Low-flow Intake Technical Analysis

Zaffar Eusuff
E-mail: meusuff@water.ca.gov
Ph: (916) 651 9239
Bay-Delta Office
California Department of Water Resources

August 13, 2009

Background

- Low-flow Screen as A “Delta Near-term Action” Item
  - Governor’s list of Interim Delta Actions dated July, 2007
  - California Urban Water Agencies position paper dated July, 2008

- DWR Low-flow Intake (LFI) Initiative
  - Preliminary investigation
  - Low-flow: 2,000 cfs capacity
  - Consultants: CH2M HILL and MWH Americas
  - Study kicked off in November, 2008 and completed in June, 2009
  - Budget: $105,000
  - Product: Administrative Draft *“Low-flow Intake Technical Analysis”*

Administrative Draft

Low-flow Intake Technical Analysis

Prepared for

California Department of Water Resources,
Bay-Delta Office, Fishery Improvements Section

1416 9th Street
Room 252-31A
Sacramento, CA 95814

June 2009

CH2MHILL
2485 Natomas Park Drive
Suite 600
Sacramento, CA 95833

Scope of LFI Technical Analysis

- Review of previous efforts/initiatives/concepts of screening CCF: About 60 items of different types
- Overview of available existing technical information
  - Geotechnical, Bathymetric, Hydrodynamic, Water Quality, and CCF configuration
- Summary of biological factors that may affect the design and operation of a screened intake
  - Fish temporal distribution, life history, and predation information

Scope of LFI Technical Analysis (contd)

- Development of Low-flow Intake (LFI) alternatives
- Conceptual-level construction cost estimates for the alternatives: Comparison purpose ONLY
- Identification of additional data needs necessary for further investigation of the alternatives in greater detail

LFI Alternatives – Development

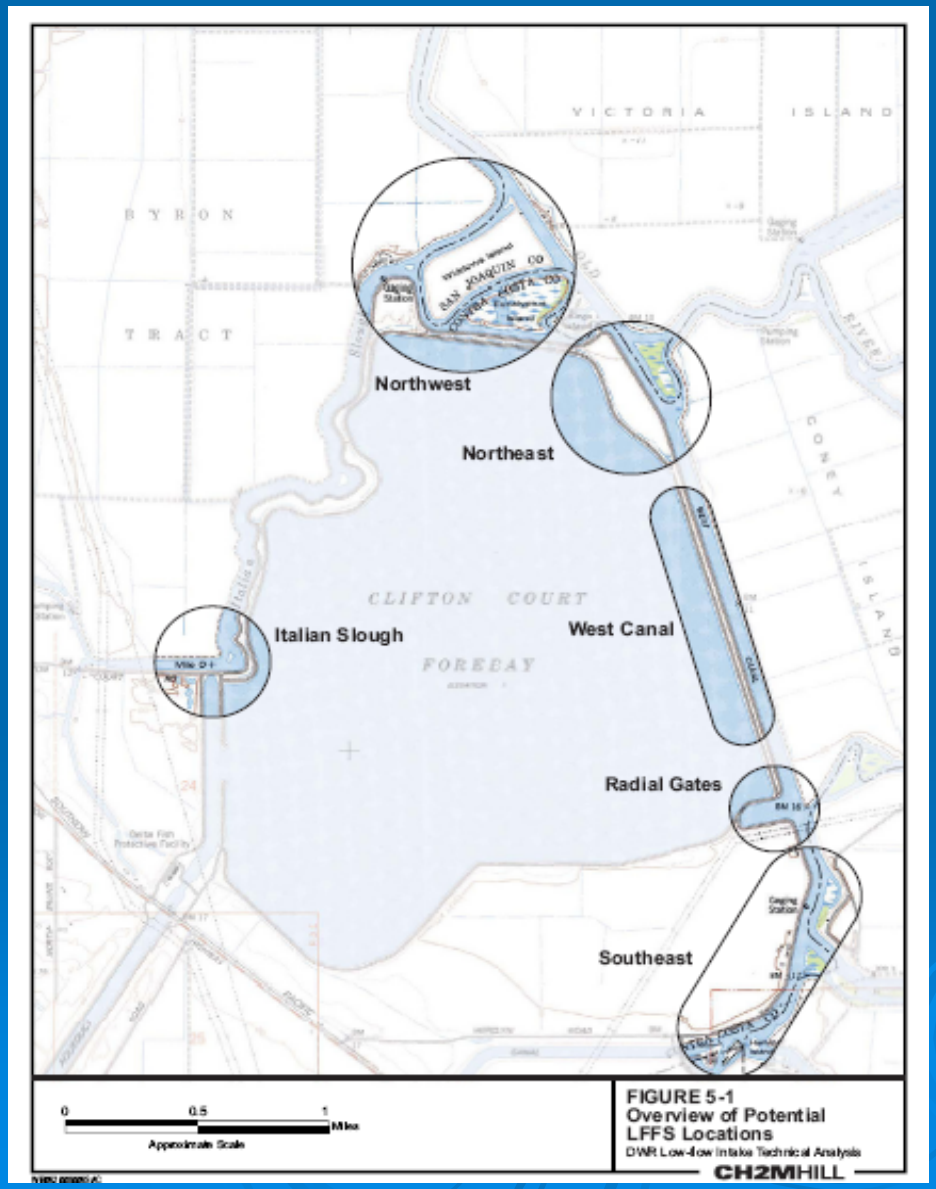
- Selection of diversion capacity – 2,000 cfs
  - Provides reliability in terms of pumping units at Banks
  - Based on South Delta Program's hydraulic analysis

- General Principles
  - Use best available information – Biological, Geotechnical, Bathymetric, Hydrodynamic, Water Quality, and CCF configuration
  - Provide a physical fish screen barrier in front of the LFI
  - Comply with fish screen design criteria for delta smelt
  - Use the most biologically protective fish screen concepts
    - Avoid the need to collect, handle, and transport fish
    - Avoid areas where potential predation may occur

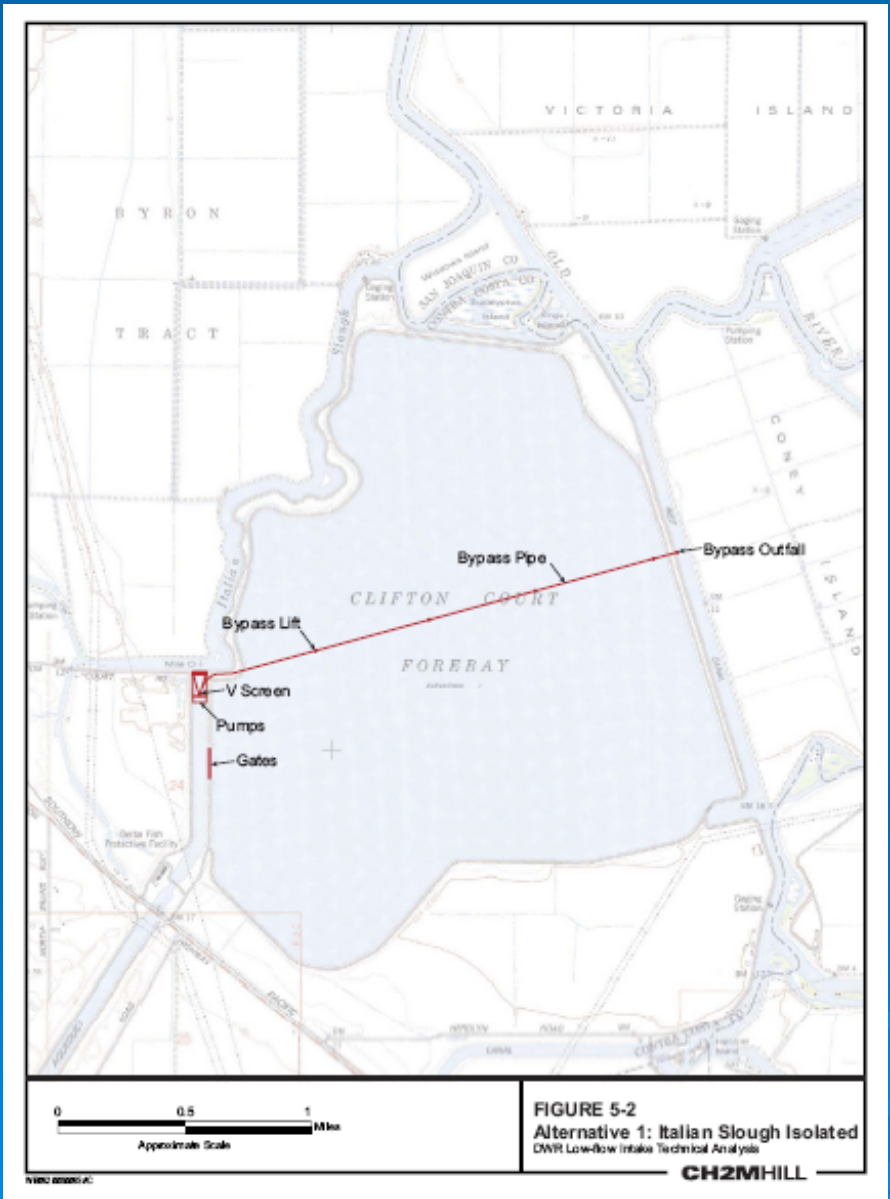
LFI Alternatives – Development (contd.)

- Key factors
  - Operating period: April - June
  - Site location: Desirable hydraulic characteristics, minimize bypass distance
  - Screen technology: Flat panel, V screen, Cone screen
  - Conveyance option: Through CCF, isolating CCF

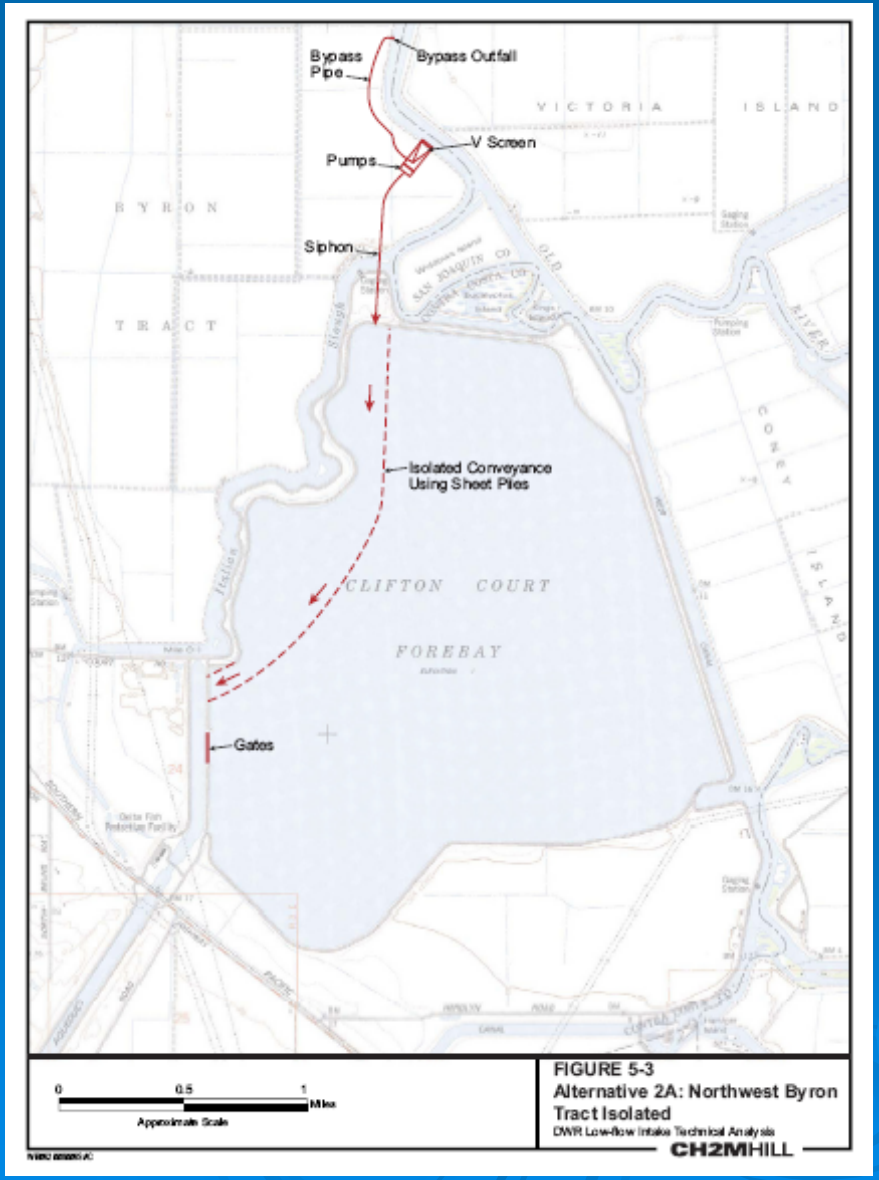
LFI Alternatives – Potential Locations



LFI Alternative 1 – Italian Slough (Isolated)



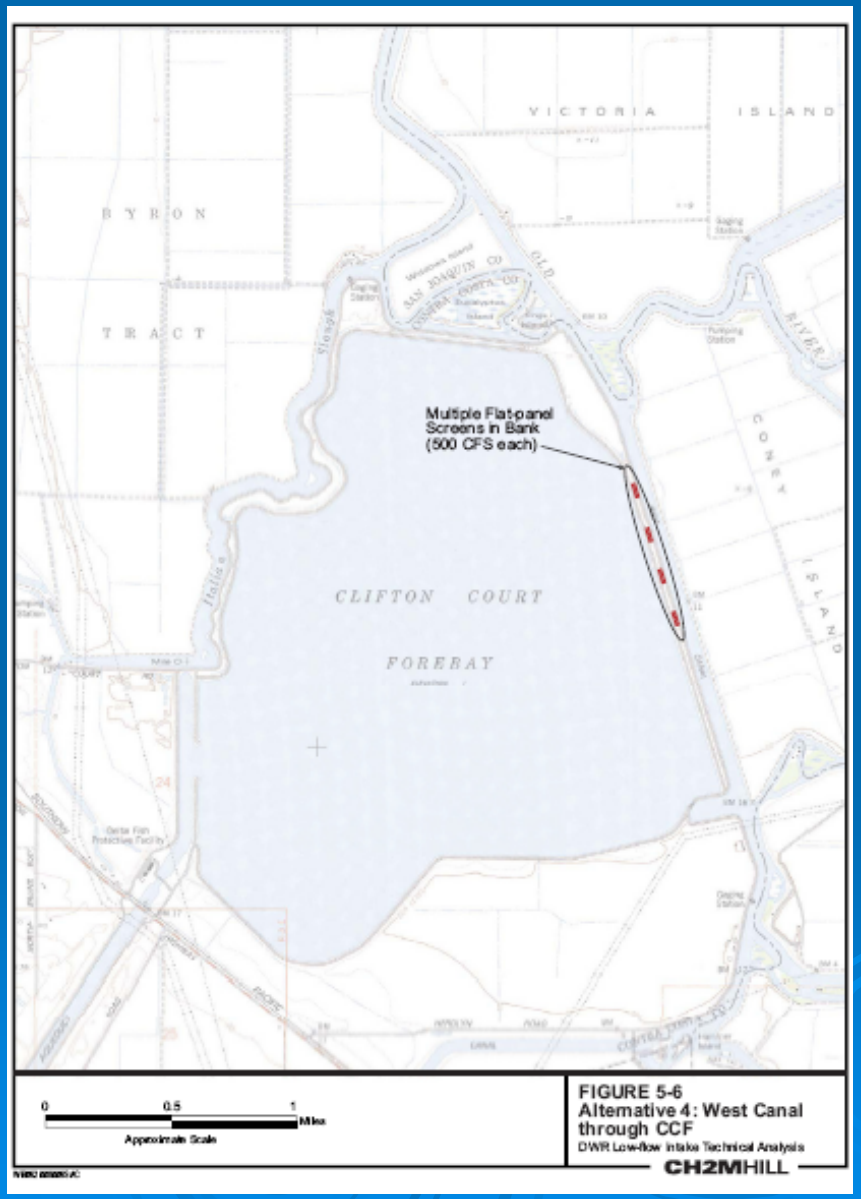
LFI Alternative 2A – NW Byron Tract (Isolated)



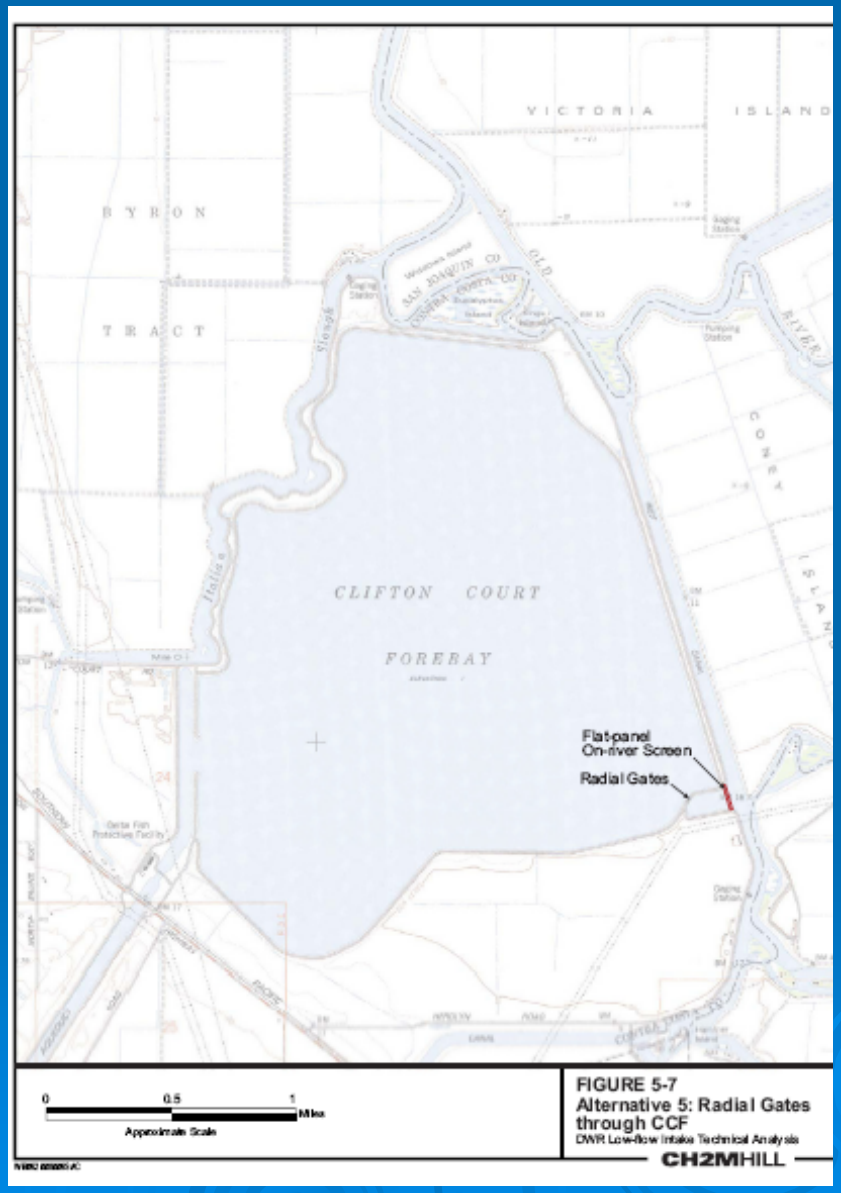
LFI Alternative 2B – NW Widdows Island (Isolated)

LFI Alternative 3 – NE Through CCF

LFI Alternative 4 – West Canal Through CCF



LFI Alternative 5 – Radial Gates Through CCF



LFI Alternative 6 – SE of CCF (Isolated)

Conceptual Cost Estimate

- Comparative purpose ONLY
- Cost Elements and Basis:

Element	Basis (Project)	Unit cost (in 2009 $)
V screen w/ pumped bypass	Banta Carbona	$45,000/cfs
Flat screen	CCWD Old River Intake	$50,000/cfs
Pump station	CCWD Old River Intake	$56,000/cfs
Box siphon	Red Bluff (proposed)	$27,000/ft
Sheet pile	Red Bluff (proposed)	$5,000/ft
Gate	SDIP-Grant Line Canal (proposed)	$5,000/sft

Comparative Cost Summary

Alternative	Cost ($ Million)[a]			
	Screens	Pump Station	Conveyance/Gates	Total
Alternative 1: Italian Slough Isolated	$100	$112	$10	$222
Alternative 2A: Northwest Byron Tract Isolated	$90	$112	$136	$338
Alternative 2B: Northwest Widdows Island Isolated	$100	$112	$126	$338
Alternative 3: Northeast through CCF	$90	$112	$0	$202
Alternative 4: West Canal through CCF	$100	$112	$0	$212
Alternative 5: Radial Gates through CCF[b]	$75	$0	$0	$75
Alternative 6: Southeast Isolated	$100	$112	$117	$329

[a] February 2009 dollars

[b] Based on 1,500-cfs screened capacity

Next Steps

- Share this Technical Analysis with other interested stakeholders
- Undertake a Feasibility study following approval by DWR Management and State Water Contractors

Questions?