

PRELIMINARY WATER SECURITY PROJECT ANALYSIS

*Casitas Municipal Water District
Ventura County, CA*

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**CASITAS MUNICIPAL WATER DISTRICT
Ventura County, CA**

Preliminary Water Security Project Analysis

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Analysis Authorization and Purpose and Approach

Authorization

In a letter to WREA dated August 12, 2016, at the direction of the Board of Directors, Casitas Municipal Water District (CMWD) General Manager Steve Wickstrum requested a proposal on a reconnaissance level analysis of a number of “new” water supply projects (initially 5) (some of which were suggested by CMWD Board Members.) The task was given the name “Water Security Project Analysis” (Analysis).

Along with Kear Groundwater, WREA submitted a proposal for the Analysis which was verbally accepted by CMWD on August 17, 2016.

Purpose

The purpose of the analysis is to estimate the technical and financial feasibility of a list of projects supplied by CMWD and/or other projects discussed and agreed to be included in the list. We anticipate that selected projects from this list and preliminary evaluation will be further evaluated for feasibility.

Approach

In discussions with CMWD staff, and results of a September 8, 2016 meeting that included Jordan Kear of Kear Groundwater, Lou Nagy of WREA, Steve Wickstrum, Neil Cole, and Mike Moler of CMWD, the general ranking of projects was discussed and a general categorical ranking scheme was developed. It consists of two “tiers”. The top tier projects to be studied in relatively greater detail than those in the lower tier. Please note that the order in which the tier items are presented has no significance.

Glossary

Terms used in this Analysis are as follows:

A	Acre
AF	Acre Feet
AFY	Acre Feet/Year
AMSL	Above Mean Sea Level
Bathal	Ocean bottom sedimentary depositional environment
Calleguas	Calleguas Municipal Water District
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
CFS	Cubic Feet/Second
City	City of Ventura
CMWD	Casitas Municipal Water District
DWR	Department of Water Resources

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F, FT	Foot or Feet
Faunal	Relating to non-plant life
GPD	Gallons per Day
GPM	Gallons per Minute
GSP	Groundwater Sustainability Plan
HoBo	Horizontal Bore
Lake	Lake Casitas
MGD	Million Gallons per Day
MGL	Milligrams per Liter
MWD	Metropolitan Water District of Southern California
NEPA	National Environmental Policy Act
Netric	Zone where sunlight reaches ocean floor
OBGMA	Ojai Basin Groundwater Management Agency
OVSD	Ojai Valley Sanitary District
POC	Point of Connection
SACSG	San Antonio Creek Spreading Grounds
TDS	Total Dissolved Solids
United	United Water Conservation District
UVRB	Upper Ventura River Basin
Y	Year

Upper Tier Projects

Upper tier projects are to be evaluated using the following parameters as they may apply to the particular project being evaluated.

- Water Production Capacity
- Water Quality
- Reliability of Supply
- Water Rights (as evaluated by the consultancy team; to be verified by Casitas' qualified water rights attorney)
- Public Agency of Involvement
- CEQA and Environmental Impacts
- Opinion of Probable Cost
- Project Timeline

Upper Tier Project List

A list of upper tier projects follows:

- Item 1. Matilija Formation Horizontal Bores
- Item 2. Ojai East Septic Collection, Package Treatment, Recharge
- Item 3. State Water Project Transfers, City of Ventura Calleguas Emergency Inter-Tie
- Item 4. Pipeline from Matilija Chlorinator to Matilija Hot Springs

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Item 5. Renovate Senior Canyon Mutual Water Company Horizontal Well

Item 6. Ojai Desalter Project

ITEM 1. MATILIJA FORMATION HORIZONTAL BORES

Project Description

Item 1, the Matilija Formation Horizontal Bores (Matilija HoBos) Target project is comprised of drilling bores and well completions in the Matilija sandstone which would begin vertically then change direction to eventually become horizontal, directed to the north, and target the stratigraphic base of the Matilija Formation along the easternmost portion of the Santa Ynez Mountains. The Project would allow for drought-period release of groundwater impounded within the target formation. With low-elevation well head points, water would conceptually drain to the well heads under pressure and be controlled via a valve or series of valves for redundancy and safety. When opened, the valves would allow for water to flow a dedicated pipeline (temporary or permanent) discharging directly to the canal or the Lake¹.

Target Formation

The Matilija Sandstone is known to be among the more porous and permeable local bedrock formations. Recharge to the Matilija Sandstone aquifers which would feed the HoBos conceptually appears to occur primarily via precipitation on the ridges of the Santa Ynez Mountains to the west and up to 3,000 FT higher in elevation than Lake Casitas.

The Matilija Sandstone forms prominent strike ridges in the Santa Ynez Mountains for more than 48 mi (80 km), from east of Highway 154 to northeast of Ojai. It is exposed on both sides of the Santa Ynez fault, thinning both westward and eastward from its maximum exposed thickness of 2,624 FT (800 m) at the type section, Matilija Springs.

Lithologically, the Matilija Sandstone consists of a medium to thick-bedded sandstone sequence at the base that is overlain by massive and cross-bedded sandstone units, and in turn, by interbedded gray to red siltstone and cross-bedded sandstone. Within the predominantly siltstone section, there are thin beds of limestone and gypsum, containing mud cracks and abundant mollusk fossils. The siltstone and cross-bedded sandstone unit passes upward into laminated sandstone and siltstone beds which are transitional with the overlying Cozy Dell Formation. Faunal data indicate a shallowing sequence from bathyal depths at the base of the Matilija to neritic and locally non-marine conditions in the cross-bedded sandstone and siltstone beds, about two-thirds of the way through the unit, and deepening toward the top of the formation and overlying Cozy Dell Formation (Link and Welton, 1982). The vertical sequence of facies indicates

¹ Alternately, the water could be allowed to flow into Santa Ana Creek and possibly other tributary waters to the Lake, but may not be environmentally feasible.

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that the Matilija Sandstone records a major regressive event (exposure of sea floor above sea level) filling the Santa Ynez basin. A second regressive episode of deposition (Cozy Dell-Coldwater-Sespe Formations) followed in the late Eocene to Oligocene.

Production

Item 1 production is estimated to be approximately 8,000 Acre Feet per Year (AFY), with production during dry years only. During wet years when other sources of water are more readily available, we would expect depleted reserves to be restored at an estimated rate of greater than 2,000 AFY within the aquifers intersected by the HoBos. Adaptive management would be an absolute necessity for this project.

The target portion of the formation outcrops between the Ventura River and the Juncal Pass. This is a 6-mile ridge, where 2,000 FT of stratigraphic thickness of this formation is exposed. Assuming 2,000 vertical feet of saturation, a block of $1,26 \times 10^{11}$ cubic feet of material may be available for groundwater storage. Assuming a 1% specific yield, on average for this formation block, we calculate over 29,000 AF of water in storage. This is thought to be a conservative estimate of available water.

On a more liberal end of the estimation spectrum, a specific yield of 5 percent may be assumed, and a 3,000-foot saturated thickness may be assumed. This could bring a potential amount of water in available storage upwards of 200,000 acre feet.

A 5,000 Gallons per Minute (GPM) rate, per well, is assumed based on Tecolote tunnel data for design considerations. The Matilija Formation is penetrated by several adits and tunnels to the west of the target area, namely in Santa Barbara County. Many of these were drilled or hand-excavated during the 1800s and only limited anecdotal information of their construction is available. However, the Tecolote Tunnel, connecting Lake Cachuma and the South Coast, was constructed from 1950 to 1956 and detailed geologic information is available. The Mission Tunnel between Gibraltar Reservoir and Santa Barbara and the Doulton Tunnel serving the Montecito area have been in operation longer and are cited to add about 1,000,000 GPD and 300,000 GPD to diverted surface flows from bedrock formations including the Matilija Formation (Muir, 1968).

Tecolote Tunnel data indicate an increase in flow from about 1,000 gpm (1.4 MGD) to 7,000 gpm (10 MGD) while drilling through the Matilija Formation (USBoR, 1959). Other flows also emerged from the relatively thin sandstone units within the Cozy Dell formation. This significant resource is an excellent proxy for the postulated Matilija HoBos.

Three spudding (pilot well) locations are considered. West to east, these are referred to as the 12,000-FT West HoBo, the 10,000-FT Central HoBo, and the 10,000-FT East Hobo. Locations and approximate trajectories of each well are presented on

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Attachments 1 and 2. Summaries of each are presented below. Most of these involve construction on Bureau of Land Management and U.S. Forest Service lands.

Note that the target formation exists at great vertical depth beneath the District area. The Chismahoo oil exploration well encountered the Matilija Formation at 5,800 FT and remained within the formation until the exploration well's total depth of over 8,000 FT. No significant oil or gas shows were encountered in this bore.

12,000-FT West HoBo: Postulated to be spudded at an elevation of about 1900 FT, just north of Superior Ridge and directed toward White Ledge Peak. Over the bore target formation exposure elevations are typically above 3,000 FT AMSL. Flow would enter Coyote Creek when opened, tributary to Lake Casitas. This location is outside of the District Boundary but within the Lake Casitas Watershed Wilderness. Los Padres National Forest permitting will be essential for construction and operations and maintenance.

15,000-FT Central HoBo: Postulated to be spudded at an elevation of about 860 FT, just south of the intersection of Cooper Canyon Road and the District Boundary. Direction of the bore would be to the north, just east of North Fork Santa Ana Creek. Over the bore target formation exposure elevations are typically above 3,000 FT AMSL. Flow would enter Cooper Canyon when opened, tributary to Santa Ana Creek and Lake Casitas. This location is inside of the District Boundary and within the Lake Casitas Watershed Wilderness. Los Padres National Forest permitting will be essential for construction and operations and maintenance as the intended as the majority of the bore will underlie LPNF lands. Some private property owner negotiations are anticipated to be required.

10,000-FT Central HoBo: Postulated to be spudded at an elevation of about 1200 FT, near lightly cultivated land associated with the Taft lease / property. Direction of the HoBo would be generally under the North Fork Santa Ana Creek. Over the bore target formation exposure elevations are typically above 3,000 FT AMSL. Flow would enter Santa Ana Creek when opened, tributary to Lake Casitas. This location is outside of the District Boundary but within the Lake Casitas Watershed Wilderness. Private property owner/lessee negotiations and Los Padres National Forest permitting will be essential for construction and operations and maintenance.

10,000-FT East HoBo: Postulated to be spudded at an elevation of about 850 FT, just inside the District boundary at Rice Canyon. Direction of the East HoBo would be generally north-northwest. Over the bore target formation exposure elevations are typically above 2,000 FT AMSL. Flow would enter the creek in Rice Canyon when opened and be directed to the Robles Canal, tributary to Lake Casitas. Private property owner negotiations and Los Padres National Forest permitting will be essential for construction and operations and maintenance. This HoBo would be likely lowest pressure/production of the described bores.

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Water Quality

Groundwater Quality from Matilija Formation wells and springs locally is expected to be consistent with the water generated by the Matilija HoBo. Total Dissolved Solids (TDS) in the range of 400 to 800 MGL and calcium-bicarbonate water character are expected. Iron, manganese, sulfates may be elevated but not expected to be detrimental to project implementation. Pilot project efforts would be implemented to detail actual water quality.

Reliability

Using an adaptive management strategy, the reliability of the HoBo is high, in that water could be extracted on an as-needed basis (during droughts) and allowed to recharge during periods of higher precipitation. Conceptually, when a target/threshold low lake level is reached, the HoBos would be opened, but remain shut-in and monitored during other times.

Water Rights

The district must explore the extraction of this percolating groundwater and its appropriative right to extract. Other than some minor spring use (Ojala), this resource appears to be untapped as effectively all water in storage has bypassed the root zone of flora in the headwaters along the ridge. We expect that a physical solution (such as serving affected spring owners with a water source during drought periods and HoBo use) would be offered as offsets of potential water rights issues.

Public Agency Involvement

For this project it is anticipated that the involved agencies will include the U.S. Bureau of Land Management and the USDA Forest Service, from whom a permit must be acquired. The project involves discharging raw water into watercourses that for the most part are jurisdictional. Additional agencies likely to be involved are the Regional Water Quality Control Board, the CA Department of Fish and Wildlife, the US Army Corps of Engineers, the Ventura County Watershed Protection District the National Marine Fisheries Service/NOAA, and possibly others. Well site preparation may involve a grading permit from the Ventura County Development Services Department.

Private landowners, whose property could be used for access, pipeline alignment and drilling if CMWD property is not available for drilling, will also be involved.

California Environmental Quality Act, National Environmental Policy Act

This will trigger the California Environmental Quality Act (CEQA) process due to their discretionary permitting requirements. An Initial Study will be required to determine the level of environmental documentation to be prepared. While it is possible that a Mitigated Negative Declaration may be implemented, there remains the possibility that

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an Environmental Impact Report (EIR) will be required. Additionally, since the horizontal bore project involves work on federal lands, adherence to the National Environmental Policy Act (NEPA) will be required. This may include significant and extensive studies on groundwater supplies. NEPA will require that CMWD engage an initial analytical approach to determine if pursuit of a Categorical Exclusion (CE), an Environmental Assessment (EA), or an Environmental Impact Statement (EIS) is required.

When it is uncertain that a CE will apply, an EA will be required to be prepared to determine if there are significant environmental effects. This will determine the appropriate NEPA document for the Project.

Opinion of Probable Cost

Anticipated capital cost of the project is \$5.6 million per well for drilling and construction, and the pipeline to the canal. Operation costs on the order of \$10,000 per year. (See Item 1 Preliminary Opinion of Probable Cost attached).

Project Timeline

From initiation of design through the environmental review process to completion of construction, if the project is allowed to progress without delay, the total time is estimated at 5 years. It is anticipated that the project would be conducted in phases, with the initial HoBo constructed during the earliest phase as a pilot test/proof of concept project that could be utilized accordingly. Subsequent HoBos could be completed as needed and as the adaptive management of the initial HoBo proves worthwhile.

**ITEM 2. OJAI EAST SEPTIC COLLECTION,
PACKAGE TREATMENT, RECHARGE**

Project Description

Item 2, the Ojai East Septic Collection, Package Treatment, Recharge project is comprised of installing a package wastewater treatment plant and a network of sewer collection mains and laterals along with appurtenances such as manholes, cleanouts, siphons and lift stations for the project area, a relatively densely populated section ("cell") of the East Ojai area currently utilizing ISDS (Individual Sewage Disposal Systems) (septic systems) for sewage disposal. The initial candidate project area is generally higher in elevation than the San Antonio Creek Spreading Grounds and injection well site (SACSGRP). (See Project Location Plan.)

The sewer mains will be directed to a package treatment plant, ideally located at a low point in the selected area. The treatment plant will need to be sited in an area of easy access near the SACSGRP on a parcel that CMWD will need to acquire if not compatible with existing CMWD or partner agency parcels.

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The influent will be treated by means of a centralized redundant extended aeration system including anoxic chambers and clarification followed by membrane filtration and disinfection to meet tertiary standards. A sludge processing system will be included to decant the sludge (which will need to be handled offsite periodically), reducing volume and decreasing water loss. The treated effluent would then be piped to the lower pond in the SACSGRP to help recharge the Ojai Groundwater Basin, preferably by passive infiltration with an option for direct injection to the basin through the injection wells located there.

Production

Assuming a “cell” of approximately 300 residences at 3.5 persons per residence at 60 GPD/Person¹, Item 2 “production” (treated wastewater) is estimated to be approximately 70 AF/Y. However, the net volume may be less given that at least some of the recharged water would have percolated into the Ojai Basin via existing ISDS. It is estimated that the project would improve recharge by allowing water to bypass the root zone of flora capable of transpiring water near leach lines at ISDS facilities. For example, if the estimated 70 AF/Y were delivered to the centralized treatment project location and recharged, current conditions may allow upwards of 35 AF/Y to recharge with 35 AF/Y taken up cumulatively by local trees and plants at individual sites.

There appear to be about two additional “cell” areas in East Ojai of about the same size that could be sewered. Those would not be as close to and will be downhill from the SACSGRP, so the cost would be even higher for those systems.

Water Quality

Due to the fact that the proposed system will normally be discharging treated effluent to SACSGRP, the quality of the treated water must meet or exceed that of the Groundwater Basin Plan as administered by the Los Angeles Regional Water Quality Control Board (Water Board). Lowering the levels of nitrate and chloride will be the challenge for this system. Due to the proposed high level of treatment (final membrane filtration) of this water, overall quality is expected to be good.

Reliability

Judging relative reliability relating to production Item 2 is high in that the residences will be constantly occupied so the daily inflow would be relatively constant.

Water Rights

There do not appear to be any water rights issues to be dealt with if this item is implemented. However since the SACSGRP has defined rights to the inflow from San

¹ Per Metcalf and Eddy, Wastewater Engineering 2003 Page 156, Table 3-1.

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Antonio Creek, the additional water from the treatment plant will need to be accounted for separately.

Public Agency Involvement

For this project it is anticipated that the involved agencies will include the Water Board, the Ojai Basin Groundwater Management Agency, and Ventura County Planning. Since Ventura County Watershed Protection District owns the SACSGRP parcel, they as well as other partner and regulatory agencies in the SACSGRP facilities (e.g. CMWD, Golden State Water) will also be involved. Additionally, pipeline creek crossings of Thatcher Creek to the east and San Antonio Creek to the west, will involve the CA Department of Fish and Wildlife, the US Army Corps of Engineers, the National Marine Fisheries Service/NOAA, and possibly others.

California Environmental Quality Act

This project will trigger the California Environmental Quality Act (CEQA) process due to possible discretionary permitting requirements. It is likely that the change from septic systems to a centralized treatment plant and the open cutting of the trench for pipes in the project area will have potential for resulting in either a direct or potential physical change in the environment. An Initial Study will be required to determine the level of environmental documentation to be prepared, most likely an Environmental Impact Report (EIR).

As part of the development of the SACSGRP, an EIR was compiled and certified. With the additional use presented by the infiltration of the treated water, the EIR will likely be required to be amended.

Opinion of Probable Cost

Anticipated capital cost of the project is \$11 million, and operation costs approximately \$100K per year. It should be noted that East Ojai is very rocky, and as a result, cost for the pipeline installation is anticipated to be very high. (See Item 2 Preliminary Opinion of Probable Cost attached.)

This or a similar project in the area that involves a new sewer system in a developed area would likely never be developed as a water source, but more likely for the reason of water quality concerns exacerbated by the ISDS effluent. In that case, State or Federal monies may be available for the construction, or an Assessment District formed.

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Project Timeline

From initiation of design through the environmental review process to completion of construction, if the project is allowed to progress without delay, the total time is estimated at 8 years.

**ITEM 3. STATE WATER PROJECT TRANSFERS,
CITY OF VENTURA CALLEGUAS EMERGENCY INTER-TIE**

Project Description

Item 3 consists of State Water Project Water “wheeling” through an emergency inter-tie between City of Ventura (City) and Calleguas Municipal Water District (Calleguas).

In 1971 CMWD entered into an agreement with the City and the California State Department of Water Resources (DWR) to purchase the allocation rights to up to 15,000 Acre Feet per Year (AFY) of State Water Project water (10,000 AFY-City, 5,000 AFY-CMWD), none of which has ever been delivered to CMWD or the City. Additionally, United Water Conservation District (United) has the rights to approximately 3,500 AFY¹ also yet to be delivered. The agreement states that the City will have the responsibility and discretion to determine how and where the agreed upon water deliveries would take place.

Historically, short of building a 45-mile-long pipeline and appurtenances from the Interstate 5 corridor to deliver the water to the City, there was no practical way to deliver the allocation. Certain other ideas were reviewed including de-sal (approved over the idea of a pipeline by a City Advisory vote in the early 1990’s), “wheeling” from the Metropolitan Water District of Southern California (MWD) through Calleguas and presumably the City of Oxnard, but it was determined unacceptable unless the area where the final points of use (in this case the combined service area of the City and CMWD) was annexed to MWD.

Annexation costs were considered prohibitive, and so with the exception of 1990-91 drought-caused wheeling action from the City of Oxnard through the City and CMWD to Santa Barbara through southern Santa Barbara districts, there was no movement in this regard.

Within the past two years the concept of wheeling without annexation was reconsidered by Calleguas, and has now been deemed acceptable. The City has begun planning the alignment and hydraulic design of the pipeline. The POC is at the dead end of the Calleguas 24” “Las Posas Feeder” pipeline at Price Road and Highway 118 in Somis. The proposed alignment proceeds west and north on 118 crossing the Santa Clara River Bridge and terminating at the City’s Saticoy water conditioning facility at

¹ Originally, it was a 5,000 AFY allocation but approximately 1,500 AFY was transferred to the Port of Hueneme, which is being delivered through the City of Oxnard system.

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Telephone Road and Wells Road, a total distance of about 7 miles. (See Items 1-6 Project Location Map.)

Production

Per the agreement between the DWR, the City and CMWD, CMWD has the rights to up to 5,000 AFY of the subject State Water project allocation. The “production” could essentially be the in - lieu delivery of the wheeled water to the City, which would eliminate the need for the City to buy and serve CMWD water from the Lake, preserving Lake water for future drought conditions. Depending on available capacity, this could be done in small increments over time. The in-lieu deliveries would be considered a benefit to CMWD and the City as a whole even though the water may be used anywhere in the City, due to the fact that the in-lieu volumes “remain” in the Lake.

Alternately, on the west side of the City, a modification to the Olive-Ramona/ City turnout (or other appropriate point that works best for the hydraulics of the system) to allow two-way flow could be completed to allow wheeling through the City from east to west (as opposed to the current configuration, west to east) into the CMWD delivery system in Ventura Avenue. This alternative would be needed for water deliveries during minimum pool conditions of the Lake. Pressure regulation, and a reservoir and a pump plant might be required. This approach has the limitation of only delivering the instantaneous demand in that portion of the system as there is no method of back-feeding the surplus (i.e. wheeled supply minus instantaneous demand) into Lake Casitas short of constructing a bypass near the dam.

However, there is a limit on the Calleguas line capacity at the proposed 24-inch point of connection (POC). The maximum capacity at the POC is approximately 11 Cubic Feet per Second (CFS) during the low water usage period, and 4 CFS during the high usage period. It should also be noted that Ventura County Waterworks District 19 and California American Water both have existing Calleguas turnouts at the POC. The maximum annual delivery volume has been calculated to be approximately 5,400 AFY assuming 6 months each for the high and low periods. This does not consider competing demands from the existing two turnouts. The actual volume available after accounting for the existing turnouts is probably considerably less.

It has not yet been determined what portion of the actual volume available will be allocated to the City, CMWD and United, but the above figures demonstrate that without changes to the existing and planned delivery systems, the volumes will be only a fraction of the contracted water rights.

A solution that would increase the available volume would be to move the POC east to the intersection of Somis Road and Highway 118 where two Calleguas 30-inch pipes interconnect (Somis Cross-Tie). The maximum capacity at that point not accounting for competing demands, is in excess of 28,000 AFY¹. Connecting to the Calleguas system

¹ The actual reserve capacity at the Somis inter-tie is currently being verified by Calleguas.

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at the Somis Cross-Tie presents a much better chance of receiving deliveries more in line with the DWR contracted volumes. However, it will require approximately 3 miles of additional pipeline, and possibly an upsize of a portion of the existing pipeline.

Water Quality

Wheeled water quality is dependent on the last delivery purveyor in the pipeline. Considering the City, the last purveyor is Calleguas, and in this case per the City and Calleguas annual reports, the quality is very similar. Any internal adjustments in disinfection etc. downstream of the inter-tie would be addressed routinely by City operations.

In the case of water from the inter-tie being supplied to the CMWD served portion of the City (which at that point would be a blend of Calleguas and City water), it would slightly decrease the water quality since CMWD water is of higher quality than the blend, but the difference is not substantial.

Reliability

As the delivery of any State water is drought sensitive, the allocation is not dependable. The use of the in-lieu water by the City would mean that the City would use the State Water, and the water that would have been delivered to the City would remain in Lake Casitas for the future use and benefit of all CMWD customers. This water could be held in the Lake as curtailed delivery during higher rainfall periods or when allocation is available, and as such increase the “reliability” during drought periods.

Water Rights/Legal Issues

It is assumed that the agreements in place that are pertinent to the projects in Item 3 include appropriate dealings with water rights issues. Construction of the inter-tie pipeline would entail legal agreements concerning issues such as first come first serve rights, easements, operation and maintenance, and cost sharing will have to be negotiated, compiled and agreed on.

Public Agency Involvement

Since the City is apparently taking the responsibility for the implementation of the inter-tie project there should no direct Public Agency involvement for CMWD, other than that of the City, Calleguas and possibly United. Construction project involved agencies will include Regional Water Quality Control Board, the CA Department of Fish and Wildlife, the US Army Corps of Engineers, the Ventura County Watershed Protection District the National Marine Fisheries Service/NOAA, and possibly others.

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California Environmental Quality Act

The inter-tie project will trigger the California Environmental Quality Act (CEQA) process due to their discretionary permitting requirements. An Initial Study will be required to determine the level of environmental documentation to be prepared, most likely an Environmental Impact Report (EIR).

It is assumed that the City will be implementing the project, and will be the Lead Agency under CEQA and compile the Environmental Document. Since CMWD is a party to the allocation agreement, it is likely that there will be considerable documentation to be compiled by all participants for inclusion in the EIR.

Opinion of Probable Cost

Anticipated capital cost of the 7-Mile emergency inter-tie project is said to be approximately \$20 Million. Adding the additional 3 miles to increase available capacity on a pro-rata basis will total approximately \$29 Million. See the table below for a construction cost share program based on DWR allocation¹.

Participant	Allocation, AFY	% of Total	Cost, 7 Mile Pipeline	Cost, 10 Mile Pipeline
City	10,000	54	\$10.8M	\$15.7M
CMWD	5,000	27	\$5.4M	\$7.8M
United	3,500	19	\$3.8M	\$5.5M
Total	18,500	100	\$20M	\$29M

Specific cost of water from the Project has not yet been determined, but it is assumed that the rates and fees would be worked out and be part of the legal agreement between the parties.

Project Timeline

For the inter-tie portion of the project, from initiation of design through the environmental review process to completion of construction, if the project is allowed to progress without delay, a conservative estimate of the total time required could be as short as 3-5 years.

¹ Cost/AF to the participants, could be as high as \$2,000 and depending on water quality, disinfection may increase the cost another \$100-\$200/AF.

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**ITEM 4. PIPELINE FROM MATILIJA CHLORINATOR
TO MATILIJA HOT SPRINGS¹**

Project Description

Item 4 consists of the evaluation of replacing a portion (Approximately 9,800') of the existing 27-inch Matilija Conduit with smaller pipe. Currently, the size is incompatible (too large) for the existing demand, therefore water in the pipe is not "turned over" as often as it should be to avoid low chlorine residual and the formation of undesirable disinfection byproducts.

The relative low velocity in the pipe during normal operations necessitates frequent flushing with high flows to artificially "turn over" the water in the pipe. CMWD staff has stated that, occasionally, the pipe is flushed once per week due to low chlorine residual levels. Replacement will be with 12-inch and 8-inch pipe which will also need periodic flushing (as with all pipes) but the current demand will allow constant automatic turn-over, so the flushing frequency can be substantially reduced.

The alignment starts at the Matilija chlorination station, where a 12-inch pipe will be connected and run northwest across the Ventura River to Camino Cielo where it will be downsized to an 8-inch pipe, running northwest and west to a fire hydrant at Ojala. There, a 2-inch line would start, running to the end at the Matilija Hot Springs meter. Some 12 existing metered connections would also need to be connected to the new line.

It is assumed that the replacement pipeline will be installed generally along the same alignment as the existing pipe with the possibility of using the existing pipe for sliplining, especially for the Ventura River crossing.

Production

Production for Item 4 is comprised of the water saved by not having to flush the large pipe. According to CMWD records, flushing the Matilija conduit in the area consumes approximately 12 AFY which is discharged into the groundwater basin, as opposed to going back into the Lake. By changing to smaller pipe and assuming the same flushing frequency and time, based solely on pipe diameters, the total flush volume "saved" would be approximately 9.6 AFY. This water will remain in the Lake. The volume would probably be more since the number of flushes will probably be lower due to the smaller pipe having fewer water quality issues.

¹ This project is included in the CMWD 2016-2025 10 Year Capital Improvement Program named "Replace Matilija Conduit from Robles to Camino Cielo or Matilija Dam".

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Water Quality

The effect on (local) water quality will be positive, as the contents of the pipe will be turned over more frequently.

Reliability

The “reliability” of the water saved annually by the decrease in flushing and the pipeline downsizing is very high.

Water Rights/Legal Issues

There do not appear to be any water rights or legal issues to be dealt with if this item is implemented.

Public Agency Involvement

Since at least part of the pipeline alignment will be crossing and within the bed and bank of Matilija Creek and the Ventura River. The involved agencies will include the Regional Water Quality Control Board, the CA Department of Fish and Wildlife, the US Army Corps of Engineers, the Ventura County Watershed Protection District the National Marine Fisheries Service/NOAA, and possibly others. In addition, the change in system configuration will require interaction with the California Department of Public Health.

California Environmental Quality Act

Most projects covered in this study will trigger the California Environmental Quality Act (CEQA) process due to their discretionary permitting requirements. It is likely that since this is technically a reconstruction project, it will be categorically exempt from CEQA per Section 15302. Replacement or Reconstruction: (c) Replacement or reconstruction of existing utility systems and/or facilities involving negligible or no expansion of capacity.

Opinion of Probable Cost

Anticipated capital cost of the project is \$ 1.13 million. (See Item 4. Preliminary Opinion of Probable Cost attached).

Project Timeline

From initiation of design through the environmental review process to completion of construction, if the project is allowed to progress without delay, the total time is estimated at 2 years, and is tentatively scheduled for 2020-2022.

**CASITAS MUNICIPAL WATER DISTRICT
Ventura County, CA**

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**ITEM 5. RENOVATE SENIOR CANYON MUTUAL
WATER COMPANY HORIZONTAL WELL**

Project Description

Item 5. Evaluates the potential production increase of the Senior Canyon Mutual Water Company (a major CMWD customer) horizontal well, the concept being that the increased volume of water produced will not have to be purchased from CMWD, and that water will remain in the Lake.

Senior Canyon Mutual Water Company (SCM) owns a 3,000 FT long horizontal well or tunnel constructed in 1929 that initially was the main supply for the SCM system. The horizontal well has supplied water virtually on an uninterrupted basis. Records from 30 years ago show that the tunnel occasionally produced in excess of 400 GPM. More recently the flow had decreased to below half that amount. Not surprisingly with the extended drought the flow rate has been reduced to approximately 50 GPM. SCM has three metered connections to CMWD that were initially installed as emergency backup and auxiliary supply to the system. However, as the drought has progressed, with the decrease in flow from the tunnel, SCM has been using CMWD water almost exclusively.

Periodic inspections have revealed substantial debris on the tunnel floor, calcification scale on the tunnel walls and a major rock fall at approximately 2200 FT from the entrance.

Dr. James Scott, a Mining Engineer who had been involved in the tunnels in Santa Barbara, visited the site in 1994, (when presumably the flow was approximately 200 GPM) said that the condition of the tunnel had a direct impact on the tunnel yield, and that it may be possible to double flow quantities from the tunnel if improved. However, no work has been done by SCM since then.

Improvements that may increase tunnel flow include:

- Cleaning the floor of the tunnel of debris;
- Sealing permeable sections of the floor;
- De-scaling the walls of the tunnel;
- Drilling multiple holes in permeable (fissured) tunnel wall formations;
- Advancing a separate bore due north from tunnel portal to target Juncal Sandstone.

Production

Assuming Dr. Scott is correct, during normal years, the increase of 200 GPM would result in a theoretical "production" of approximately 320 AFY.

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The benefit for CMWD will be that there will be a one to one correlation between increase in tunnel production and decrease in SCM purchases, freeing up that volume for other parts of the CMWD system.

Note that improvements should be captured by SCM infrastructure to avoid losses to Senior Canyon/San Antonio Creek for which others may have Senior water rights.

Water Quality

There will be no anticipated change in water quality. The water from the tunnel is considered surface water and SCM has the equipment in place to comply with the Surface Water Treatment Rule, for a production of approximately 400 GPM.

Reliability

Based on the SCM production records, although the flow varied from time to time due to rainfall patterns, flow from the tunnel has been remarkably constant.

Water Rights

SCM has appropriative rights to approximately 270 GPM direct diversion and a total of 434.4 AFY. SCM also has riparian rights. Although yet to be confirmed, most likely the diversion rates and volumes are only limited by the capacity of the horizontal well, and what can be claimed as beneficially used riparian water.

Public Agency Involvement

Since there will be at least a modest amount of debris removed from the tunnel, the collection and hauling to first a stockpile area then loaded on trucks to a disposal site would normally trigger the requirement for obtaining a Grading Permit and possibly a Stockpiling Permit from the Ventura County Development Services Department.

California Environmental Quality Act

Most projects covered in this study will trigger the California Environmental Quality Act (CEQA) process due to their discretionary permitting requirements. It is likely that since this is technically a maintenance project, it will be categorically exempt from CEQA per Section 15302. Replacement or Reconstruction: (c) Replacement or reconstruction of existing utility systems and/or facilities involving negligible or no expansion of capacity.

Opinion of Probable Cost

Anticipated capital cost of the project is \$134,000 (See Item 5 Preliminary Opinion of Probable Cost attached).

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Preliminary Water Security Project Analysis

Project Timeline

From initiation of design through the environmental review process (if applicable) to completion of construction, if the project is allowed to progress without delay, the total time is estimated at 1 year.

ITEM 6. OJAI DESALTER PROJECT

Project Description

Item 6. consists of the Ojai Desalter Project (ODP). This project conceptually would target otherwise unusable high chloride water from the lowest aquifers in the Ojai Basin to allow for its potable use and allow for recharge water to replace the poorest quality water over time. Delivering the water acquired from the ODP will require installation of a membrane treatment system, and connection to the existing Golden State Water Company (GSWC) transmission system, as well as targeting a well, (existing or new) to supply the high chloride water. Additionally, the brine water would be delivered to the existing Ojai Valley Sanitary District (OVSD) collector lines in the project area.

Production

Production for Item 6. is estimated to be in a range from 300 to 400 AFY. Estimated maximum flow rate to be used in facility design is approximately 200 GPM.

Water Quality

Based on the aquifer zone isolation testing during recent well drilling, it appears that Ojai aquifers below 500 FT on the west central portion of the basin are targeted for the ODP. Produced water is expected to be sodium-chloride in character, with TDS in the near brackish state (around 2,000 MGL TDS). Desalting would result in the water quality target of 500 MGL TDS being added to the system. (See Exhibit 1 herein.)

Reliability

Relative reliability of Item 6. is high due to the lack of use of these aquifers by municipal and agricultural interests.

Water Rights

The ODP project, if pursued, will not create the need for acquiring water rights. Effectively, the ODP would reduce demand on upper, higher quality water-bearing aquifers within the Ojai Basin and shift the pumping from current GSWC wells to deeper pumping from the those wells, other wells to be constructed, or other wells to be dedicated to the project.

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Public Agency Involvement

It is anticipated that the involved agencies will include the Ojai Basin Groundwater Management Agency (OBGMA), County of Ventura, and OVSD. Private property owners may be involved in the project as there may be water from existing wells that meet desalter criteria either not used or are yielding high chloride water.

California Environmental Quality Act

On the environmental impact scale, the project is not anticipated to have a significant effect on the environment based on the tenets of CEQA. The environmental document anticipated to be required is an MND, because the ODP would modify existing water facilities. Due to the fact that brine from the desalter project will change the wastewater characteristics, more environmental documentation will likely be necessary.

Opinion of Probable Cost

Anticipated cost of the OD project ranges from \$2.6 million to \$2.9 million, depending on whether or not an existing well can be used or if a new well has to be drilled.

Project Timeline

The time required from conception to completion is allowed to progress without delay is estimated at 1 year if a categorical exemption is available and an existing well can be used. Additional time may be required if a new well or wells are to be constructed.

CASITAS MUNICIPAL WATER DISTRICT Ventura County, CA

Preliminary Water Security Project Analysis

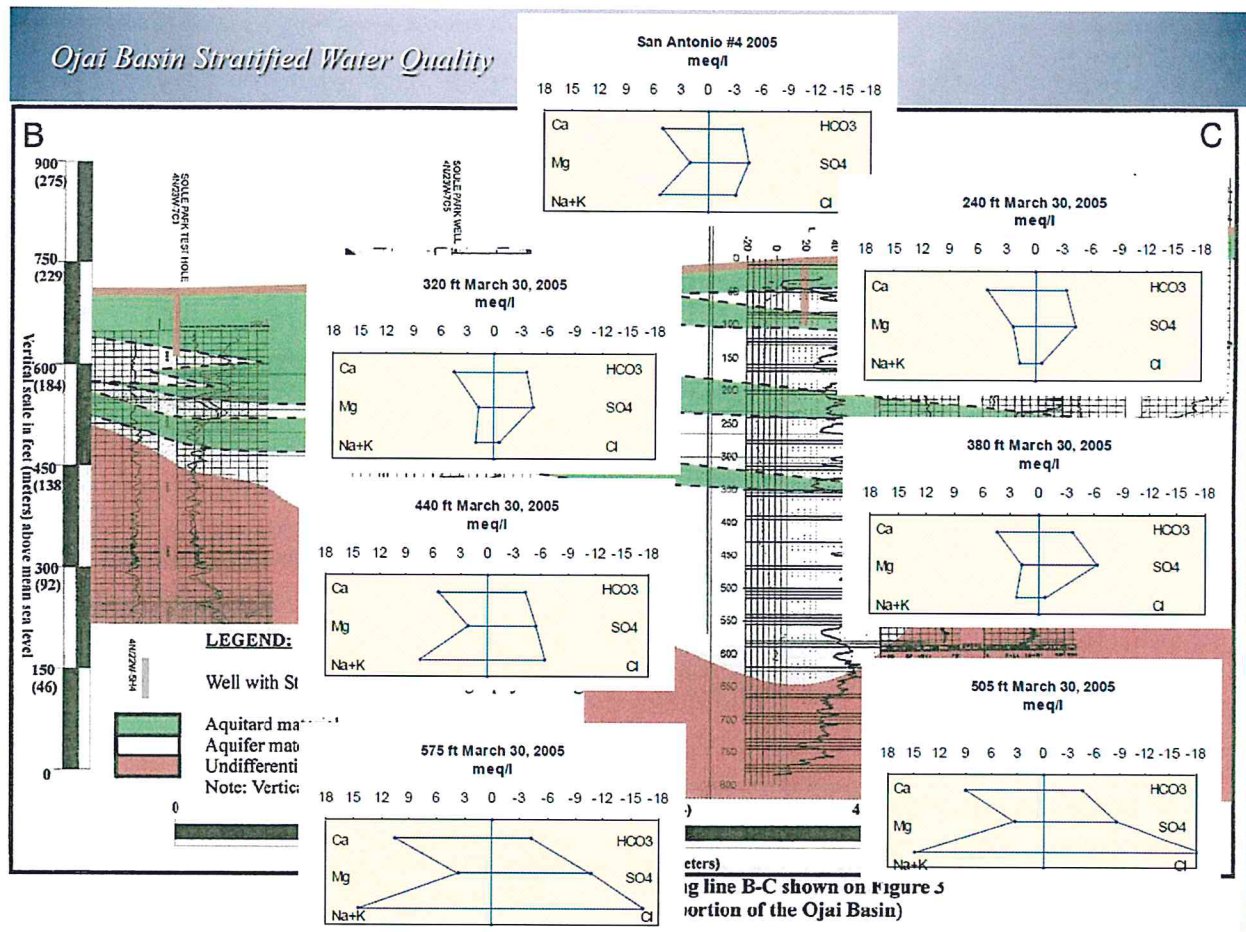


EXHIBIT 1: Ojai Basin Stratified Water Quality

Lower Tier Projects

Lower tier projects will be examined briefly, with enough information to determine the initial feasibility.

Lower Tier Project List

The list of lower tier projects follows:

- Item 7. Scalping Plant on OVSD Collector Main for Wastewater Re-Use at Ojai Valley Inn
- Item 8. Fire Hydrant and Dead End Flush Water Re-Use
- Item 9. Matilija Dam Groundwater/Surface Water
- Item 10. Debris Basin Enhanced Percolation Stations, Etc.
- Item 11. Santa Ana Road Underground Stream
- Item 12. Environmental/Habitat Modifications

**CASITAS MUNICIPAL WATER DISTRICT
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Preliminary Water Security Project Analysis

**ITEM 7. SCALPING PLANT ON OVSD COLLECTOR
MAIN FOR WASTEWATER RE-USE AT OJAI VALLEY INN**

Project Description

The Item 7 Scalping Plant on Ojai Valley Sanitary District (OVSD) Collector Main for Wastewater Re-Use at Ojai Valley Inn project is comprised of evaluating the installation of a package wastewater treatment plant (“scalping plant”) along with appurtenances such as manholes, cleanouts, siphons and lift stations to deliver treated wastewater to the Ojai Valley Inn Golf Course irrigation system. (See Item 1-6 Project Location Plan.)

The “scalped” wastewater from the OVSD collector main will be directed to the package treatment plant, ideally located at a low point in the selected area. The treatment plant will need to be sited in an area of easy access near the OVI water service on a parcel that CMWD may need to acquire.

The “scalped” influent will be treated by means of a centralized redundant extended aeration system including anoxic chambers and clarification followed by membrane filtration and disinfection to meet tertiary standards. A sludge processing system will be included to decant the brine/sludge, reducing volume and decreasing water loss. (Alternatively, the brine could be returned to the collector main.) The treated effluent would then be piped to the OVI irrigation system.

Production

OVSD Staff have stated that as much as 100,000 gallons per day could be “scalped” from the nearby collection main. Since treated wastewater storage is not contemplated, the “production” will be limited to what can be used on a daily basis. Assuming that the rainfall ETo deficit is positive 8 months of the year, the plant can produce and irrigation system deliver approximately 74 AFY.

By installing an injection well, the remaining 4 months discharge (37 AF) can be introduced into the groundwater basin.

Water Quality

Due to the fact that the proposed system will normally be discharging treated effluent to the OVI irrigation system, the quality of the treated water must meet or exceed that of the Groundwater Basin Plan as administered by the Los Angeles Regional Water Quality Control Board (Water Board), as well as the requirements of CDPH for recycled water. Lowering the levels of nitrate and chloride will be the challenge for this system. Due to the proposed high level of treatment (final membrane filtration) of this water, overall quality is expected to be good.

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Reliability

Judging relative reliability relating to production, Item 7 is high in that the system only “scalps” a fraction of the OVSD flow at the point of connection.

Water Rights

There do not appear to be any water rights issues to be dealt with if this item is implemented.

Public Agency Involvement

For this project it is anticipated that the involved agencies will include the Water Board, California Department of Public Health, the Ojai Basin Groundwater Management Agency, and Ventura County Planning. Additionally, work on the OVSD CUP such as a modification or possibly a new CUP, may be necessary. Other issues related to reducing the waste stream at the OVSD plant may arise, which may involve the CA Department of Fish and Wildlife, the US Army Corps of Engineers, the National Marine Fisheries Service/NOAA, the City of Ventura (regarding rights to the discharge), and possible others.

California Environmental Quality Act

This project will trigger the California Environmental Quality Act (CEQA) process due to possible discretionary permitting requirements. It is likely that the “scalped” water to a centralized treatment plant and the development of a site will have potential for resulting in either a direct or potential physical change in the environment. An Initial Study will be required to determine the level of environmental documentation to be prepared, most likely an Environmental Impact Report (EIR).

Opinion of Probable Cost

Anticipated capital cost of the project is \$2.0 million, and operation costs approximately \$150,000 per year.

Project Timeline

From initiation of design through the environmental review process to completion of construction, if the project is allowed to progress without delay, the total time is estimated at 4 years.

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**ITEM 8. FIRE HYDRANT AND DEAD END
FLUSH WATER RE-USE**

Project Description

Item 8, Fire Hydrant and Dead End Flush Water Re-Use addresses the concept of capturing the flush water and using it for irrigation. CMWD completes fire hydrant and dead end flushing on an as-needed basis, whenever the chlorine residual drops below a pre-determined level or when other water quality issues are present. A large diameter hose and 5,000 gallon truck could be utilized to capture and temporarily store the water and then deliver it to a prearranged user.

Production

Generally, the flushed water enters the stormdrain system. CMWD records show that approximately 105,000 G/Y water is lost to flushing.

Water Quality

Once the water comes in contact with atmosphere, it becomes non-potable. This is not an issue since it would conceivably be used for irrigation.

Reliability

Quantities may vary due to the as-needed basis of flushing.

Public Agency Involvement

CDPH would likely need to be noticed about the re-use arrangement.

Conclusion

Although it is a good practice not to “waste”¹ water, the re-use of flush water does not represent a major factor in “new” water for CMWD.

ITEM 9. MATILIJA DAM GROUNDWATER/SURFACE WATER

Project Description

Item 9, Matilija Dam Groundwater/Surface Water involves collecting and ultimately transmitting and storing water that currently exists in the shallow sediments in and near Matilija Lake, and water behind the dam.

¹ Please note that currently the discharged flush water enters the storm drain which eventually helps recharge the groundwater basin.

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At present, this water spills over the dam and flows into the Upper Ventura River groundwater basin and is also used by several retail purveyors and private parties. Additionally, it maintains a significant level of the diverse habitat on the local portion of the River.

Production

Based on USACE information and information presented in the EIR associated with the Matilija Dam Removal, it is estimated that there is approximately 500 AF in surface and subsurface storage behind the dam which could be piped directly to the Robles Diversion, then directed into the canal to be stored in Lake Casitas.

While this water may be accessible for short-term use, it is estimated that if the entire 500 AF were extracted, and the current drought continues, it would take some 2 years for that amount to be available again.

Additionally, there are several issues with its extraction, including dam stability hydrocompaction of sediment materials, and water quality, not to mention that the water in subsurface storage helps to maintain the Lake "full" and allows for spilling over the dam face.

Conclusion

Based on the above, the groundwater and surface water resources of Matilija Lake and the sediments therein are discounted as a significant "new" potential water source for CMWD.

ITEM 10. DEBRIS BASIN "ENHANCED" PERCOLATION

Project Description

Item 10 consists of examining if percolation can be enhanced by changing practices at debris basins.

There are 3 existing debris basins in the Ventura River Watershed that could aid in re-charging the groundwater basin.

An appropriate technique to improve a relatively flat area to allow higher (enhanced) percolation is to "scarify" the surface with a springtooth or ripper. Focusing on the debris basins, during operations to remove debris, the basin bottom is left in a similar condition and so the percolation will be "enhanced" as a matter of normal maintenance.

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In other words, if the debris basin is maintained properly, the resultant percolation will be “enhanced”.

Production

If the debris basins are maintained properly as suggested above, there should be no appreciable difference in recharge from cleanout to cleanout.

Conclusion

Debris basin “enhanced” percolation practices are being followed presently and so there is little if any benefit to doing more. Therefore, this practice will not be a source of “new” water for CMWD.

ITEM 11. SANTA ANA ROAD UNDERGROUND STREAM

Project Description

Item 11 is the “Santa Ana Road Underground Stream”. Based largely on anecdotal information, the Santa Ana Road “underground stream” is a term given to a portion of subsurface water draining into the Upper Ventura River groundwater basin near Oak View.

Production

This water has been indicated by observations of a relatively shallow and stable water level in a local, lightly-used groundwater well. In reality, this water is likely of very limited utility due to low production capacity if stressed, and reported high and consistent water levels are likely a result of low use and bedrock/alluvium morphology rather than a significant resource that may be available to CMWD.

Please also note that water flowing into the Upper Ventura River Basin (UVRB) via the local creeks and streams, including subsurface flow similar to the “Underground Stream”, will likely be subject to management or allocation under the forthcoming groundwater sustainability plan (GSP) for the UVRB. Any additional withdrawal may be subject to review per the tenets of the GSP and/or challenge by downstream users.

Conclusion

Based on the above, the Santa Ana road “Underground Stream” has been discounted as a potential new water source for CMWD.

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Preliminary Water Security Project Analysis

ITEM 12. ENVIRONMENTAL/HABITAT MODIFICATIONS

Project Description

Item 13 Environmental/Habitat Modification, for the focus of this Analysis, consists of modifying (removal) of two major water consuming plants; turfgrass and arrundo donax (arrundo).

Production

In a moderately high temperature environment such as Ojai, turfgrass can take up to 4.0 AFY/A of irrigation water. Removal and replacement with low water usage plants. Removal offers and approximate 3.0 AFY/A direct savings of water that will stay in the Lake.

Arundo can take up to 24¹ AFY per AFY/A. Arundo removal and replacement with native riparian plants will result in a savings in the riparian water and ultimately the groundwater of approximately 20 AF/A/Y. This would be a "savings" that would help recharge the groundwater basin as well as help keep the river alluvium saturated.

Reliability

Reliability of the savings due to turfgrass removal is very high. Savings due to arrundo removal is subject to maintaining the native plantings and not letting the arrundo re-establish itself.

Water Rights/Legal Issues

There appear to be no water rights or legal issues.

Public Agency Involvement (Mostly for Arundo Removal)

The involved agencies will include: Watershed Protection District, CA DFW, USACE, NMFS/NOAA and the Regional Water Quality Control Board.

California Environmental Quality Act

The removals detailed herein will not likely trigger CEQA. There are removal projects within the watershed that have already been permitted.

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Preliminary Water Security Project Analysis

Opinion of Probable Cost

Turfgrass removal and replacement with drought tolerant landscape meeting all County requirements: \$100,000-\$125,000/A

Arundo removal and replacement with natives: approximately \$20,000/A

General Information on Grant Funding for Emergency Drought Preparedness

¹ Impacts of Arundo, Section 4.2 by Mr. .

**CASITAS MUNICIPAL WATER DISTRICT
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Preliminary Water Security Project Analysis

PRELIMINARY OPINION OF PROBABLE COST

Item 1. Matilija Formation Horizontal Bores

Item	Qty	Description	Unit	Total
1.	1	Job, Drill well	\$2,000,000	\$2,000,000
2.	1	Job, Plumb well discharge	50,000	50,000
3.	1	Job, Well site preparation	25,000	25,000
4.	1	Job, Construct headworks discharge structure and pipe to lake or canal	2,000,000 ^{1,2}	2,000,000
5.	1	Job, Geologist consulting, project management	50,000	50,000
6.	1	Job, Engineering	25,000	25,000
7.	1	Job, Permitting	10,000	10,000
8.	1	Job, Environmental, CEQA work	125,000	125,000
			Sub-total =	\$4,285,000
			Contingencies @ 30% =	1,285,500
			Item 1 Grand Total =	\$5,570,500

Notes:

1. Cost shown is for 1-well. Some of Line Item 8, Environmental, CEQA Work, would be applicable to all 3 wells.
2. Item 4 is to be considered an allowance, based on the 10,000 central HoBo distance to the canal (15,000+/-).

Prepared by:

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**CASITAS MUNICIPAL WATER DISTRICT
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PRELIMINARY OPINION OF PROBABLE COST

Item 2. Ojai East Septic Collection, Package Treatment and Recharge
Preliminary Opinion of Probable Capital Cost

Item	Qty	Description	Unit	Total
1.	1	EA, 75,000 GPD Extended Aeration Package Plant in place with membrane filtration, sludge processing system	\$750,000	\$750,000
2.	1	Job, Site prep, grading, drainage	25,000	25,000
3.	1	Job, Site and plant electrical	50,000	50,000
4.	1300	L.F., 3" Force main	30	39,000
5.	1	Job, Post treatment lift station in place	50,000	50,000
6.	90	EA, Manholes	3,500	315,000
7.	8,500	L.F., 8" Sewer main	100	850,000
8.	36,500	L.F., 6" Sewer main	85	3,102,500
9.	300	EA, Sewer lateral connections	150	600,000
10.	15,000	L.F., 4" Lateral pipe	40	600,000
11.	300	Jobs, Abandon septic tank/leachfields	3,000	900,000
12.	2	Jobs, Cross creek	100,000	200,000
13.	1	Job, Environmental, CEQA work	100,000	100,000
14.	1	Job, Engineering and project management	700,000	700,000
15.	1	Lot, 100' x 100' Purchase @ \$500,000/AC	115,000	115,000
16.	1	Job, Legal fees	50,000	50,000
			Sub-total =	\$8,446,500
			Contingencies @ 30% =	2,533,950
			Item 1 Grand Total =	\$10,980,450

Note: No costs or fees relating to Special District formation (if required) are included herein.

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**CASITAS MUNICIPAL WATER DISTRICT
Ventura County, CA**

Preliminary Water Security Project Analysis

PRELIMINARY OPINION OF PROBABLE COST

Item 4. Replace Matilija Conduit from Matilija Chlorinator to Matilija Hot Springs

Item	Qty	Description	Unit	Total
1.	6,680	L.F. 12" DR 14 C900 PVC Pipe	\$85	\$567,800
2.	2,380	L.F. 8" DR 14 C900 PVC Pipe	70	166,600
3.	780	L.F. 2" Sch 80 PVC Pipe	20	15,600
4.	3	12" Gate valve	3,000	9,000
5.	2	8" Gate valve	2,000	4,000
6.	2	2" Gate valve	150	300
7.	1	Tie in at Chlorinator	15,000	5,000
8.	2	Fire hydrant assembly	4,000	8,000
9.	2	Air and vacuum valve assembly	2,000	4,000
10.	12	Jobs, Service connections	200	2,400
11.	1	Job, cross river (slipline in existing pipe)	50,000	50,000
12.	1	Job, Environmental and CEQA work	50,000	50,000
13.	1	Job, Surveying, engineering and project management.	50,000	50,000

Sub-total = \$932,700

Contingencies @ 30% = 279,810

Item 4 Grand Total = \$1,212,510

Note: Item 4 is currently included with other projects in the CMWD 10 year 2017-2026 Capital Improvement Program. The scheduled construction period is currently 2020 to 2022, assuming the removal of the Matilija Dam takes place beforehand.

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**CASITAS MUNICIPAL WATER DISTRICT
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Preliminary Water Security Project Analysis

PRELIMINARY OPINION OF PROBABLE COST

Item 5. Renovate Senior Canyon Mutual Water Company Horizontal Well

Item	Qty	Description	Unit	Total
1.	1	Job, Consult with Geologist	\$7,500	\$7,500
2.	1	Job, Project permitting, obtain exemption	5,000	5,000
3.	1	Job, Clean 2200' of tunnel including "de-scaling" walls and floor	22,000	22,000
4.	1	Job, Remove debris and stockpile with small loader	11,000	11,000
5.	1	Job, Load dump truck and stockpile down canyon.	12,000	12,000
6.	1	Job, Load truck and trailer and dispose of at approved site	15,000	15,000
8.	1	Job, Tunnel safety, oxygenation, confined space requirements	20,000	20,000
9.	1	Job, Seal permeable formations in floor	5,000	5,000
10.	1	Job, Drill holes in walls	5,000	5,000
			Sub-total =	\$102,500
			Contingencies @ 30% =	30,750
			Item 5 Grand Total =	\$133,250

Note: Based on removal of 350 Y³ of material.

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**CASITAS MUNICIPAL WATER DISTRICT
Ventura County, CA**

Preliminary Water Security Project Analysis

PRELIMINARY OPINION OF PROBABLE COST

Item 6. Ojai Desalter

Item	Qty	Description	Unit	Total
1.	1	EA, 300,000 GPD membrane filtration (desalter) plant, with provisions for brine to be directed to OVSD collector	\$850,000	\$850,000
2.	1	Job, Site prep, grading, drainage	10,000	10,000
3.	1	Job, Site and plant electrical	50,000	50,000
4.	1	Job, Modifications to existing well for use as brackish water supply, install well pump	200,000	200,000
5.	1	Job, Post treatment potable water booster pump station in place, including piping and connection to existing distribution system.	100,000	100,000
6.	1	Job, Piping from existing well to treatment system	10,000	10,000
7.	1	Job, Environmental, CEQA, CUP work	100,000	100,000
8.	1	Job, Engineering and project management	600,000	600,000
9.	1	Lot, 50' x 50' Purchase @ \$500,000/AC	30,000	30,000
10.	1	Job, Legal work	50,000	50,000
			Sub-total =	\$2,000,000
			Contingencies @ 30% =	600,000
			Item 6 Grand Total =	\$2,600,000

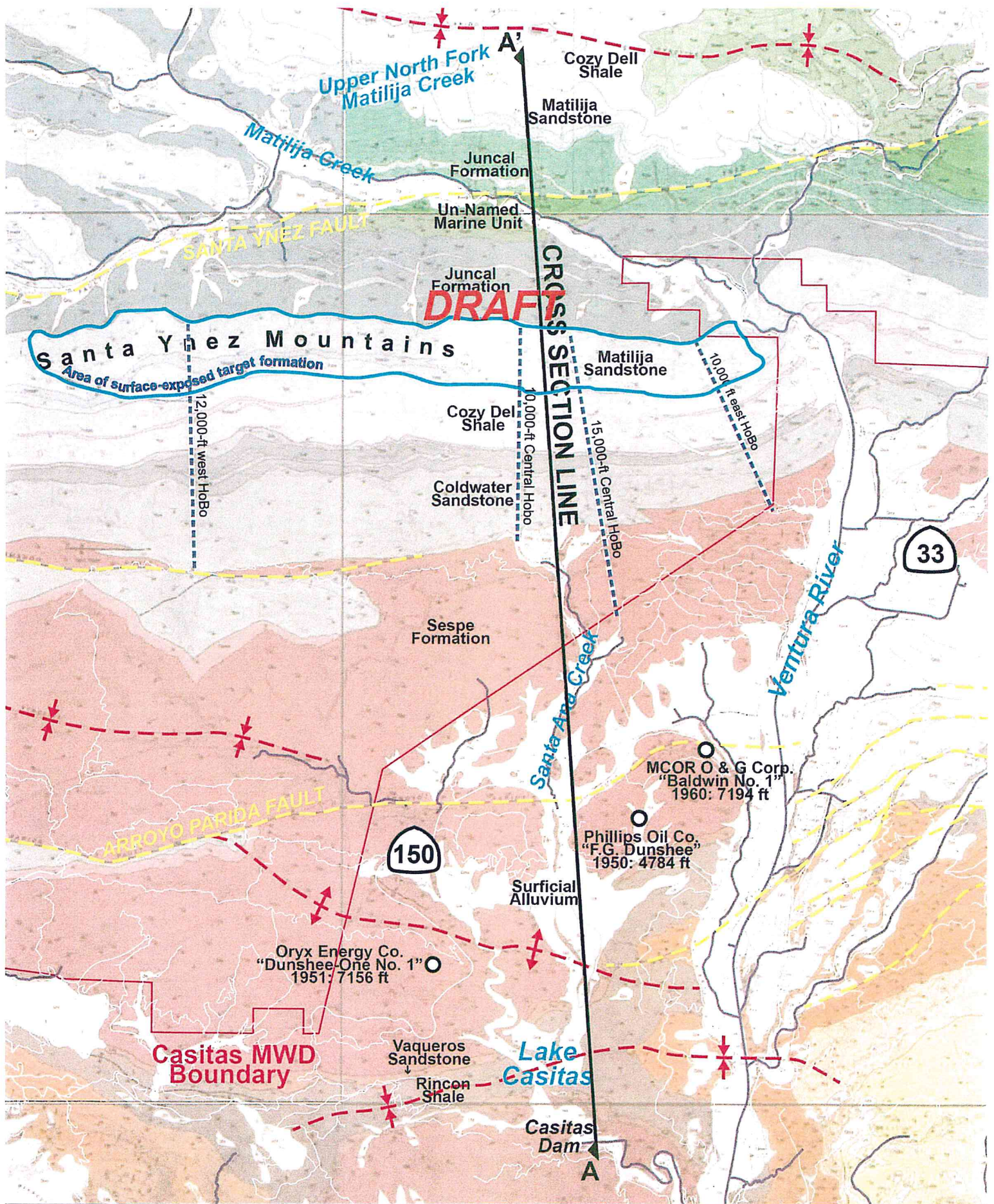
Note: Add \$300,000 if a new well is needed.

Prepared by:

WREA

WATER RESOURCE ENGINEERING ASSOCIATES
2300 Alessandro Drive, Suite 215, Ventura, CA 93001
(805) 653-7900 800-25-WATER Fax (805) 653-0610
10/14/2016





Geology: Dibblee
(1985a,b; 1987a,b; 1988)

0 1 2 miles

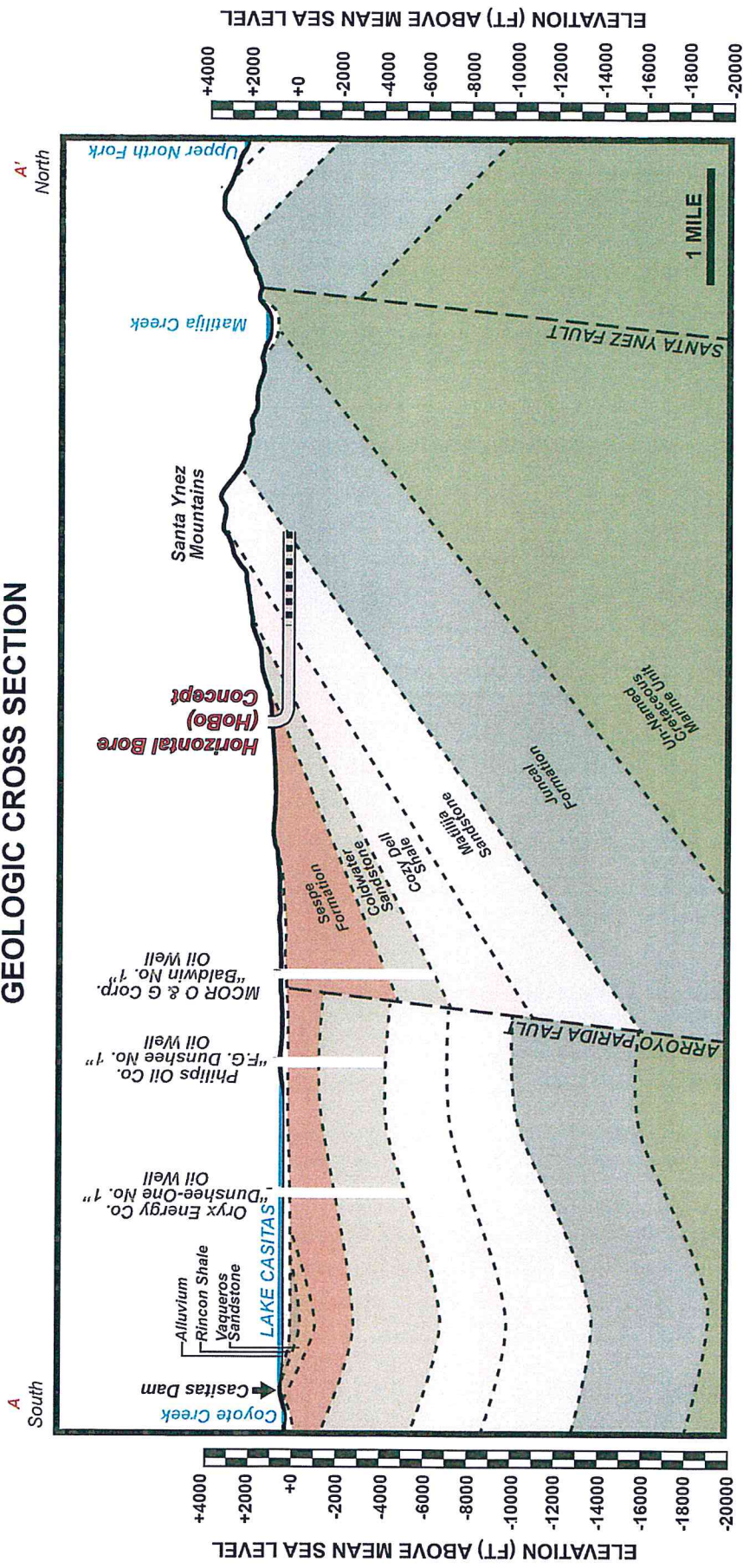


Casitas MWD
KG16-0335
Geologic Map



DRAFT

GEOLOGIC CROSS SECTION



APPROX. NO VERTICAL EXAGGERATION
See Aerial/Geologic Map Figures for Cross Section Line

Ground Surface Profile: Google Earth
Surface Geology: Dibblee (1985, 1987, 1988)

Casitas Municipal Water District
KG16-0335
Cross Section

