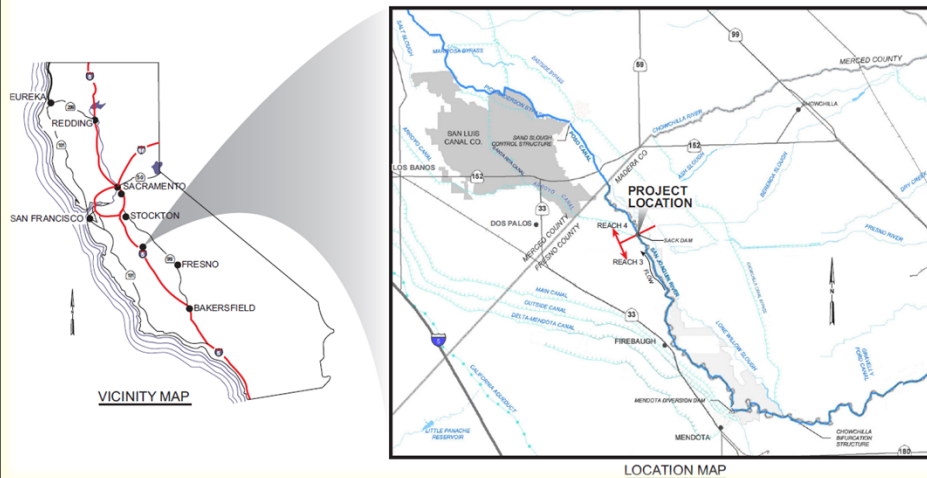


Henry Miller Reclamation District #2131  
Arroyo Canal Fish Screen and Sack Dam  
Fish Passage Project  
Restoration Goal Technical Feedback  
Group Meeting

*San Joaquin River Restoration Program  
May 17, 2012*



Project Vicinity/Location Map



### HMRD #2131 Overview:

- Primary source of water supply is surface diversions from the San Joaquin River via the Delta-Mendota Canal.
- Delivers irrigation water to approximately 47,000 acres.
- Delivers water to San Luis Wildlife Refuge Complex, the California State Wildlife Refuge, and refuge lands within Grasslands Water District.
- Sack Dam and Arroyo Canal are owned and operated by SLCC and HMRD #2131, respectively.

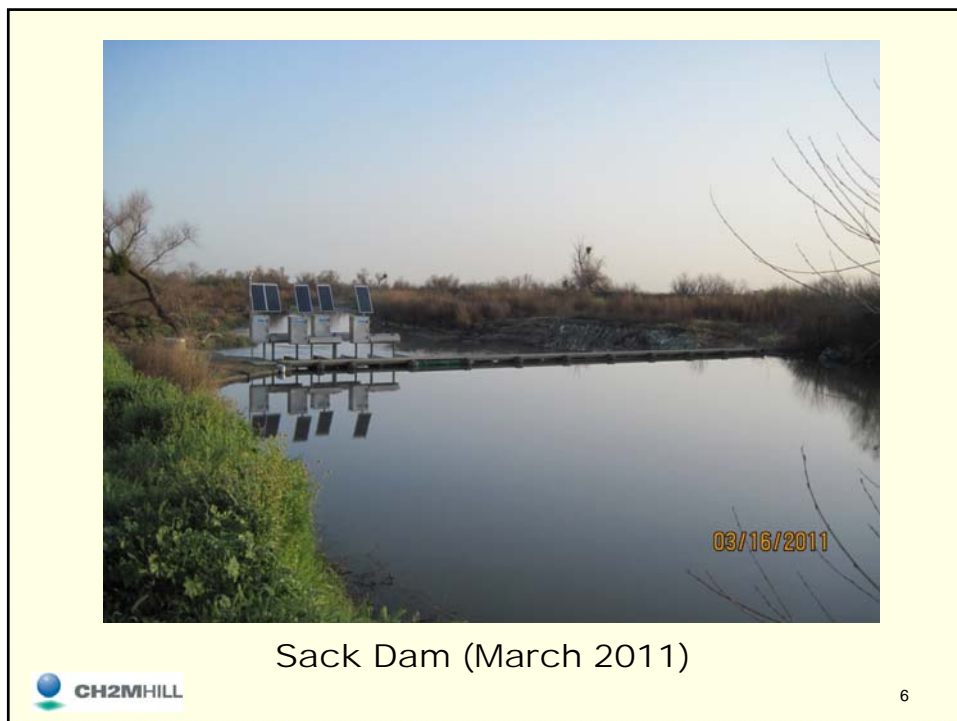


3

### SLCC Service Area



4





Sack Dam (March 2011)



7



Sack Dam (April 2011)



8



Sack Dam (December 2011)



9



Arroyo Canal Headworks



10

The ***purpose*** of the proposed project is to implement Settlement-required Phase 1 improvements at Arroyo Canal and Sack Dam facilities per Public Law 111-11. The Phase 1 improvements listed in the Settlement (paragraph 11) include:

- Screening the Arroyo Canal water diversion (Item 6)
- Modifying Sack Dam to ensure fish passage (Item 7)

The ***need*** for the proposed project stems directly from the Settlement:

*The Parties agree that the channel and structural improvements listed in Paragraph 11 are necessary to fully achieve the Restoration Goal. The Secretary shall promptly commence activities pursuant to applicable law and provisions of this Settlement to implement the improvements listed in Paragraph 11...*



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### HMRD #2131 Project Objectives:

- Implement the environmental, design, and construction activities for Sack Dam and the Arroyo Canal Headworks in a manner that will not modify or diminish the SLCC water rights, that will maintain water deliveries to SLCC (through HMRD facilities), and that will maintain pre-project water quality levels.
- Construct and operate a fish screen to protect out-migrating salmonids and upstream migration adults from straying.
- Improve fish passage at Sack Dam to allow for passage of anadromous and other native fish.
- Cooperatively implement the Proposed Action with Reclamation as identified in the Settlement.
- Secure federal funding, pursuant to Public Law 111-11, to finance the construction, operation, and maintenance of the Proposed Action.



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### Agency Coordination:

- Design process has included on going coordination with Reclamation, NMFS, USFWS, and CDFG
- Working closely with SJRRP Fish Management Work Group (FMWG)
- Design developed with detailed input and review from the FMWG Engineering Sub Group including Jeremy Lorberau/Reclamation, Steve Thomas/NMFS, and George Heise/CDFG



### Restoration Hydrograph – Tabular Format

TABLE 2-2  
San Joaquin River Restoration Flow Release Schedule<sup>a</sup> (Reach 4)  
Arroyo Canal Fish Screen and Sack Dam Fish Passage Project

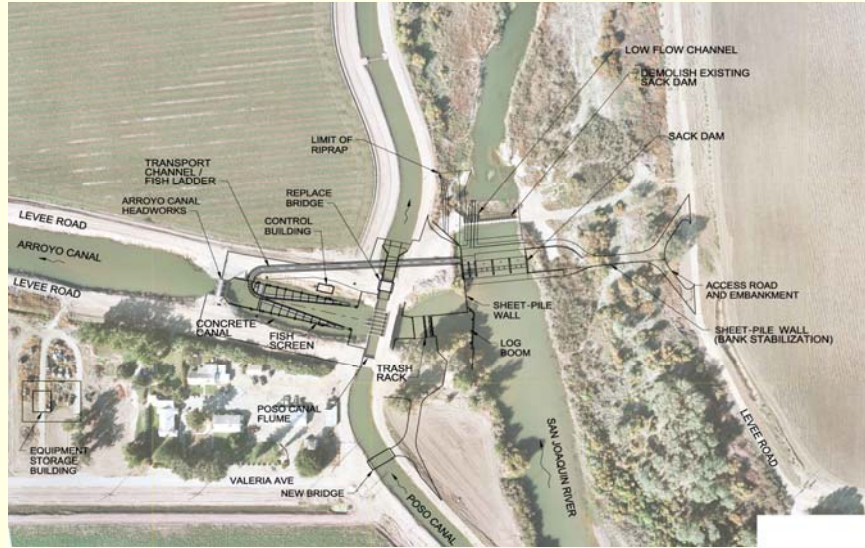
Month	Water Year Type <sup>b</sup>					
	Critical Low	Critical High	Dry	Normal Dry	Normal Wet	Wet
Oct.	0	0	115	115	115	115
Nov.1 -10	0	175	475	475	475	475
Nov. 11 - 30	0	0	155	155	155	155
Dec.	0	0	155	155	155	155
January	0	0	175	175	175	175
February	0	0	175	175	175	175
Mar. 1-15	0	285	285	285	285	285
Mar. 16-31	0	1,225	1,225	1,225	1,225	1,225
Apr. 1-15	0	0	125	2,180	2,180	2,180
Apr. 16-30	0	0	125	125	3,655	3,655
May	0	0	85	85	85	1,650
June	0	0	85	85	85	1,650
July	0	0	45	45	45	45
August	0	0	45	45	45	45
September	0	0	65	65	65	65

<sup>a</sup> Flow values are in cfs.

<sup>b</sup> Restoration flow release schedule as documented in Exhibit B of the Settlement.



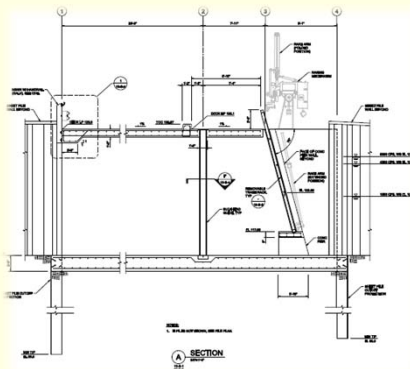
### Overall Site Plan



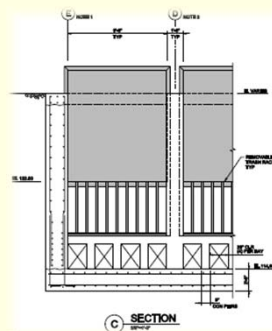
15

### Trash Rack Structure

#### Section thru Structure



#### Trash Rack Bar Configuration



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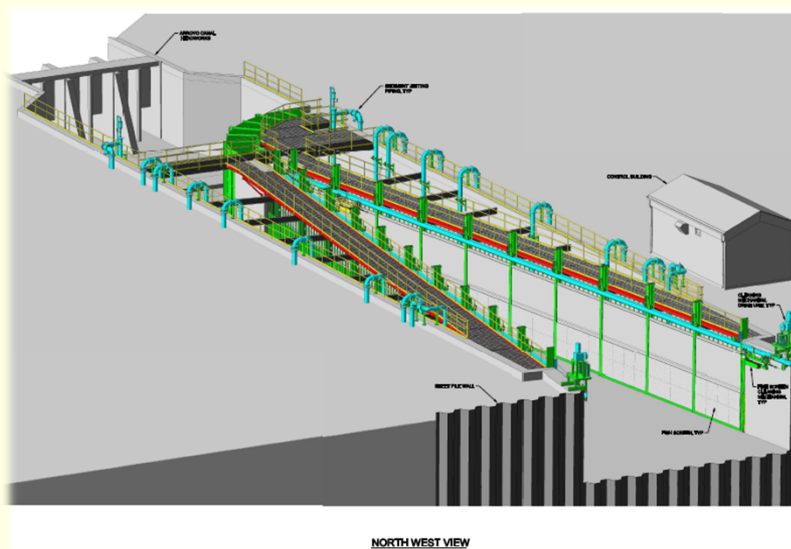
### Fish Screen:

- 700 cfs fish screen in a vee-configuration
- One 8' x 15' stainless steel profile bar fish screen with one solid panel above in each bay
- Two fish screen cleaning mechanisms
- Sediment jetting system for each bay



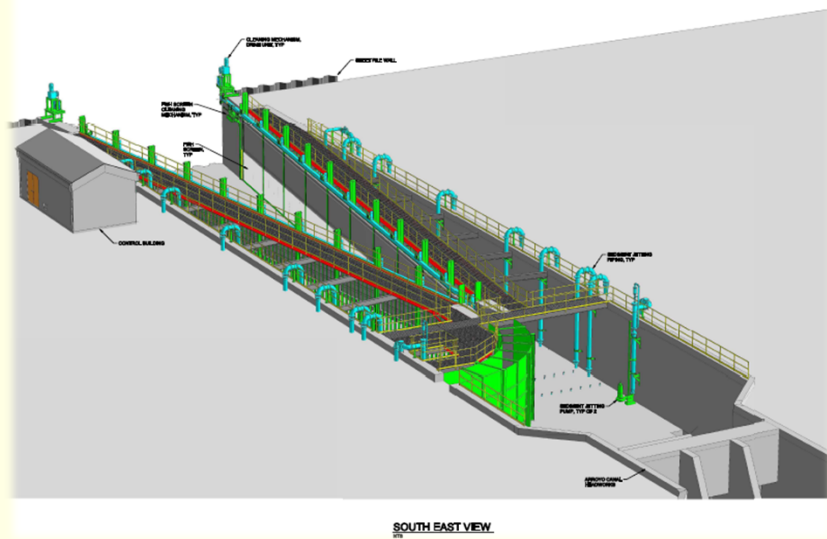
17

### Fish Screen Rendering

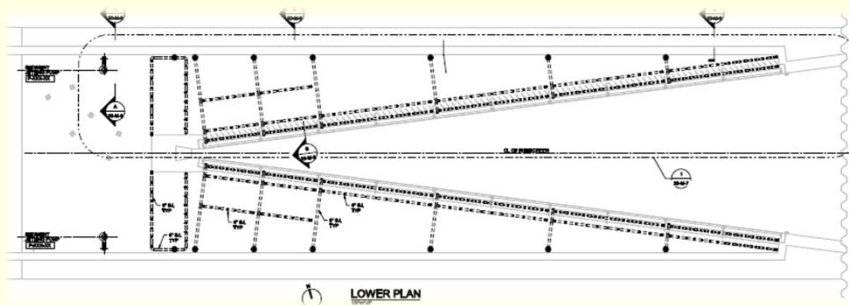


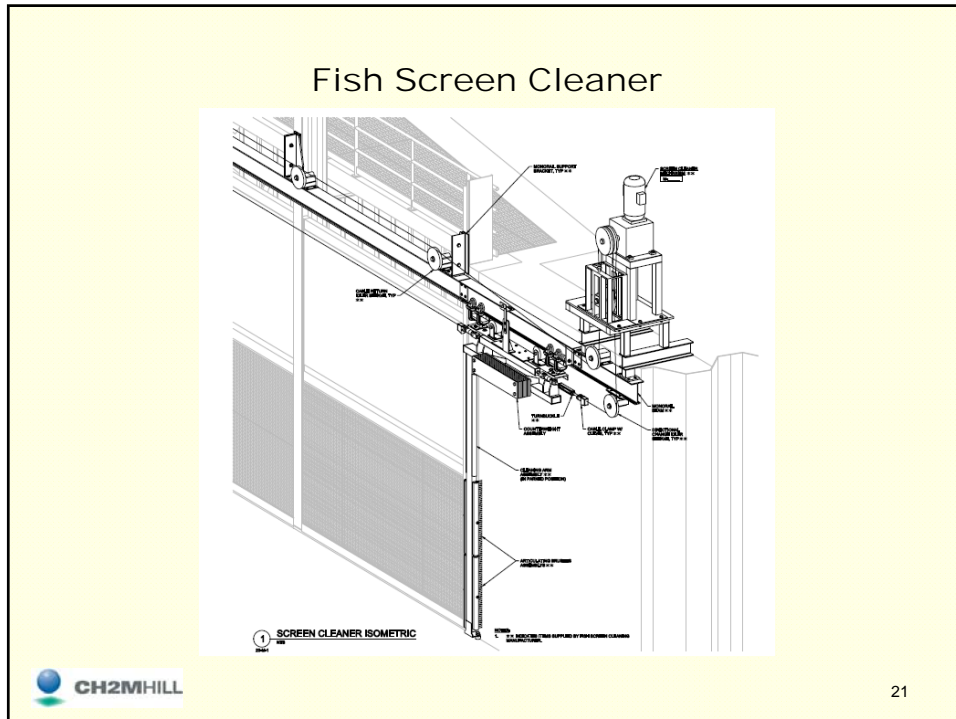
18

### Fish Screen Rendering



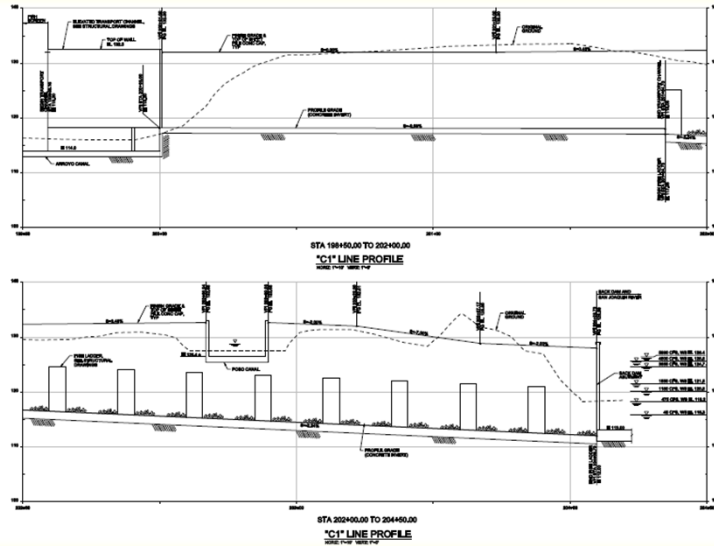
### Fish Screen Sediment Jetting System



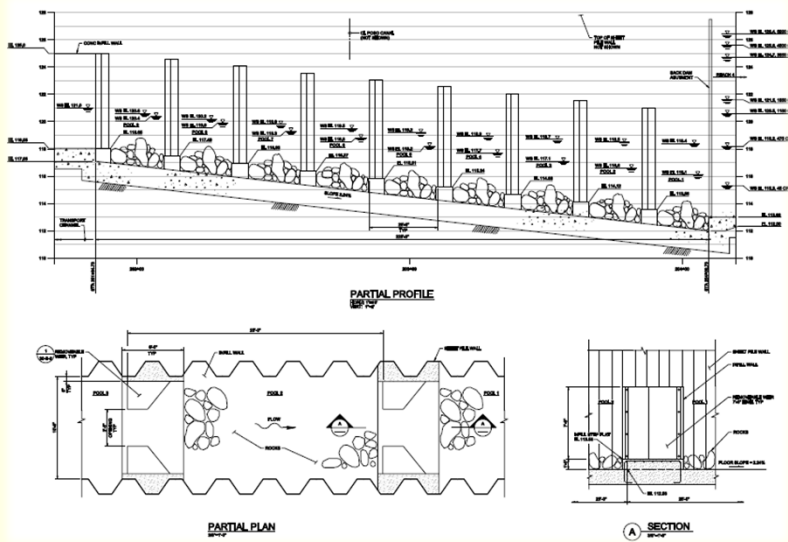


- ### Fish Ladder:
- Basis of Design (source): *Through-Delta Facility White Sturgeon Passage Ladder Study (DWR 2007)*
  - Bed Slope
    - DWR study recommended 4 percent bed slope (flattest slope constructed during experiment).
    - Project resource agencies requested bed slope of 2 percent.
    - Substrate roughness is included in design as requested by project resource agencies and suggested as a possible improvement to sturgeon passage success in DWR study.
  - Pool Length
    - DWR study recommended 12 ft to 16 ft pool length.
    - Resource agencies requested 25 ft pool length.
  - Baffles
    - Trapezoidal baffle design, similar to DWR study.
- 22

### Transport Channel/Fish Ladder Profile



### Fish Ladder Profile



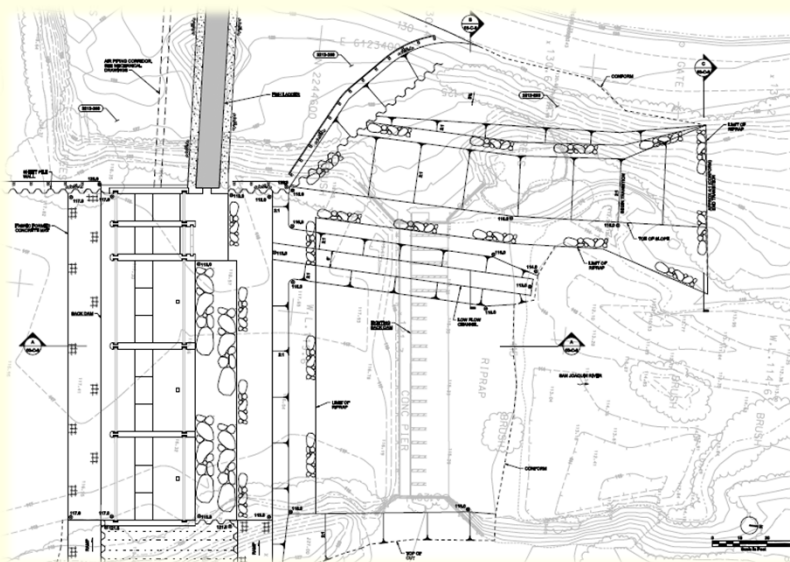
### Sack Dam:

- Bay 1 – Provides a dual function:
  - “Shadows” the fish ladder entrance at Reach 4 flows less than 475 cfs (gate is fully raised).
  - Accommodates sluicing in front of fish ladder entrance and pass flood flows.
- Bay 2 – Provides an alternative to passage across Sack Dam. Also utilized to pass flood flows.
  - Bay 2 functions at Reach 4 flows between 475 cfs and 1,160 cfs:
    - 475 cfs
      - Differential of 3.3 ft and slot velocity of ~ 11 fps
    - 1,160 cfs
      - Differential of 1.0 ft and slot velocity of ~ 6 fps
- Bay 3 through 5 – Remainder of bays needed for complete Sack Dam (“zero rise” goal at 4,500 cfs)



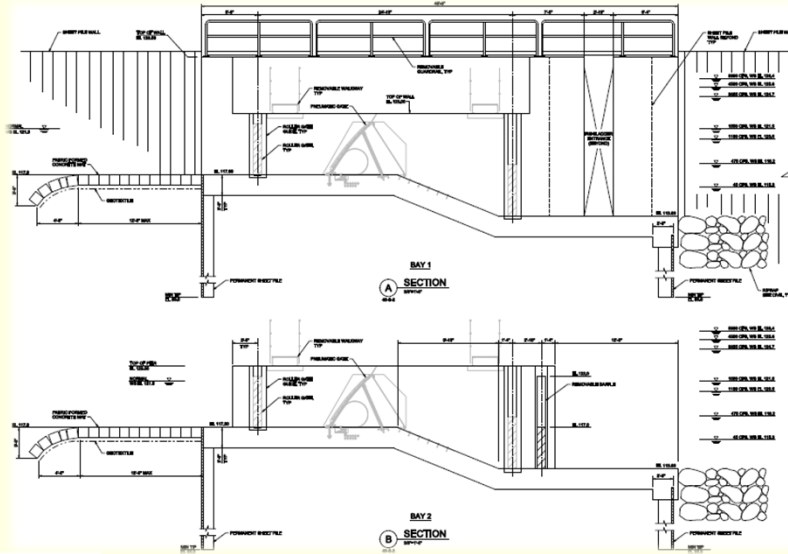
25

### Sack Dam Partial Plan

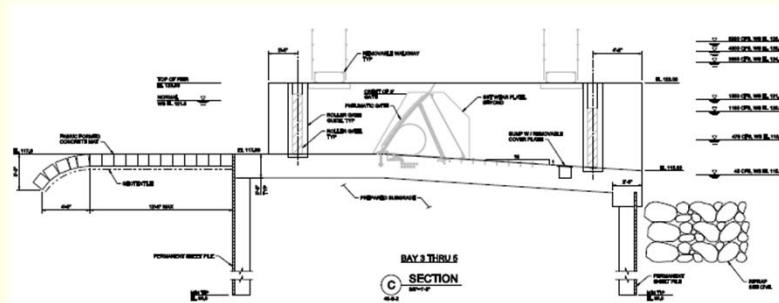


26

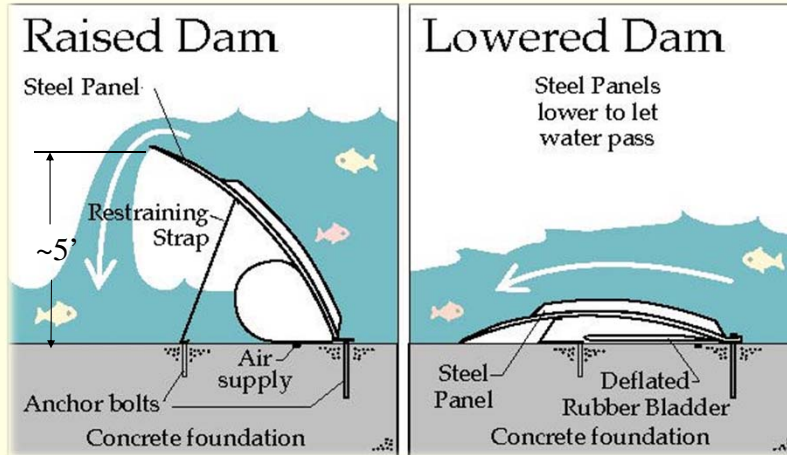
### Sack Dam Sections



### Sack Dam Sections (cont.)



### Crest Control Gate



### Representative Photographs



### Schedule:

- **Environmental Documentation:**

*Evaluating impacts/benefits and necessary mitigation for the proposed fish passage improvement project*

- Project Defined – November 2011
- Project Description & Alternatives TM completed in January 2012
- Public Draft EA/IS – June 2012
- Final EA/IS – October 2012
- Permitting effort underway



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### Schedule (cont.):

- **Engineering and Construction:**

- Engineering Design milestones :
  - 30-Percent Design: *complete*
  - 60-Percent Design: *complete*
  - 90-Percent Design: *July 2012*
  - 100-Percent Design: *September 2012*
- Issue Request for Bids: *October 2012*
- Award Construction Contract: *December 2012*
- Construction Start: *January 2013*
- Construction Complete “Project Online”: *October 2014*



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### Questions/Discussion



### Partial Plan

