/or improve CCWD's water quality by mixing supplies.
5. **Examine potential impacts on Delta pumping:** There is concern that desalination could indirectly affect Delta pumping by increasing the imbalance between Delta outflow and Delta pumping. This issue applies to the BARDP as a whole, and is not unique to a Facility Scenario.

Attachment A
Existing Facility Inventory

Existing Facilities Inventory for BARDP																					
By Fan Lau, URS, August 2009 (revised November 2009, January 2010, March 2010)																					
Facility No.	Facility	Reference(s)	Owner (Operator in parentheses if different from Owner)	Location	Map, digital alignment, or coordinates	Photograph	Applicable use permits	Type	Size	Condition	Current use (capacity used/unused)	Future use	Potential Connections	Need for upgrade/modification/retrofit	Cost estimate for upgrade/modification/retrofit	Outfall: distance to Mallard Slough intake	Overall pros	Overall cons	Applicability to evaluation		
1	CCWD Mallard Slough intake pump station	RMC 2009, DDS 2005a, DDS 2005b, CCWD 2009	CCWD	Mallard Slough at Pittsburg/Bay Point	[see CCWD 2009's Delta-Map-include-CCWD-&LV.jpg]		Water rights permit	Intake	25 mgd (DDS 2005a), or 40 mgd (DDS 2005b)		Operated up to 25 mgd when water quality is better than 65-100 mg/L chloride; otherwise, capacity could be available for desal 4-5 months out of the year (approx. Aug-Dec)		(1) north-south connection to Contra Costa Canal, (2) emergency connection to EBMUD Aqueduct, (3) Mallard Slough Pipeline	Already rehabbed in 2001			Fish screens conform to USFWS, NOAA Fisheries, and DFG criteria	Quality of intake water is not as good as that at City of Antioch intake.	Recommended for further study		
2	Mirant Pittsburg Power Plant	RMC 2009, DDS 2005a, DDS 2005b	Mirant Delta, LLC	Pittsburg, intake from SJR, discharge back to Delta	[see ExistingInfraStructure-ECCSite.ppt]		Water rights permit	Intake	1,561 mgd		Current use by Units 5 & 6 is 4 x 80,250 gpm, Unit 7 is 3 x 10,100 gpm (DDS 2005a), Units 1-4 is 1,070 mgd, Units 5-7 is 491 mgd, all at full capacity (DDS 2005b); plant operates ~10 days/year (Corwin 2009)			Needs fish screens that conform to USFWS, NOAA Fisheries, or DFG criteria			Mirant has expressed interest in desal	Would need site acquisition, permits, and fish screens.	Recommended for further study		
3	CCCSD WWTP	RMC 2009	CCCSD	Martinez			NPDES permit	Outfall	53.8 mgd							> 10 miles [to be determined]	Since facility is further west, it may be easier to discharge brine due to saltier ambient waters.	If site is too far west, would need new construction to connect to rest of the desal facilities.	Recommended for further study		
4	DDSD WWTP	RMC 2009, DDS 2005a	DDSD	Discharge to New York Slough			NPDES permit	Outfall			Deep-water outfall approx. 400 ft from shore at depth of 46 ft below msl. Plant has average dry weather flow (ADWF) capacity of 16.5 mgd. Peak wet weather "high-high tide" rating of the gravity outflow is 27 mgd, while average outflow capacity is 38+ mgd (DDS 2005). Existing outfall is rated for an average discharge of 27 mgd. Wet weather capability of the outfall is 42 mgd.							4.7 miles	Since desal facility would normally be operated only in average or dry years, the full capacity should be available for blending of RO process brine.		Recommended for further study
5	Mirant Pittsburg Power Plant	RMC 2009, DDS 2005a, DDS 2005b	Mirant Delta, LLC	Pittsburg, intake from SJR, discharge back to Delta	[see ExistingInfraStructure-ECCSite.ppt]		NPDES permit	Outfall	1,561 mgd		Current use by Units 5 & 6 is 4 x 80,250 gpm, Unit 7 is 3 x 10,100 gpm (DDS 2005a), Units 1-4 is 1,070 mgd, Units 5-7 is 491 mgd, all at full capacity (DDS 2005b); plant operates ~10 days/year (Corwin 2009)			Needs fish screens that conform to USFWS, NOAA Fisheries, or DFG criteria			1.8 miles	Mirant has expressed interest in desal	Would need site acquisition, permits, and fish screens.	Recommended for further study	
6	USS-POSCO processing facility outfall	Order No. R2-2006-0029	USS-POSCO	New York Slough at Pittsburg	Lat: 38° 01' 48" N, Long: 121° 51' 32" W		NPDES permit	Outfall	28 mgd											Recommended for further study	
7	Contra Costa Canal	RMC 2009, CCWD 2009	CCWD	Throughout Contra Costa County	[see RMC 2009 figures, ExistingInfraStructure-ECCSite.ppt, and CCWD 2009's CCWD%20Map%20Without%20Director%20Borders.jpg]	[see CCWD's Aerial photo of Contra Costa Canal.jpg]		Conveyance (connection point)	52 miles, need to determine existing connection points with EBMUD		Could handle additional flow--need to quantify								Federally owned	Recommended for further study	
8	EBMUD Aqueduct	EBMUD 2009	EBMUD	Run from the Sierra Foothills to water treatment plants in the East Bay	[see ExistingInfraStructure-ECCSite.ppt]			Conveyance (connection point)	need to determine existing connection points with CCWD (Hasan to provide)	Recent and ongoing seismic upgrades										Recommended for further study	
9	Mallard Slough Pipeline	PPC 2008	CCWD	Concord and Bay Point	[see RMC 2009 figures]			Conveyance (untreated water)	33" diameter; assuming velocity criteria of 10 ft/s, maximum capacity is approximately 38.4 mgd									Could be used to convey brine to a western outfall		Recommended for further study	
10	Mallard Slough Discharge Line	CCWD meeting 9/29/09	CCWD	North-south, Mallard Slough intake pump station to Contra Costa Canal				Conveyance (untreated water)	36" diameter; assuming velocity criteria of 10 ft/s, maximum capacity is approximately 45.7 mgd												
11	Mallard Slough Pipeline Transfer Lateral	CCWD meeting 9/29/09	CCWD	North-south, Mallard Slough Pipeline to Contra Costa Canal, just west of Mallard Slough intake pump station				Conveyance (untreated water)	12-inch diameter; assuming velocity criteria of 10 ft/s, maximum capacity is approximately 5.1 mgd												
12	Mirant Hot Oil (Fuel) Line	PPC 2008, DDS 2005a	Shell	Pittsburg Power Plant to Mirant Antioch Power Plant				Conveyance (any water type)	10 3/4", capacity = 3.3 mgd, 45,460 ft long	Previously owned by PG&E, currently idle	Currently idle			Rehab/convert into water pipeline					Likely large mix of real estate rights, including railroads. Use of this line may not receive approval from UPRR/BNSF without insertion of casing pipe, which would make this option cost prohibitive.	Recommended for further study	
13	Multi-Purpose Pipeline	RMC 2009	CCWD	Central Contra Costa County, from Bollman WTP in Concord to Randall-Bold WTP in Oakley	[see CCWD 2008]			Conveyance (treated water)	42" diameter; 21 miles; assuming velocity criteria of 10 ft/s, maximum capacity is approximately 62.1 mgd	Completed in 2003										Recommended for further study	
14	Shell Hot Oil (Fuel) Line	PPC 2008	Shell	Richmond to Pittsburg Power Plant	[see ExistingInfraStructure-ECCSite.ppt PG&E 16" Abandoned Line]			Conveyance (reject water)	16", capacity = ?	Previously owned by PG&E, currently idle, questionable integrity	Currently idle			Rehab/convert into water pipeline					Likely large mix of real estate rights, including railroads.	Recommended for further study	

Facility No.	Facility	Reference(s)	Owner (Operator in parentheses if different from Owner)	Location	Map, digital alignment, or coordinates	Photograph	Applicable use permits	Type	Size	Condition	Current use (capacity used/unused)	Future use	Potential Connections	Need for upgrade/modification/retrofit	Cost estimate for upgrade/modification/retrofit	Outfall: distance to Mallard Slough intake	Overall pros	Overall cons	Applicability to evaluation
15	Antioch WTP	RMC 2009, DDSD 2005a, DDSD 2005b	Antioch, City of	Antioch				Intake	The plant is 26 mgd, total intake capacity is 15 mgd	Intake has rolled stainless steel fish screens that do not meet USFWS or NOAA Fisheries standards.				Needs fish screens that meet standards			Quality of intake water is better than that at Mallard Slough.	Intake capacity is low	Not recommended for immediate study
16	Mirant Antioch Power Plant	RMC 2009, DDSD 2005a, DDSD 2005b	Mirant Delta, LLC	Antioch, intake from SJR, discharge back to Delta	[see ExistingInfraStructure-ECCSite.ppt]			Intake	450 mgd		Current use by Units 6 & 7 is 4 x 76,400 gpm (DDSD 2005a), 450 mgd at full capacity			Needs fish screens that conform to USFWS, NOAA Fisheries, or DFG criteria			Mirant has expressed interest in desal	Would need site acquisition, permits, and fish screens; not near other existing facilities being evaluated	Not recommended for immediate study
17	Mirant Antioch Power Plant	RMC 2009, DDSD 2005a, DDSD 2005b	Mirant Delta, LLC	Antioch, intake from SJR, discharge back to Delta	[see ExistingInfraStructure-ECCSite.ppt]			Outfall	450 mgd		Current use by Units 6 & 7 is 4 x 76,400 gpm (DDSD 2005a), 450 mgd at full capacity			Needs fish screens that conform to USFWS, NOAA Fisheries, or DFG criteria		9.1 miles	Mirant has expressed interest in desal	Would need site acquisition, permits, and fish screens; not near other existing facilities being evaluated	Not recommended for immediate study
18	USS-POSCO processing facility intake	RMC 2009	USS-POSCO	1 mile away from DDSD RWF, intake from SJR				Intake											Not recommended for immediate study
19	DDSD recycled water facility	RMC 2009, DDSD 2001	DDSD	Antioch		[see DDSD 2001]		Outfall?		13 mgd treatment plant, readily expandable to 19 mgd, but what is outfall size?									Not recommended for immediate study
20	Antioch water distribution system	RMC 2009	Antioch, City of	Antioch				Conveyance (treated water?)											Not recommended for immediate study
21	CCWD 800 miles of pipeline	RMC 2009	CCWD	Throughout Contra Costa County				Conveyance (treated water?)	800 miles collectively										Not recommended for immediate study
22	DOW Raw Water Service Line	DDSD 2005a	DOW	From CCWD's Contra Costa Canal to Calpine Delta Energy Power Plant next to DDSD WWTP				Conveyance (untreated water)	20" diameter, approx 6,000 ft long, design capacity = 10 cfs (1,500 gpm, 6.5 mgd)	Concrete pipe built in 1957, but in good condition				Currently gravity flow, so may need to install pumps. Limited pressure capability of the pipe may require one or more booster pumps along the line.			By connecting desal facility to this line, product could be delivered to DOW, CCWD, and potentially to EMBUD Aqueduct with proper diversion structure and pump station.	Due to demand by existing customers on this line, this line may not be useable for desal unless existing demand changes.	Not recommended for immediate study
23	PG&E Stan Pac Line	PPC 2008	PG&E	East to west, south of UPRR/BNSF rail line, north of SR4 through PG&E Los Medanos Gas Storage facility.				Conveyance (treated water?)		Constructed in 1950s, reportedly idle, portions removed during construction of adjacent structures				Rehab/convert into water pipeline (currently a natural gas line)				Conversion of use to water or construction of a new pipeline would likely require new land rights to be secured. Substantial due diligence effort would be necessary.	Not recommended for immediate study
24	Praxair Gas Lines (one oxygen, one nitrogen)	DDSD 2005a	Praxair	Runs from Praxair site west of DDSD WWTP to the east in Antioch.				Conveyance (untreated, treated, or reject water)	Two 8" lines, capacity of each line = 2.1 mgd, volume limited to 1,500 gpm water each					Need to extend or reroute line to intake			Could be used or allocated in a variety of ways to deliver raw water, concentrated brine, or potable product.	Too far east of study area	Not recommended for immediate study
25	Antioch Municipal Reservoir	RMC 2009	Antioch, City of	Antioch				Storage	735 AF (250 MG)										Not recommended for immediate study
26	Antioch storage reservoirs	RMC 2009	Antioch, City of	Antioch				Storage	12 other storage reservoirs totaling 22 MG										Not recommended for immediate study
27	Bollman WTP clearwell	RMC 2009, CCWD 2007a	CCWD	Concord				Storage	10 MG										Not recommended for immediate study
28	Mirant Antioch storage tanks	DDSD 2005a	Mirant Delta, LLC	At Mirant Antioch Power Plant	[see ExistingInfraStructure-ECCSite.ppt]			Storage	29 MG total for a number of tanks (precise number not given in DDSD 2005a)				Clean, treat, and prepare for use with potable water	\$250,000 to 1,575.00 per tank					Not recommended for immediate study
29	Mirant Pittsburg storage tanks	DDSD 2005a	Mirant Delta, LLC	At Mirant Pittsburg Power Plant	[see ExistingInfraStructure-ECCSite.ppt]			Storage	240 MG total for a number of tanks (precise number not given in DSD 2005)					\$250,000 to 1,575.00 per tank					Not recommended for immediate study
30	Pittsburg storage reservoirs	RMC 2009	Pittsburg, City of	Pittsburg				Storage	8 storage reservoirs totaling 16.9 MG										Not recommended for immediate study
31	Randall-Bold WTP clearwell	RMC 2009, CCWD 2007b	CCWD and DWD (CCWD)	Oakley				Storage	5 MG										Not recommended for immediate study

Facility No.	Facility	Reference(s)	Owner (Operator in parentheses if different from Owner)	Location	Map, digital alignment, or coordinates	Photograph	Applicable use permits	Type	Size	Condition	Current use (capacity used/unused)	Future use	Potential Connections	Need for upgrade/modification/retrofit	Cost estimate for upgrade/modification/retrofit	Outfall: distance to Mallard Slough intake	Overall pros	Overall cons	Applicability to evaluation
32	DDSD recycled water distribution system	DDSD 2001	DDSD	Antioch and Pittsburg				Conveyance (treated water?)	7 miles										Rejected (not appropriate to combine recycled and RO product water together)
33	CCCSD wastewater collection system	RMC 2009	CCCSD	Martinez to Walnut Creek				Conveyance (reject water)	1,500 miles of 6 in to 102 in diameter pipeline, 19 pumping stations										Rejected (wastewater collection system in operation not appropriate for domestic water use)
34	City of Antioch wastewater collection system	RMC 2009	Antioch, City of	Antioch				Conveyance (reject water)											Rejected (wastewater collection system in operation not appropriate for domestic water use)
35	City of Pittsburg wastewater collection system	RMC 2009	Pittsburg, City of	Pittsburg				Conveyance (reject water)											Rejected (wastewater collection system in operation not appropriate for domestic water use)
36	DDSD wastewater collection system	RMC 2009	DDSD	Throughout Antioch, Bay Point, Pittsburg				Conveyance (reject water)											Rejected (wastewater collection system in operation not appropriate for domestic water use)
37	DDSD recycled water storage reservoir	DDSD 2001	DDSD	Antioch				Storage	2.4 mg										Rejected (not appropriate to combine recycled and RO product water together)
38	ISD wastewater storage and disposal system	RMC 2009	ISD	Oakley and Bethel Island				Storage?											Rejected (wastewater collection system in operation not appropriate for domestic water use)
39	CCWD Delta intake in Old River (at State Route 4)	RMC 2009, CCWD 2009	CCWD	Old River at SR 4 near Discovery Bay	[see CCWD 2009's Delta-Map-include-CCWD-&LV.jpg]			Intake											Outside of service area
40	CCWD Delta intake in Rock Slough diversions (at Canal Pumping Plant No. 1)	RMC 2009, CCWD 2009	CCWD	Rock Slough east of Oakley	[see CCWD 2009's Delta-Map-include-CCWD-&LV.jpg]			Intake											Outside of service area
41	Hill Street WTP	RMC 2009	Investor-owned (GSWC)	Bay Point				Intake?	The plant is 4.14 mgd, but need to know intake size										Outside of service area
42	ISD WWTP	RMC 2009	ISD	Oakley, discharge to SJR at north end of Jersey Island			NPDES permit	Outfall	plant will be upgraded and expanded to 4.3 mgd from 2009 to 2011, but need to know outfall size										Outside of service area
43	Bay Point/Pittsburg emergency water connection	RMC 2009	Investor-owned (GSWC)	Bay Point				Conveyance (treated water?)											Outside of service area
44	ISD wastewater collection system	RMC 2009	ISD	Oakley and Bethel Island				Conveyance (reject water)											Outside of service area
45	Los Vaqueros pipeline	RMC 2009	CCWD	West of Byron and south Delta, connects Los Vaqueros Reservoir to Contra Costa Canal	[see CCWD 2009's Delta-Map-include-CCWD-&LV.jpg]			Conveyance (untreated water)											Outside of service area
46	Pipeline to Shell Refinery	RMC 2009	Portion owned by CCCSD, portion owned by CCWD	From within CCCSD property boundary, ending at refinery 2 miles from CCCSD RWF				Conveyance (untreated water?)	1.2 mi 42" diameter pipeline and 3.5 mi 20-24" diameter pipeline connection									CCWD currently uses portions of pipelines outside of CCCSD property for fire suppression to a nearby landfill and is considering to use as bypass lines during maintenance.	Outside of service area
47	Pipeline to Tosco Refinery	RMC 2009	Portion owned by CCCSD, portion owned by CCWD	From within CCCSD property boundary, ending at refinery 1 mile from CCCSD RWF				Conveyance (untreated water?)	1.2 mi 42" diameter pipeline and 3.5 mi 20-24" diameter pipeline connection									CCWD currently uses portions of pipelines outside of CCCSD property for fire suppression to a nearby landfill and is considering to use as bypass lines during maintenance.	Outside of service area
48	Port Chicago water connection	RMC 2009	Investor-owned (GSWC)	Bay Point				Conveyance (treated water?)	2.85 mgd										Outside of service area
49	ISD surface reservoir	RMC 2009	ISD	Oakley				Storage	20 MG									Planned to be used as part of the future ISD RWF upgrade	Outside of service area
50	Los Vaqueros Reservoir	RMC 2009	CCWD	West of Byron and south Delta				Storage	100,000 AF		Used for emergency supply and operational flexibility, so it might be able to be used for desal during other times?								Outside of service area
51	Storage tanks along the pipeline to Shell Refinery	RMC 2009	?					Storage	3 MG x 2 tanks										Outside of service area

Existing Assets Inventory for BARDP													
By Fan Lau, URS, August 2009 (revised September 2009)													
Asset No.	Asset	Reference(s)	Permitting/granting/issuing entity	Permitted entity	Location	Map or coordinates	Permitted flow or concentration	Other applicable restrictions	Current discharge/intake/concentration	History of violations	Overall pros	Overall cons	Applicability to evaluation
1	CCCSD NPDES permit	RMC 2009, Order No. R2-2007-0008, SWRCB 2009	SF Bay RWQCB (Order No. R2-2007-0008, NPDES No. CA0037648)	CCCSD	Suisun Bay at Martinez	Lat: 38 °, 02', 44" N, Long: 121 °, 05', 55" W	53.8 mgd	See permit for effluent limitations on conventional (CBOD5, TSS, pH, O&G, enterococci bacteria) and toxic (Cu, Pb, Hg, cyanide, acrylonitrile, dioxin-TEQ) pollutants		Repeated tox, pH, temp, Cu violations within the past 5 years. See CIWQS Facility-at-a-Glance Report.			Recommended for further study
2	CCWD diversion at Mallard Slough	DDSD 2005b	SWRCB	CCWD	From Mallard Slough, tributary to Suisun Bay		14,880 AFY	Diversion season is Jan. 1 to Dec. 31					Recommended for further study
3	DDSD NPDES permit	SWRCB 2009, Order No. R2-2003-0114	SF Bay RWQCB (Order No. R2-2003-0114, NPDES No. CA0038547)	DDSD	New York Slough at Antioch	latitude 38 degrees 01 minutes 40 seconds North and longitude 121 degrees 50 minutes 14 seconds West	16.5 mgd ADWF [see permit for concentrations]	[see permit]	[see permit]	No violations reported in the last 5 years			Recommended for further study
4	Mirant Pittsburg Power Plant NPDES permit	SWRCB 2009	SF Bay RWQCB (Order No. R2-2002-0072, NPDES No. CA0004880)	Mirant Delta, LLC	Pittsburg								Recommended for further study
5	CCWD agreement with ECCID to purchase surplus irrigation water	RMC 2009		CCWD			8,200 AFY + 4,000 AFY groundwater						Not recommended for immediate study
6	CCWD CVP contract with USBR for Delta water rights	RMC 2009		CCWD			195,000 AFY					Unreliable during drought conditions	Not recommended for immediate study
7	City of Antioch San Joaquin River pre-1914 water rights	RMC 2009		City of Antioch (WTP)	From San Joaquin River, tributary to Suisun Bay		No legal limitation, but limited to 16 mgd, limited by water quality (chloride must be <150 mg/L). No legal limits.	Diversion season is Oct. 1 to Sept. 30	In last 5 years, average 6,438 afy pumped from SJR			Use of water through these water rights limited to Antioch's sphere of influence	Not recommended for immediate study
8	DOW Chemical Company NPDES permit	SWRCB 2009	SF Bay RWQCB (Order No. R2-2008-0030, NPDES No. CA0004910)	DOW	Pittsburg								Not recommended for immediate study
9	GWF Power Plant NPDES permit	SWRCB 2009	SF Bay RWQCB (Order No. R2-2005-0018, NPDES No. CA0029106)	GWF Power Systems L.P.	Pittsburg	Lat: 38° 02' 00", Long: 121° 52' 15"	45,000 gpd of blowdown [see permit for concentrations]	[see permit]	[see permit]	[see CIWQS Facility At a Glance Report]			Not recommended for immediate study
10	Incidental take permits		CDFG/NMFS										Not recommended for immediate study
11	Mirant Contra Costa/Antioch diversion	DDSD 2005b			Antioch			Pending permit conditions					Not recommended for immediate study
12	Mirant Pittsburg Power Plant diversion	DDSD 2005b			Pittsburg			Diversion restricted at a minimum from May 1 to July 15					Not recommended for immediate study
13	USS-POSCO processing facility NPDES permit	SWRCB 2009	SF Bay RWQCB (Order No. R2-2006-0029, NPDES No. CA0005002)	USS-POSCO Industries	Pittsburg	Lat: 38 °, 01', 48" N, Long: 121 °, 51', 32" W	28 mgd [see permit for concentrations]	[see permit]	[see permit]	[see CIWQS Facility At a Glance Report]			Not recommended for immediate study
14	ISD NPDES permit	RMC 2009	Central Valley RWQCB (Order No. R5-2008-0057, NPDES No. CA0085260)	ISD	Oakley, discharge to SJR at north end of Jersey Island		4.3 mgd (ADWF)			Numerous violations reported since 2007. See CIWQS Facility At a Glance Report	New permit adopted April 2008		Outside of service area

Abbreviated citation	Full reference
RMC 2009	RMC Water and Environment. 2009. East County Industrial Recycled Water Facilities Plan, Draft. Prepared for Delta Diablo Sanitation District, Central Contra Costa Sanitary District, City of Pittsburg, City of Antioch, Contra Costa Water District, Ironhouse Sanitary District, Mirant, and Pacific Gas and Electric. February.
PPC 2008	PPC Land Consultants. 2008. Large Diameter Recycled Water Pipeline Right of Way Investigation Report, Contra Costa County, California PPC No.: 67-02. Prepared for RMC Water and Environment. June 17.
DDSD 2005a	Delta Diablo Sanitation District. 2005. Northern Contra Costa County Feasibility Level Desalination Facility Cost, Final Report. Prepared by RW Beck. April.
DDSD 2005b	Delta Diablo Sanitation District. 2005. Northern Contra Costa County Desalination Demonstration Project Environmental Constraints and Opportunities. Prepared by Jones & Stokes. April.
SWRCB 2009	State Water Resources Control Board (SWRCB). 2009. California Integrated Water Quality System Project (CIWQS) web site, http://www.waterboards.ca.gov/water_issues/programs/ciwqs/docs/publicreports/facility_address_query.xls . Accessed July 13, 2009.
EBMUD 2009	East Bay Municipal Utility District (EBMUD). 2009. Delta Levee Break, http://www.ebmud.com/current_events/delta_levee_break/ . Accessed July 21, 2009.
DDSD 2001	Delta Diablo Sanitation District. 2001. Recycled Water Facility brochure, http://ddsd.org/pdfs/RWF_Brochure.pdf .
CCWD 2009	Contra Costa Water District. 2009. Contra Costa Water Quality, http://www.ccwater.com/waterquality/where.asp? . Accessed July 28, 2009.
URS 2007	URS. 2007. Bay Area Regional Desalination Project Feasibility Study, Final Draft. Prepared for Contra Costa Water District, East Bay Municipal Utility District, San Francisco Public Utilities Commission, and Santa Clara Valley Water District. July.
CCWD 2007a	Contra Costa Water District. 2007a. Ralph D. Bollman Water Treatment Plant Brochure, http://www.ccwater.com/files/Bollman.pdf . November.
CCWD 2007b	Contra Costa Water District. 2007b. Randall-Bold Water Treatment Plant Brochure, http://www.ccwater.com/files/RandallBoldBrochure.pdf . December.
CCWD 2008	Contra Costa Water District. 2008. Annual Water Quality Report 2007, http://www.ci.pittsburg.ca.us/NR/rdonlyres/CAA1E434-C079-481C-B44D-0A4F6BEE36EA/0/AWQR20072.pdf .
Pers comm 2009	Personal communication between Emily Corwin, CCWD, and Andrea Ricci, Mirant Pittsburg Power Plant regarding current Mirant Pittsburg Power Plant operations and potential involvement with BARDP, November 16, 2009.

Attachment B
CCWD Mallard Slough Intake
Water Rights Information

CONTRA COSTA WATER DISTRICT
Interoffice Memorandum

Date : May 14, 1993

To : File

From : Richard Denton

Subject: Mallard Slough Licenses, Permits and Agreements

District and its predecessor, California Water Service Company, has been diverting water from Mallard Slough since 1930.

License for Diversion and Use of Water, License # 10514

License dated August 12, 1975

Application # 5941 (filed November 19, 1928)

Water Right Permit to Appropriate Water # 3167

Municipal and industrial uses

- (a) 39.3 cfs January 1 to December 31
- (b) 3,780 acre-feet/year to storage
- (c) Total diversion and storage £ 14,880 acre-feet
- (d) Total put to beneficial use £ 13,690 acre-feet

Permit for Diversion and Use of Water, Permit # 19856

Permit dated July 3, 1986

Application # 27893 (filed September 28, 1983)

Municipal and industrial uses

- (a) 39.3 cfs August 1 to December 31
- (b) Total diversion £ 11,900 acre-feet
- (c) No diversion allowed when supplemental project (SWP & CVP) water being released (excluding carriage water!)

DWR/CCWD Agreement, Mallard Slough Water Quality

April 21, 1967 (began October 1, 1967)

Based on water year (October through September)

Reimbursement request to DWR should be completed early January

Mallard Slough Permits
May 14, 1993
Page 2

Mean tidal cycle surface zone water quality of 100 mg/l chlorides

Average number of days of availability = 142

Median period = January 15 through June 5, inclusive

$$E = (142-D)/3 * (R + P)/142$$

where E is entitlement in acre-feet,
D is number of days during year that usable river water is available at Mallard Slough,
R is total Mallard Slough diversion (8:00 am on January 15 to 8:00 am) on June 6, and
P is total pumping at Rock Slough (8:00 am on January 15 to 8:00 am on June 6.

$$M = E (C_w + C_e - \$4.90)$$

where M is the amount in dollars to be paid by the State,
C_w is cost of substitute water
C_e is cost of electrical power.

Total Mallard Slough diversion limited to 26,780 acre-feet/year

39.3 cfs for 365 days = 28,452 acre-feet

THIS IS YOUR COPY OF THE LICENSE.
A COPY IS BEING RECORDED WITH THE COUNTY RECORDER.



STATE OF CALIFORNIA
THE RESOURCES AGENCY
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER RIGHTS

License for Diversion and Use of Water

APPLICATION 5941 PERMIT 3167 LICENSE 10512

THIS IS TO CERTIFY, That **CONTRA COSTA COUNTY WATER DISTRICT**
P. O. BOX 757, CONCORD, CALIFORNIA 94522

MAS made proof as of **APRIL 23, 1871** (the date of inspection)
to the satisfaction of the State Water Resources Control Board of a right to the use of the water of
MALLARD SLOUGH IN CONTRA COSTA COUNTY

tributary to **SUISUN BAY**

for the purpose of **MUNICIPAL AND INDUSTRIAL USES**
under Permit **3167** of the Board and that the right to the use of this water has been perfected
in accordance with the laws of California, the Regulations of the Board and the permit terms; that the
priority of this right dates from **JUNE 13, 1924** and that the amount of water to which
this right is entitled and hereby confirmed is limited to the amount actually beneficially used for the stated
purposes and shall not exceed (A) **THIRTY-NINE AND THREE-TENTHS (39.3) CUBIC FEET PER**
SECOND BY DIRECT DIVERSION, TO BE DIVERTED FROM JANUARY 1 TO DECEMBER 31 OF EACH
YEAR; AND (B) THREE THOUSAND SEVEN HUNDRED EIGHTY (3,780) ACRE-FEET PER ANNUM
BY STORAGE, TO BE COLLECTED FROM JANUARY 1 TO DECEMBER 31 OF EACH YEAR. THE
TOTAL AMOUNT OF WATER TO BE TAKEN FROM THE SOURCE (DIRECT DIVERSION PLUS ?
COLLECTION TO STORAGE) SHALL NOT EXCEED (14,880 ACRE-FEET PER CALENDAR YEAR. THE
TOTAL AMOUNT OF WATER TO BE PLACED TO BENEFICIAL USE SHALL NOT EXCEED 13,690
ACRE-FEET PER CALENDAR YEAR.

water year
yields direct
diver = 12,239
+ Storage
withdrew 2,647
-----> 14,886
14,55

12,239
- 3,072
-----> 15,311 water year yields

THE POINT OF DIVERSION OF SUCH WATER IS LOCATED:

AT MALLARD SLOUGH PUMPING PLANT, BEING NORTH 5,900 FEET AND EAST 1,400 FEET FROM
THE CORNER OF SECTION 14, T2N, R1W, MDS&N, BEING WITHIN SE1/4 OF SW1/4 OF SECTION 1,
T2N, R1W, MDS&N.

A DESCRIPTION OF LANDS OR THE PLACE WHERE
SUCH WATER IS PUT TO BENEFICIAL USE IS AS FOLLOWS:

WITHIN THE ULTIMATE WATER SERVICE AREA OF CONTRA COSTA COUNTY WATER DISTRICT, AS
SHOWN ON MAP FILED WITH STATE WATER RESOURCES CONTROL BOARD.

THIS LICENSE SHOULD NOT BE CONSTRUED AS CONFIRMING IN LICENSEE AN EASEMENT
UPON OR RIGHT OF WAY ACROSS LANDS OF THE STATE OF CALIFORNIA OR AN EASEMENT UPON
OR RIGHT OF WAY ACROSS LANDS SUBJECT TO EASEMENT OF THE STATE OF CALIFORNIA.

Licensee shall allow representatives of the Board and other parties, as may be authorized from time to time by the Board, reasonable access to project works to determine compliance with the terms of this license.

All rights and privileges under this license, including method of diversion, method of use and quantity of water diverted are subject to the continuing authority of the Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use or unreasonable method of diversion of said water.

~~This continuing authority of the Board may be exercised in imposing specific requirements, in excess of those contained in this license, with respect to: (a) limiting quantity of water used to meet the reasonable water requirements of licensee without unreasonable depletion of the source; (b) licensee may be required to implement such programs as: (1) issuing an order limiting the water allocation; (2) restricting diversions; (3) to eliminate agricultural fallow water; (4) to utilize other flows; (5) increasing evaporation losses from water surfaces; (6) controlling phytoplankton growth; and (7) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this license and to determine reasonably water use against reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation.~~

Reports shall be filed promptly by licensee on appropriate forms which will be provided for the purpose from time to time by the Board.

The right hereby confirmed to the diversion and use of water is restricted to the point or points of diversion herein specified and to the lands or place of use herein described.

This license is granted and licensee accepts all rights herein confirmed subject to the following provisions of the Water Code:

Section 1625. Each license shall be in such form and contain such terms as may be prescribed by the Board.

Section 1626. All licenses shall be under the terms and conditions of this division (of the Water Code).

Section 1627. A license shall be effective for such time as the water actually appropriated under it is used for a useful and beneficial purpose in conformity with this division (of the Water Code) but no longer.

Section 1628. Every license shall include the enumeration of conditions therein which in substance shall include all of the provisions of this article and the statement that any appropriator of water to whom a license is issued takes the license subject to the conditions therein expressed.

Section 1629. Every licensee, if he accepts a license does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefor shall at any time be assigned to or claimed for any license granted or issued under the provisions of this division (of the Water Code), or for any rights granted or acquired under the provisions of this division (of the Water Code), in respect to the regulation by any competent public authority of the services or the price of the services to be rendered by any licensee or by the holder of any rights granted or acquired under the provisions of this division (of the Water Code) or in respect to any valuation for purposes of sale to or purchase, whether through condemnation proceedings or otherwise, by the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State, of the rights and property of any licensee, or the possessor of any rights granted, issued, or acquired under the provisions of this division (of the Water Code).

Section 1630. At any time after the expiration of twenty years after the granting of a license, the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State shall have the right to purchase the works and property occupied and used under the license and the works built or constructed for the enjoyment of the rights granted under the license.

Section 1631. In the event that the State, or any city, city and county, municipal water district, irrigation district, lighting district, or political subdivision of the State so desiring to purchase and the owner of the works and property cannot agree upon the purchase price, the price shall be determined in such manner as is now or may hereafter be provided by law for determining the value of property taken in eminent domain proceedings.

Dated: AUG 12 1975

STATE WATER RESOURCES CONTROL BOARD

R. L. Rosenberg
Chief, Division of Water Rights

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STATE OF CALIFORNIA

STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER RIGHTS

PERMIT FOR DIVERSION AND USE OF WATER

PERMIT 19856

Application 27893 of Contra Costa Water District

P.O. Box R20 Concord, California 94524

filed on September 28, 1983, has been approved by the State Water Resources Control Board SUBJECT TO VESTED RIGHTS and to the limitations and conditions of this Permit.

Permittee is hereby authorized to divert and use water as follows:

1. Source:

Tributary to:

Mallard Slough

Suisun Bay

2. Location of point of diversion:	40-acre subdivision of public land survey or projection thereof	Section	Township	Range	Base and Meridian
<u>Mallard Slough Pump Station North 5,900 feet and East 1,400 feet from NE corner of Section 14</u>	<u>SE$\frac{1}{4}$ of SW$\frac{1}{4}$</u>	<u>1</u>	<u>2N</u>	<u>1W</u>	<u>MD</u>

County of Contra Costa

3. Purpose of use:	4. Place of use:	Section	Township	Range	Base and Meridian	Acres
<u>Municipal and Industrial</u>	<u>Within the water service area of Contra Costa Water District as shown on map filed with the State Water Resources Control Board.</u>					

The place of use is shown on map filed with the State Water Resources Control Board.

5. The water appropriated shall be limited to the quantity which can be beneficially used and shall not exceed 39.3 cubic feet per second to be diverted from August 1 to December 31 of each year. The maximum amount diverted under this permit shall not exceed 11,900 acre-feet per year. (0000005)

6. The amount authorized for appropriation may be reduced in the license if investigation warrants. (0000006)

7. Complete application of the water to the authorized use shall be made by December 1, 2000. (0000009)

8. Progress reports shall be submitted promptly by permittee when requested by the State Water Resources Control Board until license is issued. (0000010)

9. Permittee shall allow representatives of the State Water Resources Control Board and other parties as may be authorized from time to time by said Board, reasonable access to project works to determine compliance with the terms of this permit. (0000011)

10. Pursuant to California Water Code Sections 100 and 275, and the common law public trust doctrine, all rights and privileges under this permit and under any license issued pursuant thereto, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the State Water Resources Control Board in accordance with law and in the interest of the public welfare to protect public trust uses and to prevent waste, unreasonable use, unreasonable method of use or unreasonable method of diversion of said water.

The continuing authority of the Board may be exercised by imposing specific requirements over and above those contained in this permit with a view to eliminating waste of water and to meeting the reasonable water requirements of permittee without unreasonable draft on the source. Permittee may be required to implement a water conservation plan, features of which may include but not necessarily be limited to: (1) reusing or reclaiming the water allocated; (2) using water reclaimed by another entity instead of all or part of the water allocated; (3) restricting diversions so as to eliminate agricultural tailwater or to reduce return flow; (4) suppressing evaporation losses from water surfaces; (5) controlling phreatophytic growth; and (6) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this permit and to determine accurately water use as against reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation.

The continuing authority of the Board also may be exercised by imposing further limitations on the diversion and use of water by the permittee in order to protect public trust uses. No action will be taken pursuant to this paragraph unless the Board determines, after notice to affected parties and opportunity for hearing, that such action is consistent with California Constitution Article X, Section 2; is consistent with the public interest and is necessary to preserve or restore the uses protected by the public trust. (0000012)

11. The quantity of water diverted under this permit and under any license issued pursuant thereto is subject to modification by the State Water Resources Control Board if, after notice to the permittee and an opportunity for hearing, the Board finds that such modification is necessary to meet water quality objectives in water quality control plans which have been or hereafter may be established or modified pursuant to Division 7 of the Water Code. No action will be taken pursuant to this paragraph unless the Board finds that (1) adequate waste discharge requirements have been prescribed and are in effect with respect to all waste discharges which have any substantial effect upon water quality in the area involved, and (2) the water quality objectives cannot be achieved solely through the control of waste discharges. (0000013)

12. Permittee shall consult with the Division of Water Rights and, within one year from the date of this permit shall submit to the State Water Resources Control Board its Urban Water Management Plan as prepared and adopted in conformance with Section 10610, et seq. of the California Water Code, supplemented by an additional information that may be required by the Board.

All cost-effective measures identified in the Urban Water Management Plan and as supplemented, shall be implemented in accordance with the schedule for implementation found therein. (0000029)

13. This permit is subject to prior rights. Permittee is put on notice that during some years water will not be available for diversion during portions or all of the season authorized herein. The annual variations in demands and hydrologic conditions in the Sacramento-San Joaquin Delta are such that in any year of water scarcity the season of diversion authorized herein may be reduced or completely eliminated on order of this Board made after notice to interested parties and opportunity for hearing. (0000090)

14. No diversion is authorized by this permit when satisfaction of inbasin entitlements requires release of supplemental Project water by the Central Valley Project or the State Water Project.

- A. In basin entitlements are defined as all rights to divert water from streams tributary to the Sacramento-San Joaquin Delta or the Delta for use within the respective basins of origin or the Legal Delta, unavoidable natural requirements for riparian habitat and conveyance losses, and flows required by the State Water Resources Control Board for maintenance of water quality and fish and wildlife. Export diversions and Project carriage water are specifically excluded from the definition of inbasin entitlements.
- B. Supplemental Project water is defined as water imported to the basin by the projects, and water released from Project storage, which is in excess of export diversions, Project carriage water, and Project inbasin deliveries.

The State Water Resources Control Board shall notify the permittee of curtailment of diversion under this term after it finds that supplemental Project water has been released or will be released. The Board will advise the permittee of the probability of imminent curtailment of diversion as far in advance as practicable based on anticipated requirements for supplemental Project water provided by the Project operators. (0000091)

15. The State Water Resources Control Board reserves jurisdiction over this permit to change the season of diversion to conform to later findings of the Board concerning protection of beneficial uses of water in San Francisco Bay and Suisun Marsh. Action to change the season of diversion will be taken only after notice to interested parties and opportunity for hearing. (0000094)

16. Permittee shall, when required by the Department of Fish and Game under applicable provisions of the Fish and Game code comply with such modifications to the diversion structure including fish exclusion provisions as may be necessary to protect fishlife. (0140500)

17. This permit shall not be construed as conferring upon the permittee an easement upon or right-of-way across lands of the State of California or an easement upon or a right-of-way across lands subject to easement of the State of California. (0350999)

This permit is issued and permittee takes it subject to the following provisions of the Water Code:

Section 1390. A permit shall be effective for such time as the water actually appropriated under it is used for a useful and beneficial purpose in conformity with this division (of the Water Code), but no longer.

Section 1391. Every permit shall include the enumeration of conditions therein which in substance shall include all of the provisions of this article and the statement that any appropriation of water to whom a permit is issued takes it subject to the conditions therein expressed.

Section 1392. Every permittee, when he accepts a permit, does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefor shall at any time be assigned to or claimed for any permit granted or issued under the provisions of this division (of the Water Code), or for any rights granted or acquired under the provisions of this division (of the Water Code), in respect to the regulation by any competent public authority of the services or the price of the services to be rendered by any permittee or by the holder of any rights granted or acquired under the provisions of this division (of the Water Code) or in respect to any valuation for purposes of sale to or purchase, whether through condemnation proceedings or otherwise, by the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State, of the rights and property of any permittee, or the possessor of any rights granted, issued, or acquired under the provisions of this division (of the Water Code).

Dated: JULY 3 1986

STATE WATER RESOURCES CONTROL BOARD

L. D. JOHNSON

Chief, Division of Water Rights

AGREEMENT

THIS AGREEMENT made this 21 day of April, 1967, between the STATE OF CALIFORNIA, acting by and through its Department of Water Resources, hereinafter referred to as the "State", and CONTRA COSTA COUNTY WATER DISTRICT, a public body organized and existing pursuant to Division 12 of the Water Code of the State of California, hereinafter referred to as the "District",

WITNESSETH:

WHEREAS, since 1930 the District and its predecessor, California Water Service Company, have been diverting water from Mallard Slough on Suisun Bay in Contra Costa County pursuant to Water Right Permit to Appropriate Water number 3167 issued on Application number 5941 filed on November 19, 1928. Said diversions have been for direct beneficial use and to storage for later beneficial use within the service area of the Treated Water Division of the District when the water in Mallard Slough had a chloride ion content (mean tidal cycle surface zone) of 100 parts per million or less and was not otherwise polluted to make it unsuitable for treatment for municipal and domestic use (hereinafter referred to as usable river water), and

WHEREAS, the average number of days per water year (October 1 to September 30, hereinafter referred to as "year") that usable river water has been available to the District at said point of diversion is 142 and the median period of said availability is from January 15 to June 5, both days inclusive, and

WHEREAS, during each day usable river water has been and will in the

future be available to the District the quantity thereof has been and will be adequate to meet the water requirements of the District from that point of diversion during such day, and

WHEREAS, in the future the average number of days per year that usable river water will be available to the District will decrease and such decrease will be due in part to the operation of the State Water Resources Development System as defined in Section 12931 of the Water Code, and

WHEREAS, it is contemplated that the Contra Costa Canal, supplemented by the Kellogg Unit or other facilities to be constructed by the Bureau of Reclamation, will meet the District's future water requirements which are not met by usable river water. If such facilities are not constructed by the Bureau of Reclamation, water supply facilities will have to be constructed by another agency or agencies to meet the District's future requirements including a substitute water supply equal to the District's water deficiency entitlement as defined in this agreement;

NOW, THEREFORE, the parties agree as follows:

1. The term of this agreement shall begin on the first day of October, 1967, and shall continue in effect until terminated by either party by written notice to the other party given at least 12 months prior to the effective date of such termination. The effective date of termination shall be the last day of a year (September 30) and no termination shall be effective prior to September 30, 2007.

2. The State shall reimburse the District in the manner hereinafter provided for any decrease in availability to the District of usable river water

in Mallard Slough during the term of this agreement caused by operation of the State Water Resources Development System. Such decrease in availability of usable river water is hereinafter referred to as the District's "water deficiency entitlement".

3. The quantity of the District's water deficiency entitlement shall be determined for each year during the term of this agreement by the formula $E = \frac{(142-D)}{3} \frac{(R+P)}{142}$ where E is the District's water deficiency entitlement for such year in acre-feet, D is the number of days during such year that usable river water is available to the District at Mallard Slough, R is the total quantity of water in acre-feet diverted by the District from Mallard Slough from 8:00 A. M. on January 15 to 8:00 A. M. on June 6 and P is the total quantity of water in acre-feet purchased by the District and introduced into its facilities in the vicinity of Chenery Reservoir from 8:00 A. M. on January 15 to 8:00 A. M. on June 6. If in any year D exceeds 142, the District shall have no water deficiency entitlement for such year and the amount of such excess shall offset any water deficiency entitlement of the District for an equal number of days in the next succeeding year or years when D is less than 142.

4. For the purpose of computing the District's water deficiency entitlement, the District will at its expense measure the chloride ion content of water in Mallard Slough at such intervals as shall be reasonably necessary and shall make the results of such measurements available to the State. The State may at its expense verify the accuracy of the District's measurements and any error thus disclosed shall be corrected by the District.

5. Each year during the term of this agreement that the District has a water deficiency entitlement it shall purchase a quantity of substitute water equal thereto from the Contra Costa Canal as supplemented by the Kellogg Unit or other facilities constructed by the Bureau of Reclamation to meet the District's requirement, but if sufficient water is not available to the District from such source it shall purchase said quantity of substitute water from a project or projects constructed by another agency or agencies to meet the District's future water requirements. For the purposes of this agreement, substitute water shall be deemed to have been purchased during the period beginning at 8:00 A. M. on January 15 and ending at 8:00 A. M. on June 6 of such year and the price paid by the District for substitute water shall be deemed to be the average price per acre-foot paid by the District for all untreated water purchased by it for introduction into its facilities in the vicinity of Chenery Reservoir during said period without deduction for any discount, allowance or rebate that may hereafter be made or allowed by the U. S. Bureau of Reclamation in the event the District hereafter undertakes, to any extent to operate and maintain any facilities of the U. S. Bureau of Reclamation not operated and maintained by the District as of the date of this agreement.

6. Each year during the term of this agreement that the District purchases substitute water for its water deficiency entitlement, the State will pay the District an amount of money computed in accordance with the formula $M = E(C_w + C_e - \$4.90)$ where M is the amount in dollars to be paid by the State, E is the District's water deficiency entitlement for such year determined in

the manner provided in Section 3 hereof, Cw is the amount per acre-foot paid by the District for substitute water delivered to the District as provided in Section 5 hereof, and Ce is the average amount (if any) per acre-foot paid by the District for electric energy to transport substitute water from the point of delivery thereof to the District to the District's facilities in the vicinity of Chenery Reservoir. The State shall pay said amount to the District not later than October 31 of the following year. Such payments are hereby determined to be reasonable costs of the annual maintenance and operation of the State Water Resources Development System and shall be disbursed from the California Water Resources Development Bond Fund pursuant to subsection (b) (1) of Section 12937 of the Water Code.

7. The District, in consideration of the payments by the State herein provided, releases the State from liability for any decrease in the availability to the District of usable river water at Mallard Slough caused by operation of the State Water Resources Development System during the term of this agreement.

8. The obligations of the State herein shall not be affected by any modification or discontinuance of the District's Mallard Slough pumping plant or Chenery Reservoir.

9. Nothing herein shall be deemed to be a release or waiver of any right of the District to purchase supplemental water supplies from the State with the priorities established by Water Code Section 11460, 12201 to 12204 inclusive, and 12931.

IN WITNESS WHEREOF the parties hereto have executed this agreement
by their respective officers thereunto duly authorized on the date first above
written.

Approved as to legal form
and sufficiency:

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES

By P. A. Towner /s/
Chief Counsel

By William R. Gianelli /s/
Director

ATTEST:

CONTRA COSTA COUNTY WATER
DISTRICT

B. M. McCloskey /s/
Secretary

By Ralph D. Bollman /s/
President