

Constructed Recharge Facilities on the Santa Cruz River

Constructed Effluent Recharge Opportunities in
Conjunction with Proposed Flood Control Structures
North of Cortaro Bridge and South of Avra Valley Road

September, 2008

PURPOSE

- Describe RFCD Evaluation-Low Flow Stabilization Study
- Describe Recharge Evaluation Associated with Study
- Discuss Permitting
- Describe Estimated Benefits and Costs
- Evaluate and Resolve Issues

Study Area

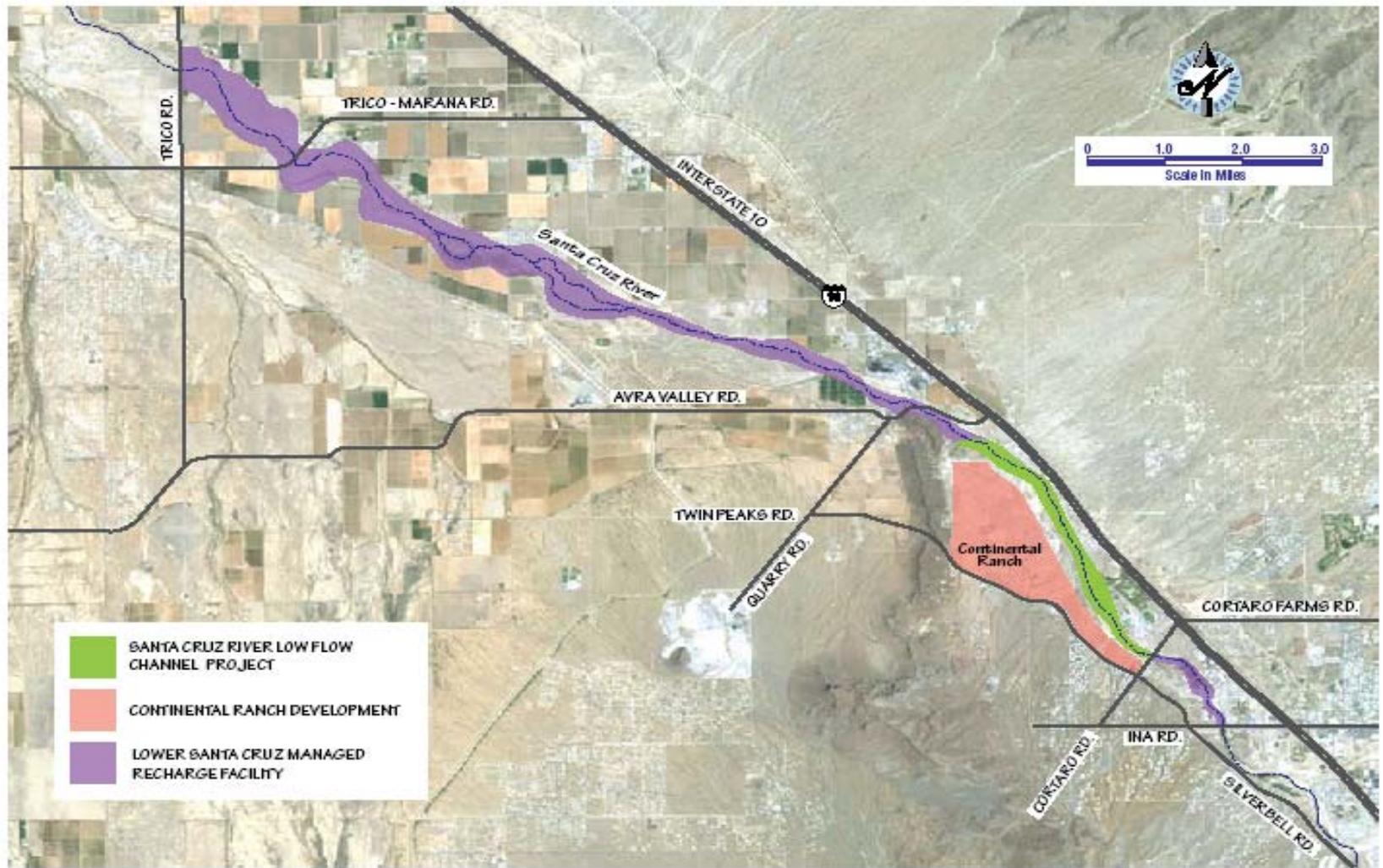


Figure 4-1

Lower Santa Cruz Managed Recharge Facility in relation to Santa Cruz River Realignment Project

LSCMRF



RFCD Low-Flow Evaluation

- Compound channel bank protection system was constructed within the Santa Cruz River in 1986 as part of Continental Ranch, in accordance with the conditions of a USACE Section 404 permit.
- Low-flow channel 400 feet wide with soil cement bank protection on either side. Daily effluent flow from WWTF and stormwater runoff up to 10-year flow events are contained
- Perennial effluent has degraded channels within the low-flow channel along significant reaches of both soil cement banks beneath toe of banks in many areas

Collapsed Low-Flow Bank Protection



Effluent Undermining Soil Bank Protection



Alternatives Evaluation

- Alternative 1: Stabilization of Bank Collapse Areas – No Repair - \$11M
- Alternative 2: Soft Structural Bank Stabilization Cost: \$11M
- Alternative 3: Soft Structural Bank Stabilization with Centralized Channel- \$11M
- Alternative 4: Soft Structural Bank Stabilization with Grade Control Structures -\$14M
- Alternative 5: Full Structural Bank Stabilization with Grade Control Structures -\$18.5M

Preferred Alternatives

- Combination of Alternatives #3 and #4- Soft Structural Stabilization with Grade Control Structures and Sinuous Central Channel
- Minimize degradation of the low flow channel bed
- Increase in effluent recharge with variety of constructed recharge techniques upstream of and between four grade control structures.
- Centralized channel keeps erosive effluent channel away from low flow soil cement bank protection.
- Routine maintenance of effluent channel enhances effluent recharge by limiting the build-up of organic layer on channel bed.

Conceptual Designs- Weirs at Grade Control Structures

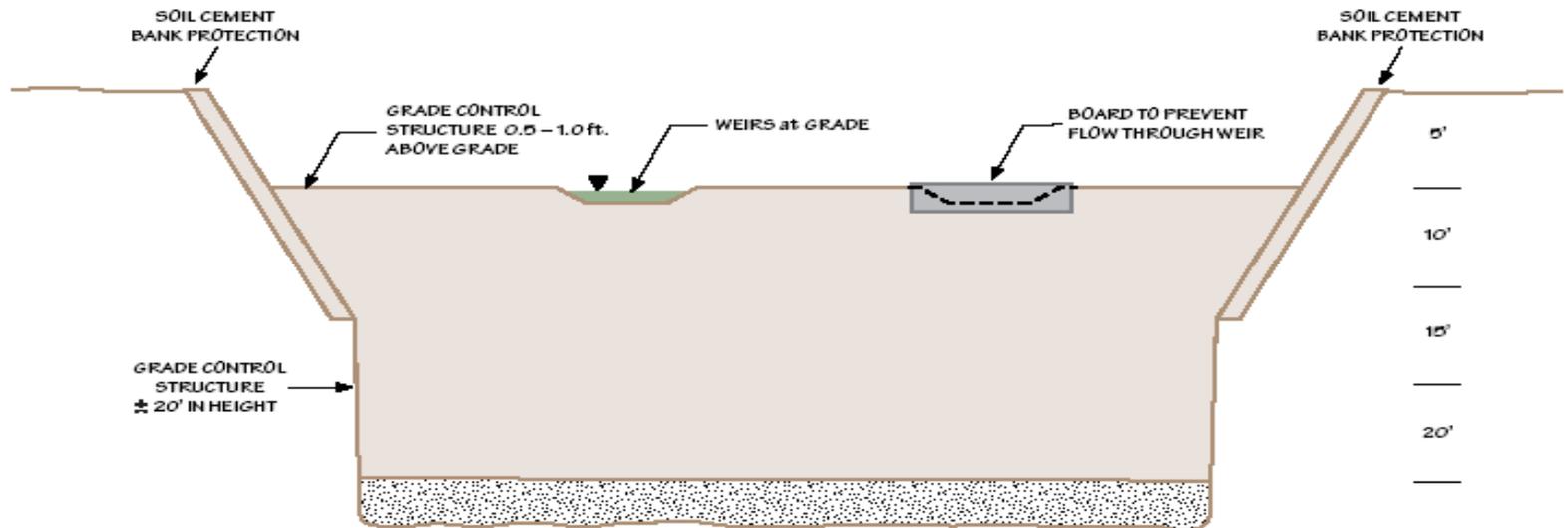


Figure 4-5
CROSS SECTION of WEIRS at GRADE CONTROL STRUCTURE
Santa Cruz River Low Flow Channel – Continental Ranch Area

Elevated with Weirs Grade Control

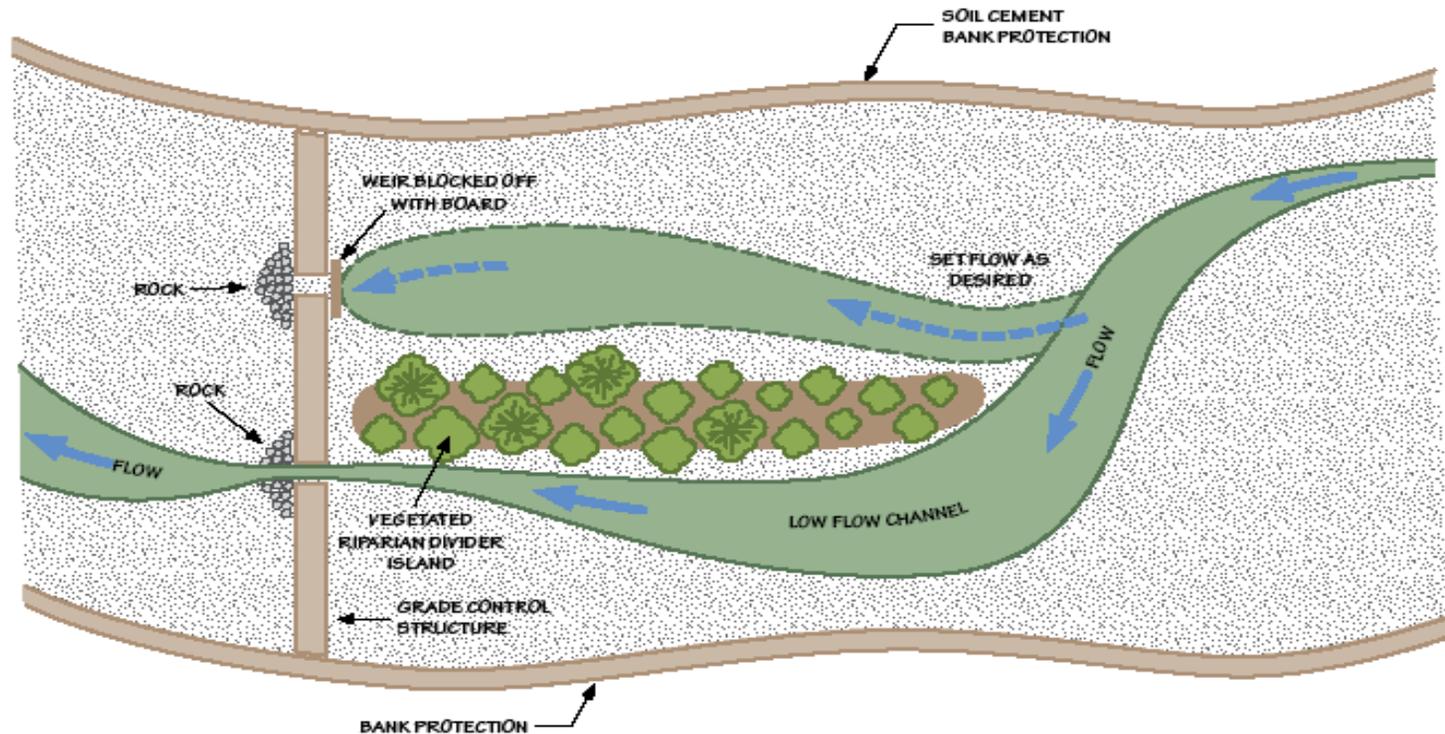


Figure 4-6
PLAN VIEW of WEIRS at GRADE CONTROL STRUCTURE
Santa Cruz River – Continental Ranch Area

Parallel Basins at Grade Control

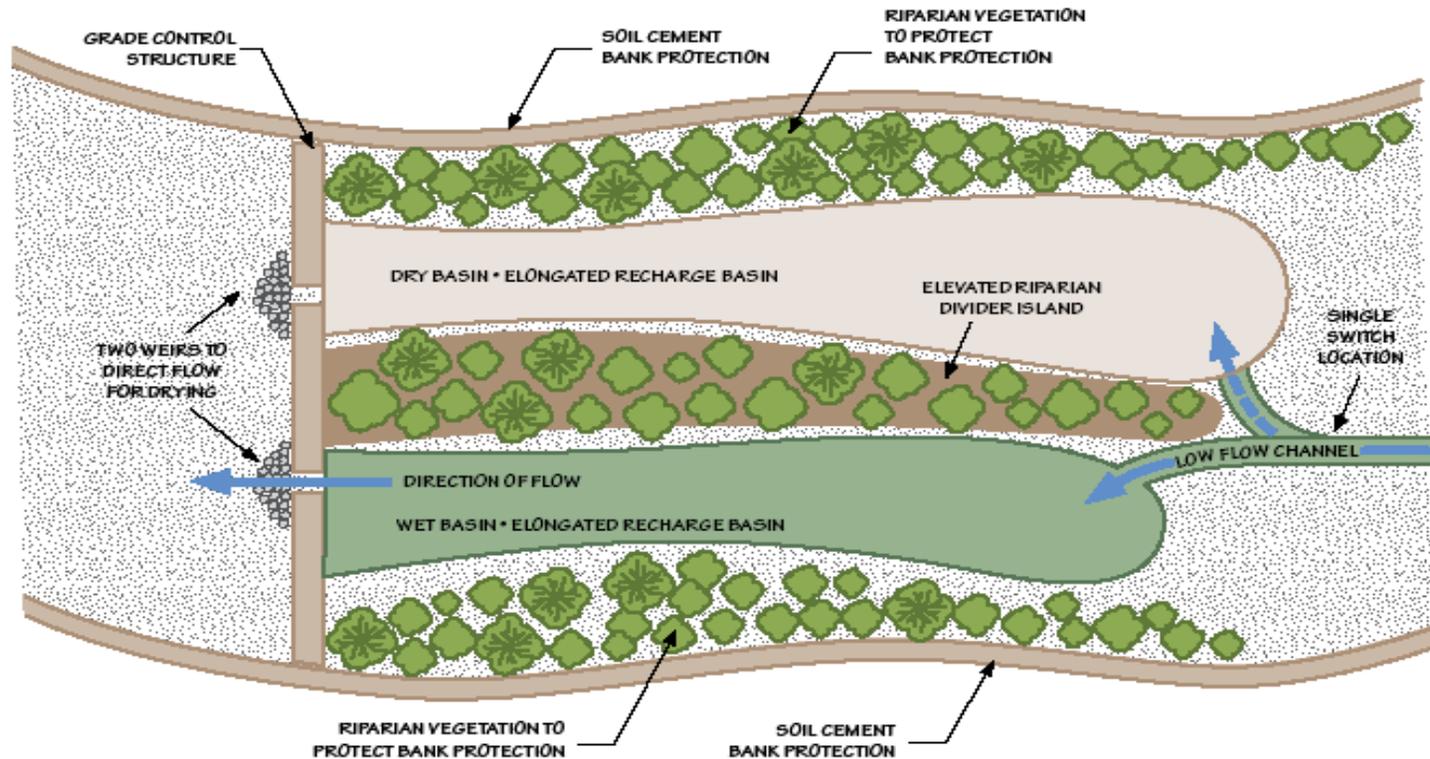


Figure 4-7
PARALLEL BASINS at GRADE CONTROL STRUCTURE
Santa Cruz River – Continental Ranch Area

T-Levees Upstream of Grade Control

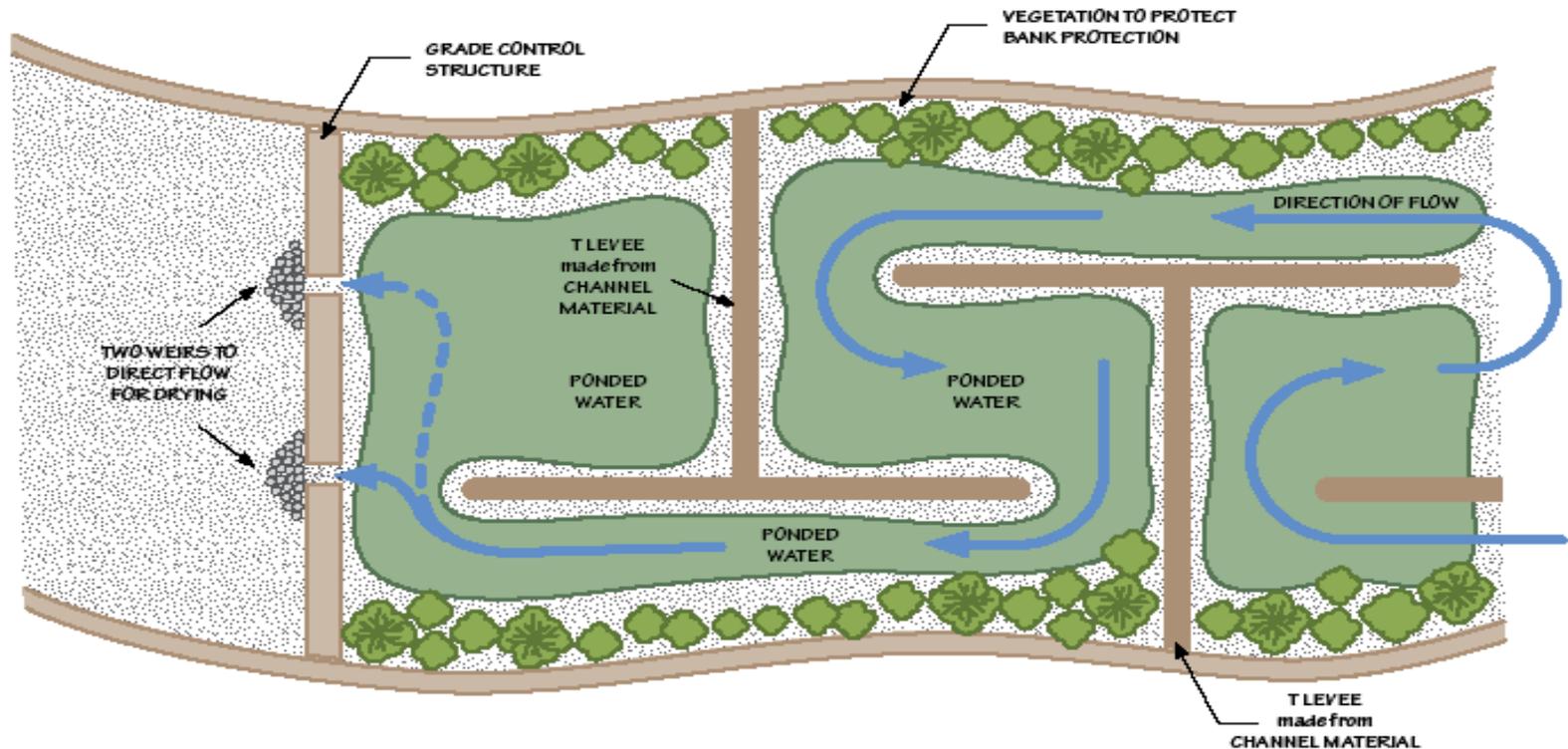


Figure 4-8
T-LEVEE SYSTEM TIED INTO BANK PROTECTION and GRADE CONTROL STRUCTURE
Santa Cruz River – Continental Ranch Area

Inflatable Dam on Grade Control Structure

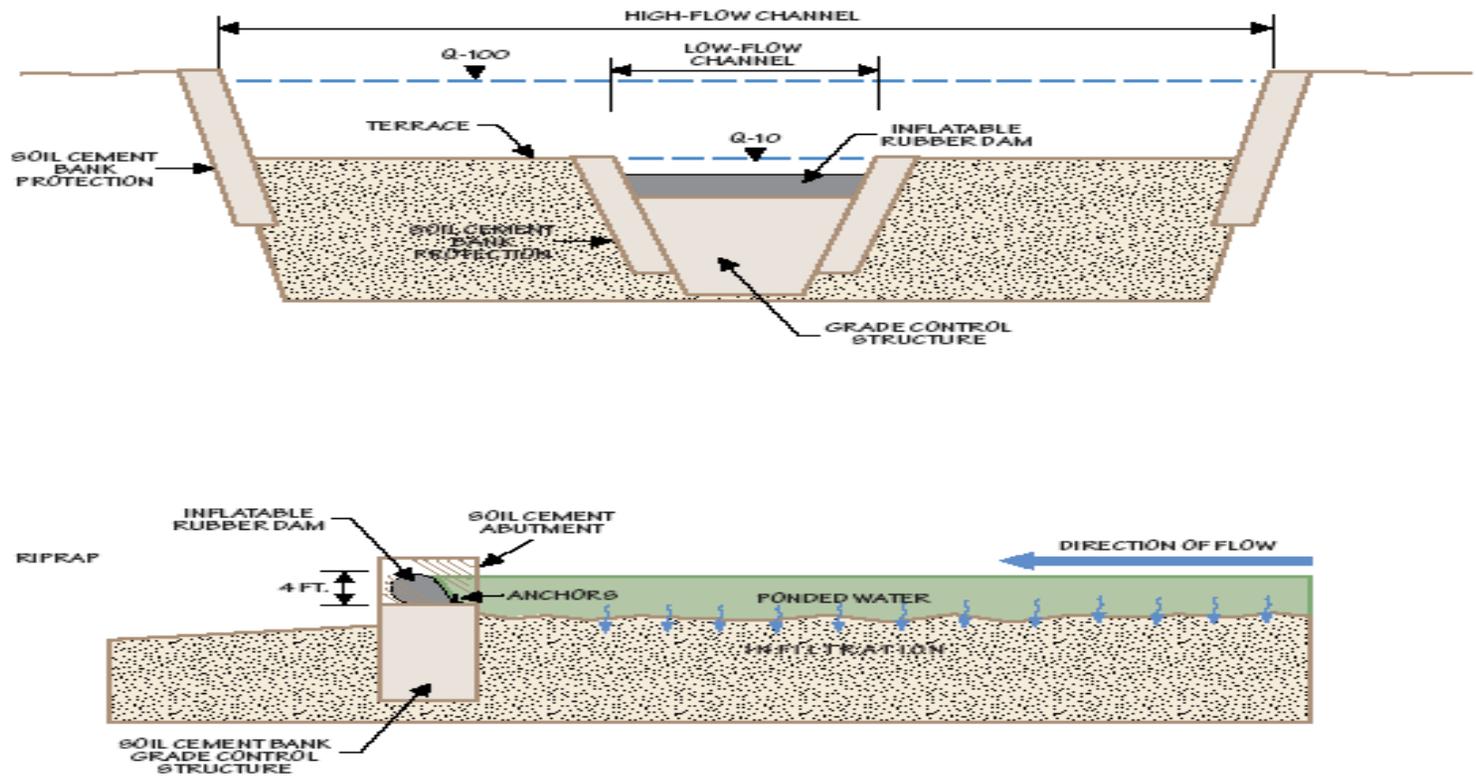


Figure 4-10
INFLATABLE RUBBER DAM on GRADE CONTROL STRUCTURE
Santa Cruz River – Continental Ranch Area

Permitting

- COE 404-Probably an Individual with NWP 31
- USF Constructed Recharge Facility Permit
- APP- Modification of existing?
- Storage permits for stakeholders
- Floodplain Use Permit
- NEPA-USBR or COE funding

Estimated Benefits

- Increase recharge along 3.6 mile reach from 3940 AF/yr (1,970 AF/yr credits) to estimated 10,000-11,000 AF/yr recharge and credits.
- Multi-purpose project combining flood control, recharge and riparian enhancement
- Estimated value of additional credits varies but at \$80-250/AF could range from \$640K/yr to \$2M/yr
- Lost credits reduced by 8,000-9,000 AF/yr
- Recovery available by CMID wells within area
- Ownership of Floodway mostly RFCDD

Estimated Flood Control Related Conceptual Costs for Preferred Alternative

- Excavation- \$3.5M
- Grade Controls- \$3M
- Seeding and Irrigation- \$0.95M
- Rip-Rap for Tributaries- \$0.76M
- Mobilization- \$0.35M
- Contingency-\$1M
- Design- \$1.3M
- Inflation(5yr)- \$2.7M

Estimated Recharge Associated Costs

- **Capital Costs – Basins or T-Levees**
 - Basins or T-levees US grade controls (15) : \$450,000
 - New gaging station at AV Road- \$30,000
- **Capital Costs- Inflatable Dam \$2.3M**
- **O&M Costs**
 - Basins/T-levee scraping cleanings \$45,000-75,000/yr
 - Gaging station- \$15,000/yr

Issues Resolution

■ Permitting

- APP – Possible new permit
- Time frames for 404 and Facility at least one year
- NEPA

■ Twin Peaks Bridge

■ Sources of Funding

- RFCD Tax Levy
- U.S. Army Corps of Engineers- TRDN-35/65% cost share for flood control/riparian
- Future bond project
- Town of Marana
- Regional Transportation Authority
- Natural Resources Conservation Service
- U.S. Bureau of Reclamation and other effluent stakeholders

THE END

