Cachuma Operation and Maintenance Board
2008 – 2010 Operations and Maintenance Reliability Program

Project Component No. 1
SCC Second Barrel Pipeline, Upper Reach

Project Description

The Cachuma Project provides approximately 80% of the potable water delivered by Goleta Water District, City of Santa Barbara, Montecito, Summerland, and Carpinteria. No redundant supply or pipeline exists to convey Cachuma Project water or SWP water to the South Coast if the Goleta Reach of the South Coast Conduit is out of service, due to scheduled and/or unexpected repairs.

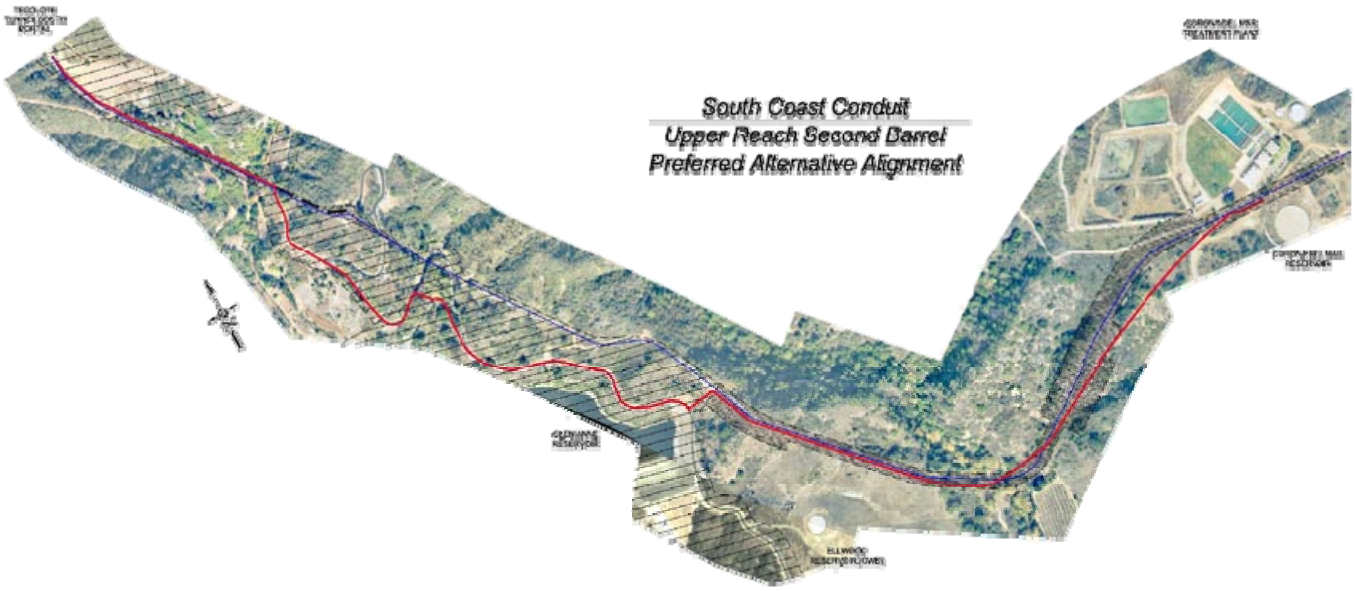
The purpose of the project is to increase the operational flexibility, reliability, and capacity of the South Coast Conduit (SCC) between the South Portal of the Tecolote Tunnel (SPTT) and the Corona Del Mar Water Treatment Plan (CDMWTP). The increase in operational flexibility, reliability, and capacity are intended to accommodate peak demand levels and to allow maintenance of the pipeline. The limitations and age of the original equipment, significant system modifications, and increased demands constrain the ability of the SCC to function at the system's original design capacity. Because of these limitations, COMB is forced to rely on water stored in Lauro, Ortega, and Carpinteria reservoirs to meet regional water needs. Because the Upper Reach of the SCC has the largest demand deficit and is located upstream from the sources of demand, the proposed improvements will allow more water flow farther along the pipeline to improve the level of service and reliability.

Project Schedule

Completion of Environmental Studies: 2008
Engineering and Construction: 2008-2010

Project Budget

Planning (partially completed):	$100,000
Engineering:	$700,000
Construction:	$6,000,000
Right-of-Way:	$350,000
Environmental Mitigation:	$125,000
Construction Admin & Observation:	$740,000
Contingency (15%):	$1,150,000
Total Budget:	$9,165,000

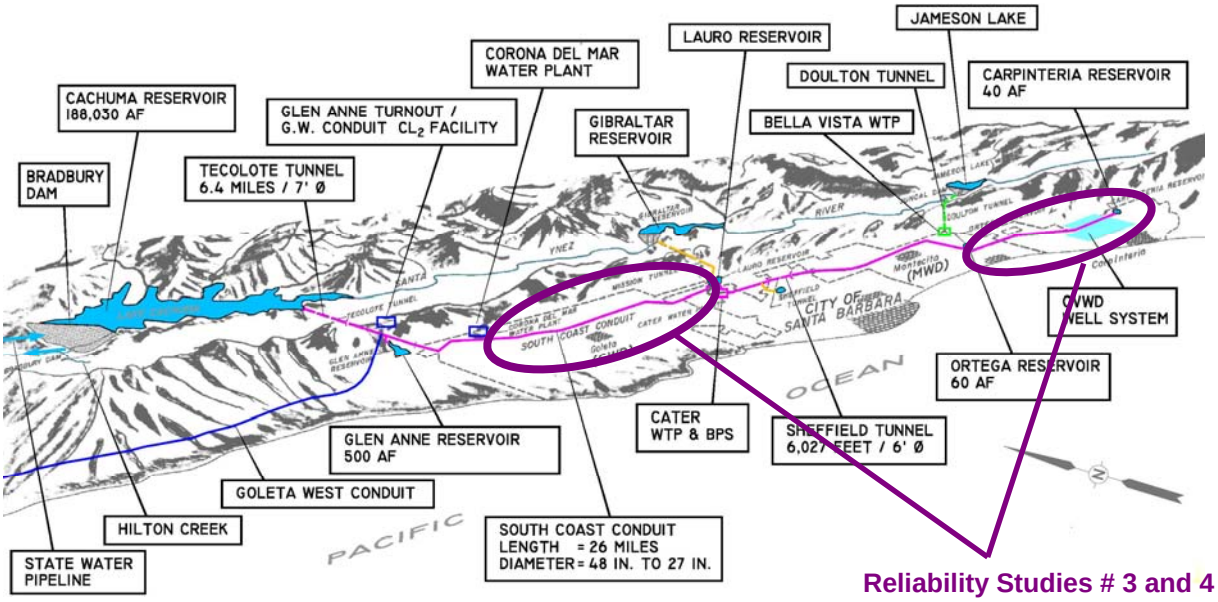


Cachuma Operation and Maintenance Board
2008 – 2010 Operations and Maintenance Reliability Program

Project Component No. 2
SCC Reliability Studies Reaches 3 and 4

Project Description

The Cachuma Operation and Maintenance Board (COMB) operates the South Coast Conduit (SCC) from the north portal of Lake Cachuma to the Carpinteria Reservoir. This pipeline is the primary source of water for the Goleta Water District, City of Santa Barbara, Montecito, Summerland and Carpinteria Valley areas. No redundant pipeline exists for conveyance of water supply in the SCC when a section of the pipeline needs to be isolated for emergencies or repair. In addition, dewatering this section of the SCC is a lengthy process, greatly reducing its operational flexibility and reliability. Due to the age and the material from which it is constructed, the pipe is inherently difficult to repair or modify.



Two of four SCC Reaches have been studied and a program has been defined to make the necessary modifications/additions or improvements to those reaches of the SCC. This project component is to do similar studies for the remaining two Reaches. During this project component, field investigations will be performed on the conduit and all structures to identify reliability concern areas and to determine what actions will be necessary to improve the reliability of the SCC in these reaches. Work will include input from geotechnical and specialists in concrete construction and rehabilitation. Construction timing will be defined so that flows in the SCC can be maintained while rehabilitation work is progressing. As work progress in the definition of reliability improvements environmental review will take place to outline any mitigation measures that will be necessary to effectuate the project work.

Project Schedule	Project Budget	
Completion of Studies: 2010	Planning:	$150,000

Cachuma Operation and Maintenance Board
2008 – 2010 Operations and Maintenance Reliability Program

Project Component No. 3
Mission Creek Crossing with Fish Passage and Six Other SCC Creek Crossings

Project Description

The Cachuma Operation and Maintenance Board (COMB) operates the South Coast Conduit (SCC) from the north portal at Lake Cachuma to the Carpinteria Reservoir. As part of the Phase 2 Reliability Study for the SCC conducted in 2006[1], seven creek crossings, identified as areas of concern in the 2005 Reliability and Alternatives Study[2], were evaluated. The SCC crosses Mission Creek at approximately Station 74+00. In the 1970s, the SCC was damaged by "rock impact" during a high flow event in the Creek. The SCC underwent emergency repairs which included repairs to the exterior of the steel pipe shell (however the interior mortar lining was not accessed for repair) and a non-reinforced concrete backfill/cap. The emergency backfill/cap concrete is currently undermined on the downstream side, and the concrete acts as a grade control structure. The Mission creek crossing was identified as having continued exposure to undermining. The recommended approach was to replace the crossing (along with others) with new pipe encased in structural concrete.

In June 2007, a report[3] was prepared for the Santa Barbara County Public Works department that addressed the Mission creek at Highway 192. That report concluded that the existing concrete is a barrier to migrating salmonids, and should be removed and replaced with a riffle-pool stream bed. The proposed stream improvement cannot practically be constructed without removal and relocation (at greater depth) of the SCC across Mission Creek. COMB desires to replace the SCC at Mission creek and the proposed stream channel improvements in one project.

Six additional SCC Creek crossings require investigation and probable repairs.

Project Schedule

Completion of Environmental Studies: 2008
Engineering and Construction: 2008-2009

Project Budget

MC Planning:	$20,000
MC Engineering:	$500,00
MC Construction:	$1,375,000
MC Temporary Easements:	$50,000
MC Environmental Mitigation:	$75,000
MC Contingency	$300,000
Six SCC Crossings	$1,500,000
Total Budget:	$3,800,000

[1] Phase 2 Reliability Study for South Coast Conduit Upper Reach Tecolote Tunnel to Corona Del Mar WTP and Carpinteria Reach South Coast Conduit Booster Pump Station to Ortega Reservoir, DRAFT dated August 2006 (Cover dated September 2006), Boyle Engineering Corporation ref: VT-C32-102-05, Section 6.

[2] Reliability and Alternatives Study for the South Coast Conduit Carpinteria Reach Cater Booster Pump Station to the Ortega Reservoir, FINAL DRAFT dated April 2005, Boyle Engineering Corporation ref: VT-C32-102-03.

[3] Highway 192 at Mission Creek Fish Passage Improvement Project, June 2007, by Questa Engineering Corporation, ref: 240100.

Cachuma Operation and Maintenance Board
2008 – 2010 Operations and Maintenance Reliability Program

Project Component No. 4
SCC In-Line Valve Installations

Project Description

The Cachuma Operation and Maintenance Board (COMB) operates the South Coast Conduit (SCC) from the north portal of Lake Cachuma to the Carpinteria Reservoir. This pipeline is the primary source of water for the Goleta Water District, City of Santa Barbara, Montecito, Summerland and Carpinteria Valley areas. Prior to 2004 there was only one isolation valve along the SCC Carpinteria Reach (at approximately Sta. 598+44.) No redundant pipeline exists for conveyance of water supply when a section of the pipeline needs to be isolated for repair. In addition, dewatering this section of the SCC is a lengthy process, greatly reducing its operational flexibility and reliability. Due to the age and the material from which it is constructed, the pipe is inherently difficult to repair or modify.

Two isolation valves have been installed since 2005 by the line stopping method. Line stopping is a process where a "hot tap" is performed on the pipe and a "plug" is installed through the tap to stop the flow. Two line stops are required to isolate a pipeline section. Temporary bypass piping is also required to allow flow to continue while temporarily isolating a section of the main pipeline. This dual line stop with bypass piping is required in order to install an in-line valve while maintaining service in the SCC. It will be beneficial to install additional in-line isolation valves at four more locations currently anticipated to be located at:

384+00	Montecito Yard
495+00	Valley Club
700+00	Paredon Arroyo Valve
815+80	El Carro Park

Project Schedule

Completion of Environmental Studies: 2008
Engineering and Construction: 2008-2010

Project Budget

Planning:	$25,000
Engineering:	$350,000
Construction:	$1,800,000
Environmental Mitigation:	$50,000
Temporary Easements:	$50,000
Contingency	$325,000
Total Budget:	$2,600,000

Cachuma Operation and Maintenance Board
2008 – 2010 Operations and Maintenance Reliability Program

Project Component No. 5
Lauro Reservoir, Barker Pass and Sheffield Tunnel Vent Improvements

Project Description

The Cachuma Operation and Maintenance Board (COMB) operates the South Coast Conduit (SCC) from the north portal of Lake Cachuma to the Carpinteria Reservoir. In 2005, COMB retained Boyle Engineering Corporation (Boyle) to perform a Phase II Reliability Study for the SCC Upper Reach - Tecolote Tunnel to the Corona Del Mar Water Treatment Plant and Lower Reach – SCC Booster Pump Station to Ortega Reservoir. In that report, DRAFT dated September 2006, recommendations for the SCC between the SCC Booster Pump Station to Ortega Reservoir reach were made for design engineering tasks. Those tasks were intended to increase the flow in the SCC from 18 MGD to 24 MGD (as originally designed by the USBR).

The proposed vent structure improvements at Barker Pass (photo to the right), Sheffield Tunnel and Lauro Reservoir are intended to accommodate the refined hydraulic capacity, and surge suppression. In addition, the design modifications will address increased resistance to contamination for operation as a potable water line, and will reduce the potential for flooding damage to private property.

Project Schedule

Completion of Environmental Studies: None required (categorically exempt*)
Engineering and Construction: 2008 - 2009

Project Budget

Planning:	$10,000
Engineering:	$55,000
Construction:	$375,000
Environmental Mitigation:	$-0-
Contingency:	$60,000
Total Budget:	$500,000

*To be confirmed by COMB's environmental consultant

Cachuma Operation and Maintenance Board
2008 – 2010 Operations and Maintenance Reliability Program

Project Component No. 6
SCC Corrosion Repairs at Appurtenances

Project Description

The Cachuma Operation and Maintenance Board (COMB) operates the South Coast Conduit (SCC) from the north portal of Lake Cachuma to the Carpinteria Reservoir. The pipeline was designed by the US Bureau of Reclamation in the early 1950's. Corrosion protection for the interior of the pipeline is cement mortar, except for the outlets on the Upper Reach of the SCC, which are un-lined. Recent inspections of portions of the Upper Reach have confirmed that the un-lined outlets are badly corroded. (Lateral 11 is illustrated.) Within the Upper Reach of the SCC, there are approximately 18 un-lined laterals, 30 manholes each with an un-lined 20-inch diameter manway and an unlined outlet for an air-release and vacuum-relief valve, and 33 manholes each with un-lined blowoffs (drains) and manways.

The risk of failure of these unprotected outlets is high. Repair consisting of removal of the tuberculation (rust products), welding new pipe sleeves, and then lining each outlet with cement mortar is necessary in order to maintain the reliability of the Goleta Reach of the South Coast Conduit. Supplemental steel reinforcement or replacement of the outlet may be necessary on a case-by-case basis. This work will require the SCC to be out of service periodically until each outlet is rehabilitated.

Within the Carpinteria Reach of the SCC, there are approximately 32 manholes with air release valves, 26 manholes with blowoff assemblies and 43 turnouts. Most of the turnout valves are considered inoperable and the meters at the turnouts need maintenance.

Corrosion protection for the exterior of the SCC is cement mortar, except in the below-grade manholes and vaults, which is painted. Corrosion of the piping and equipment was evident in almost all of the below-grade manholes and vaults observed. In order to increase both the reliability and useful service life of these vital components of the South Coast Conduit, cleaning of the steel and recoating/painting is necessary. Corrective action may require piping and valve replacement in some, if not most of the locations.

Project Schedule

Completion of Environmental Studies:
None Required (categorically exempt*)

Engineering and Construction: 2008-2009

Project Budget	Phase 1 High Priority	Phase 2 Lower Priority
Planning:	$25,000	$-0-
Engineering:	$150,000	$25,000
Construction:		
Upper Reach:		
Blowoffs:	$350,000	$-0-
ARVs:	$100,000	$260,000
Laterals/Meters:	$570,000	$-0-
Lower Reach:		
Blowoffs:	$650,000	$-0-
ARVs:	$100,000	$285,000
Laterals/Meters:	$-0-	$1,250,000
Environmental Mitigation:	$-0-	$-0-
Contingency:	$130,000	$120,000
Total Budget:	$2,075,000	$1,940,000

*To be determined by COMB's environmental consultant.

Project Component No. 7
SCC Modifications to Reduce Air-Binding

Project Description

The Cachuma Operation and Maintenance Board (COMB) operates the South Coast Conduit (SCC) from the north portal of Lake Cachuma to the Carpinteria Reservoir. Air binding was identified in a letter report dated March 27, 2003 as the possible source of excessive head loss measured between the Sheffield Flow Control Station and the eastern portal of the Sheffield Tunnel. That recommendation was confirmed in a 2005 report[4]. Subsequent analysis has confirmed that the head loss is likely due to air-binding in a short down-sloping segment of pipe between the Flow Control Station and the adjacent dry creek. Near the calculated location of the air bubble is the existing blowoff with manway at Station 223+40 (photo). Addition of piping to the existing manway will include a combination air-and vacuum release valve and positive vault drainage.

Additionally, based on the hydraulic models developed for the SCC operations a surge analysis has been completed and part of the 2005[1] and 2006[5] reports. Installation of air release and vacuum valves on the SCC in the tunnel is recommended.

Project Schedule

Completion of Environmental Studies: None required (categorically exempt*)
Engineering and Construction: 2008 - 2009

Project Budget

Planning:	$-0-
Engineering:	$15,000
Construction:	$70,000
Environmental Mitigation:	$-0-
Contingency	$15,000
Total Budget:	$100,000

*To be confirmed by COMB's environmental consultant.

4 *"Phase II Reliability Study for the SCC Upper Reach - Tecolote Tunnel to the Corona Del Mar Water Treatment Plant and Lower Reach – SCC Booster Pump Station to Ortega Reservoir"*, Boyle Engineering Corporation, DRAFT dated September 2006.

5 Phase II……

Cachuma Operation and Maintenance Board
2008 – 2010 Operations and Maintenance Reliability Program

Project Component No. 8
Glen Annie Weir Modifications

Project Description

The Cachuma Operation and Maintenance Board (COMB) operates the South Coast Conduit (SCC) from the north portal of Lake Cachuma to the Carpinteria Reservoir. The Tecolote Tunnel and the South Coast Conduit (SCC) were originally designed and built by the U.S. Bureau of Reclamation (USBR) in the 1950s for conveyance of approximately 65 million gallons per day (mgd) (100 cubic feet per second [cfs]) of unfiltered surface water. Due to a combination of issues (varying from the original design assumptions, limitations and age of original equipment, significant system modifications, and increased demands), the USBR design flow rates cannot be achieved[6].

One of the limitations is the weir placed in the Glen Anne turnout to maintain adequate hydraulic head for the Goleta West Conduit. The Glen Annie Turnout structure was an original facility on the SCC. The weir in the structure was added in 1962 to serve the Goleta West Conduit. The water for the delivery points downstream of the turnout flows over a fixed concrete weir that produces considerable turbulence. That turbulence reduces the amount of water during periods of peak demand that can continue to flow downstream. Reconstruction and reconfiguration of the weir to increase its length will improve reliability, reduce undesirable head loss, and facilitate maintenance of the turnout.

Project Schedule

Completion of Environmental Studies: None required (categorically exempt*)
Engineering and Construction: 2008

Project Budget

Planning:	$-0-
Engineering:	$20,000
Construction:	$110,000
Environmental Mitigation:	$-0-
Contingency:	$20,000
Total Budget:	$150,000

*To be confirmed by COMB's environmental consultant.

[6] *Investigation and Engineering Study for South Coast Conduit Goleta and Carpinteria Sections*, Boyle Engineering Corporation, October 1999.

Cachuma Operation and Maintenance Board
2008 – 2010 Operations and Maintenance Reliability Program

Project Component No. 9
COMB Office Building Replacement

Project Description

The Cachuma Operation and Maintenance Board (COMB) operates the South Coast Conduit (SCC) from the north portal of Lake Cachuma to the Carpinteria Reservoir. COMB Operations headquarters are located on Laurel Canyon Road in Santa Barbara. The office and board meeting room building was originally designed by and built for the U.S. Bureau of Reclamation (USBR) in the 1950s.

The structure was built on expansive soils and has experienced distress to the extent that foundation repairs were necessary in 1995. Plans were prepared in 2001 for the extension of the building to allow retirement of the temporary trailers now utilized for O&M and administrative staff. Recent damage probably accelerated by earthquakes and construction costs have rendered the proposed addition (as pictured) impractical. Replacement of the building is probably more cost effective at this time.

Project Schedule

Completion of Environmental Studies: 2008
Engineering and Construction: 2008 - 2010

Project Budget

Planning:	$50,000
Engineering:	$500,000
Construction:	$2,500,000
Environmental Mitigation:	$100,000
Contingency (15%):	$475,000
Total Budget:	$3,625,000

*To be confirmed by COMB's environmental consultant.

Cachuma Operation and Maintenance Board
2008 – 2010 Operations and Maintenance Reliability Program

Project Component No. 10
Reconfiguration Control Station Piping to Reduce HL

Project Description

The Cachuma Operation and Maintenance Board (COMB) operates the South Coast Conduit (SCC) from the north portal of Lake Cachuma to the Carpinteria Reservoir. Installation of system modifications including the Glen Anne and Corona Del Mar turnouts have resulted in significantly different operation of the pipeline from original design assumptions. Engineering analyses[7] [8] [9] of the hydraulic repercussions of these modifications indicate that the system reliability can be increased, and flow downstream can be increased with modifications to the piping at Ortega, Sheffield, and Lauro flow control facilities. These modifications will include removal of redundant valves and piping, as well as installation of hydraulically efficient meters and automated control valves.

Project Schedule

Completion of Environmental Studies: None required (categorically exempt*)
Engineering and Construction: 2008 - 2009

Project Budget

Planning:	$10,000
Engineering:	$90,000
Construction:	$450,000
Environmental Mitigation:	$-0-
Contingency 15%:	$80,000
Total Budget:	$630,000

*To be confirmed by COMB's environmental consultant.

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[7] I*nvestigation and Engineering Study for South Coast Conduit, Goleta and Carpinteria Sections*, Boyle Engineering Corporation, October 1999.

[8] *Reliability and Alternatives Study for the South Coast Conduit Carpinteria Reach Cater Booster Pump Station to the Ortega Reservoir*, Boyle Engineering Corporation, FINAL DRAFT, April, 2005.

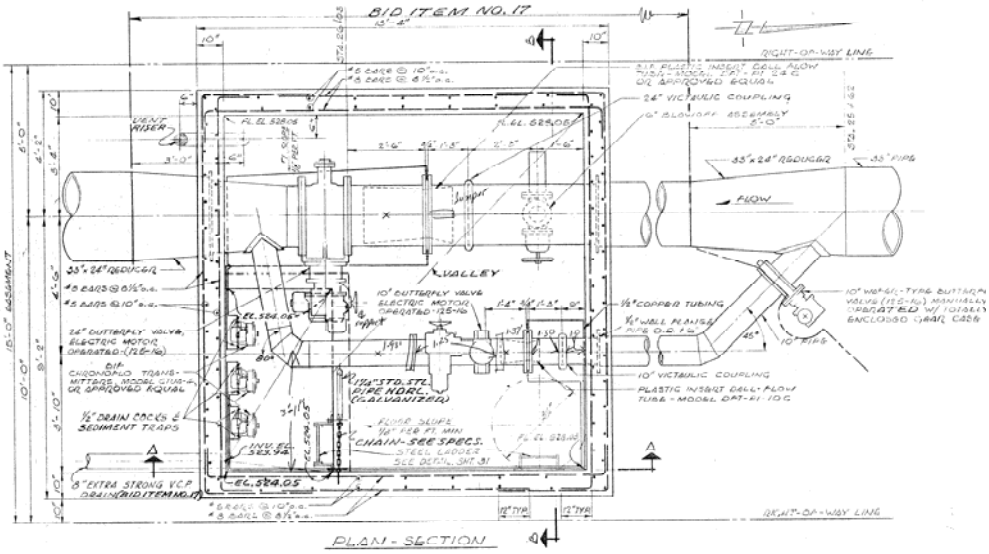
[9] *Phase 2 Reliability Study for South Coast Conduit Upper Reach Tecolote Tunnel to Corona Del Mar WTP and Carpinteria Reach South Coast Conduit Booster Pump Station to Ortega Reservoir*, Boyle Engineering Corporation, DRAFT dated September, 2006.

Cachuma Operation and Maintenance Board
2008 – 2010 Operations and Maintenance Reliability Program

Project Component No. 11
Goleta West Meter Modifications

Project Description

The Cachuma Operation and Maintenance Board (COMB) operates the South Coast Conduit (SCC) from the Lake Cachuma north portal to the Carpinteria Reservoir. The Glen Annie Turnout structure was constructed concurrent with the SCC. In 1962 a weir was constructed in the structure to serve the Goleta West Conduit. Deliveries to the Goleta West Conduit are metered utilizing a high-flow venturi meter and a low-flow venturi meter, as illustrated below.



Currently, the high-flow venturi meter is utilized to measure the flow in order to keep head loss low, but it barely reads the 3MGD average rate. A better approach is needed that also minimizes the head loss. Replacement of the two venturi meters with a single sonic-type meter will increase the system reliability, increaase the accuracy of flow measurement, and reduce head loss.

Project Schedule

Completion of Environmental Studies: None required (categorically exempt*)
Engineering and Construction: 2008-2009

Project Budget

Planning:	$-0-
Engineering:	$25,000
Construction:	$150,000
Environmental Mitigation:	$-0-
Contingency:	$25,000
Total Budget:	$200,000

*To be confirmed by COMB's environmental consultant.

Project Component No. 12
SCC Right-of-Way Definition Program

Project Description

The Cachuma Operation and Maintenance Board (COMB) operates the South Coast Conduit (SCC) from the Lake Cachuma north portal to the Carpinteria Reservoir. In previous studies[10] [11] it was noted that encroachment into the SCC pipeline easement is widespread. This program will implement the recommendations of those reports, with the intent to make the buried facility "open and notorious."

Action required in order to maintain the reliability of the SCC are (1) Identify, locate, and label the pipeline. Survey and format for GIS. One of the few remaining post-style markers is shown on the right. Up to 400 pipeline markers may need to be placed at property lines and alignment changes along the pipeline. (2) Place encroaching landowners on notice to the effect that COMB has the right to maintain the government's pipeline and that it may require the removal of the encroachment. There are approximately 150 properties affected. (3) Clear the alignment where the pipeline is within US Government fee property. (4) Notify landowners to include COMB in the planning process for site improvements. (5) Develop and implement a Building Department coordination process to avoid additional encroachments. (6) Develop a policy to protect the SCC from adjacent utilities within the public right-of-way.

Project Schedule

Completion of Environmental Studies: None required (categorically exempt*)
Engineering and Construction: 2008-2010

Project Budget

Planning:	$-0-
Engineering:	$250,000
Surveys:	$400,000
Construction:	$150,000
Environmental Mitigation:	$75,000
Contingency:	$125,000
Total Budget:	$1,000,000

*To be confirmed by COMB's environmental consultant.

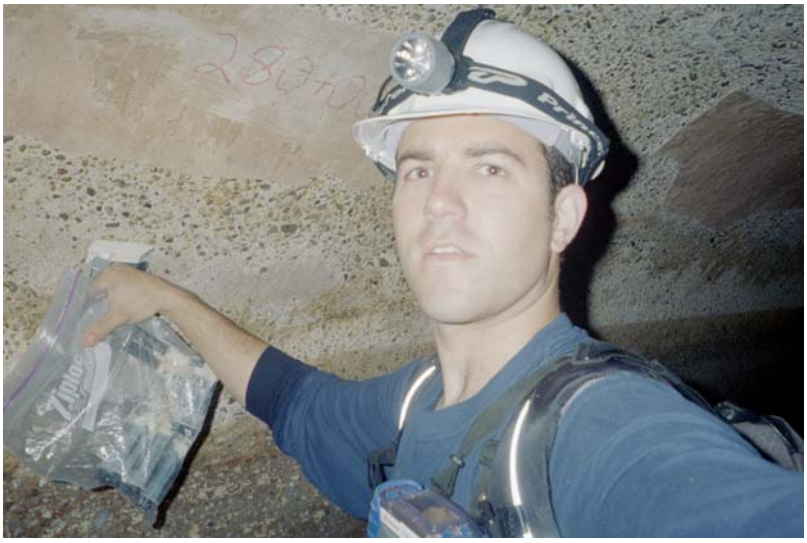
[10] *Reliability and Alternatives Study for the South Coast Conduit Carpinteria Reach Cater Booster Pump Station to the Ortega Reservoir*, Boyle Engineering Corporation, FINAL DRAFT, April, 2005.

[11] *Phase 2 Reliability Study for South Coast Conduit Upper Reach Tecolote Tunnel to Corona Del Mar WTP and Carpinteria Reach South Coast Conduit Booster Pump Station to Ortega Reservoir*, Boyle Engineering Corporation, DRAFT dated September, 2006.

Cachuma Operation and Maintenance Board
2008 – 2010 Operations and Maintenance Reliability Program

Project Component No. 13
Investigation of Probable Repairs to the Tecolote Tunnel Lining

Project Description



The Cachuma Operation and Maintenance Board (COMB) operates the South Coast Conduit (SCC) from the north portal of Lake Cachuma to the Carpinteria Reservoir. The Tecolote Tunnel connects the Lake Cachuma north portal to the South Coast Conduit. The tunnel was dewatered and inspected in 1978, 1981, 1987, 1993, 1999, and 2005. Most of the interior is in good condition, however, observed deterioration of the lining in limited areas has progressed to such an extent that repairs may be necessary to maintain the reliability of the South Coast Conduit.

The repair or rehabilitation will require engineering analyses and conceptual design in order to determine the program-level schedule and budget, as well as the extent of any environmental mitigation that may be required.

Project Schedule

Completion of Environmental Studies: To be determined (TBD) after study phase
Study Phase: 2008-2009

Study Phase Budget**

Planning Inspection:	$25,000
Concept Engineering:	$50,000
Contingency:	$10,000
Total Study Phase Budget:	$85,000

**Construction budget will be estimated as part of the study.

Project Component No. 14
Investigation of Probable Rehabilitation of Lake Cachuma Intake Tower
(Lower Gate Operability)

TECOLOTE TUNNEL

View from old Highway 150 looking west showing nearly completed intake structure. Installing of fish screens, cleanup and minor finishing remains to complete the structure. Carl M. Halvorson, Inc., and H. Halvorson, Inc., Specifications No. 2851.

SB-3271-R2 May 25, 1953

Project Description

The Cachuma Operation and Maintenance Board (COMB) operates the South Coast Conduit (SCC) from the north portal of Lake Cachuma to the Carpinteria Reservoir. The Lake Cachuma north portal of the Tecolote tunnel is supplied from the intake tower in Lake Cachuma. The intake tower was constructed in 1953 with multiple gates (illustrated in the construction photo to the right.) Minimal maintenance activities have been allocated to this structure. The operation of the lower gates has become difficult. Because of submergence, the exact nature of the gate operability has not yet been ascertained, but could be the result of trapped debris or corrosion.

The decision to repair, rehabilitate or replace the gates will require engineering analyses and conceptual design in order to determine the program-level schedule and budget, as well as the extent of any environmental mitigation that may be required.

Project Schedule

Completion of Environmental Studies: To be determined (TBD) after the study phase
Study Phase: 2008-2009

Study Phase Project Budget**

Planning & Inspection:	$25,000
Concept Engineering:	$50,000
Contingency:	$10,000
Total Study Phase Budget:	$85,000

**Construction budget will be estimated as part of the study.

Cachuma Operation and Maintenance Board
2008 – 2010 Operations and Maintenance Reliability Program

Project Component No. 15
Investigation of Probable Rehabilitation of Elevator Shaft

Project Description

The Cachuma Operation and Maintenance Board (COMB) operates the South Coast Conduit (SCC) from the north portal of Lake Cachuma to the Carpinteria Reservoir. The Lake Cachuma north portal of the Tecolote tunnel is supplied from the intake tower in Lake Cachuma. About 850 ft. from the intake tower, in the tunnel, is a jet flow valve which regulates the flow in the tunnel. Access to the valve chamber is via an elevator which descends from the control house. (The adjacent photo is actually taken from atop the lake intake.)

Water infiltration into the elevator shaft has become problematic. Action required in order to maintain the reliability of the SCC is to determine cause of that water infiltration, and determine the most appropriate means of remediating the infiltration.

The means to repair or rehabilitate the elevator will require field investigations, engineering analyses and conceptual design in order to determine the program-level schedule and budget, as well as the extent of any environmental mitigation that may be required.

Project Schedule

Completion of Environmental Studies: To be determined after the study phase.
Study Phase: 2008-2009

Study Phase Project Budget**

Planning:	$5,000
Concept Engineering:	$40,000
Contingency:	$5,000
Total Budget:	$50,000

**Construction budget will be estimated as part of the study.

Cachuma Operation and Maintenance Board
2008 – 2010 Operations and Maintenance Reliability Program

Project Component No. 16
Investigation of Probable Seismic Upgrade of Lake Cachuma Intake Tower

Project Description

The Cachuma Operation and Maintenance Board (COMB) operates the South Coast Conduit (SCC) from the north portal of Lake Cachuma to the Carpinteria Reservoir. The Lake Cachuma north portal of the Tecolote tunnel is supplied from the intake tower in Lake Cachuma. The tower was designed by the US Bureau of Reclamation in the early 1950's. (The photo illustrates the tower in 1991.) Based upon the state of knowledge gained in the 57 years since it was first designed, the tower may be at-risk during a major seismic event.

Action required in order to maintain the reliability of the SCC is to structurally inspect and analyze the tower using modern codes and computer analyses. That will allow assessment of the level of risk attendant to the existing tower, and preparation of a conceptual design (if necessary.) That will then allow determination of the program-level schedule and budget, as well as the extent of any environmental mitigation that may be required to seismically upgrade that critical facility.

Project Schedule

Completion of Environmental Studies: To be determined after the study phase
Study Phase: 2008-2009

Study Phase Project Budget**

Planning & Investigation:	$10,000
Concept Engineering:	$75,000
Contingency:	$15,000
Total Budget:	$100,000

**Construction budget will be estimated as part of the study.

Project Component No. 17
Investigation of Potential Sheffield Tunnel Pipe Replacement

Project Description

The Cachuma Operation and Maintenance Board (COMB) operates the South Coast Conduit (SCC) from the north portal of Lake Cachuma to the Carpinteria Reservoir. Previous studies identified flow limitations in the SCC system[12], some of which were due to the pressure class of pipe in the Sheffield tunnel[13]. Analyses of that pipe determined that most of the tunnel pipeline is not designed for any overstress due to increased flows or unanticipated surge events in the pipeline.

Another report[14] included comparisons of different sizes of pipeline installed parallel to the existing and within the Sheffield tunnel. It is more appropriate to determine the feasibility of replacementof the pipe in order to enhance the reliability of that part of the SCC.

The replacement of the pipe within the Sheffield tunnel will require engineering analyses and conceptual design in order to determine the program-level schedule and budget, as well as the extent of any environmental mitigation that may be required.

Project Schedule

Completion of Environmental Studies: TBD after study phase
Study Phase: 2008-2009

Study Phase Project Budget**

Planning:	$5,000
Concept Engineering:	$40,000
Contingency:	$5,000
Total Budget:	$50,000

**Construction budget will be estimated as part of the study.

[12] I*nvestigation and Engineering Study for South Coast Conduit, Goleta and Carpinteria Sections*, Boyle Engineering Corporation, October 1999.

[13] *Reliability and Alternatives Study for the South Coast Conduit Carpinteria Reach Cater Booster Pump Station to the Ortega Reservoir*, Boyle Engineering Corporation, FINAL DRAFT, April, 2005.

[14] *Phase 2 Reliability Study for South Coast Conduit Upper Reach Tecolote Tunnel to Corona Del Mar WTP and Carpinteria Reach South Coast Conduit Booster Pump Station to Ortega Reservoir*, Boyle Engineering Corporation, DRAFT dated September, 2006.