Castle Rock County Water District

Facilities Condition Assessment and Evaluation

September 2015

Causey Consulting
733 Cree Court
Walnut Creek, CA 94598

Table of Contents

Figures

Tables

Castle Rock County Water District
Facilities Condition Assessment and Evaluation

I. Executive Summary

The Contra Costa County Local Agency Formation Commission has become aware of the existence of the Castle Rock County Water District, and requested in a September 10, 2014 letter that the District provide information and an assessment of the reservoir, pump station and ancillary infrastructure operated and maintained by the District. This California Special District provides raw untreated water to approximately fifty-five customers in the District's 150-acre service area located in Walnut Creek and unincorporated Contra Costa County. All supplied water is purchased from the Contra Costa Water District raw water canal and pumped from the District pump station through the District distribution system to a terminal redwood storage tank at a site in the Borges Ranch open space.

Most District assets were constructed in 1955 and 1956 and LAFCO is concerned that they may be approaching the end of their normal service lives. The age of these assets and LAFCOs lack of information about the operation and maintenance of the District has lead to the request for a site review/study to verify the condition of the District assets by a qualified engineer. In May 2015, the District contracted with Causey Consulting to prepare the attached Facilities Condition Assessment and Evaluation Report ("Report"). Causey Consulting reviewed maintenance records and financial reports provided by the District, met with the Board President several times and conducted multiple field inspections of the pumping facilities, reservoir and distribution system assets.

The report is composed with the following sections providing the following information and assessment of the District facilities:

- Purpose of the Report
- District Description
- System Overview
- Operations and Maintenance Program
- Financial Background
- Renewal and Replacement of Assets
- Summary and Recommendations

The results of the assessment and evaluations have lead to several recommendations to enhance the operations of the District assets and to recommend that the District begin the process of developing philosophy and renewal and replacement evaluations of the redwood storage tank and distribution pipelines. While the system assets are indeed old, the District has not experienced any significant repairs or unusual expenses to keep the major elements of the system operating properly and as designed. Current annual repair and replacement costs have been limited to less than 15% of the District annual expenditures. The District reserves have been adequate to fund

all necessary maintenance activities and pumping renewal and replacement since inception and as the Board becomes reactively aware of other system needs. The District maintenance philosophy is generally run to failure and this works for the pumps and for minor pipeline repairs. However the major District asset, the redwood storage tank, may require substantial expenditures for replacement in the next few years that may exceed the available reserves if proper planning and identification of funding requirements do not take place. This also assumes that the District will not suffer significant damage from seismic activity in the service area as the Board has never conducted any seismic or structural evaluation of the system assets.

II. Purpose of Report

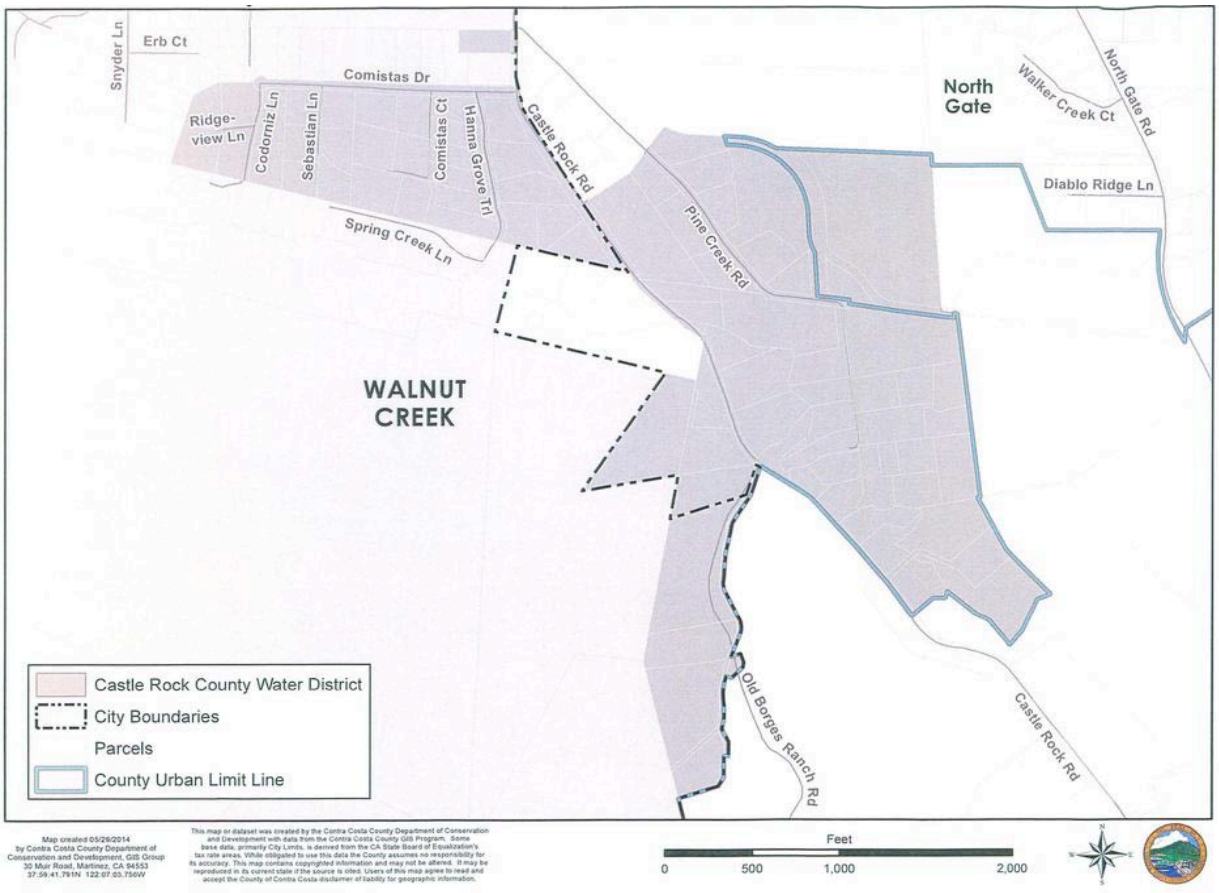
The Castle Rock County Water District ("District") is an independent California special District located in Contra Costa County California and is responsible to the County Local Agency Formation Commission (LAFCO). Recently LAFCO became aware of the District and has since sought information about the operations and maintenance of the District and the condition of the infrastructure. In that regard, they included the District in the May 14, 2014 Combined Municipal Services Review and Sphere of Influence Study (2nd Round) (MSR) of County special districts and contacted the District directly in a September 10, 2014 letter requesting a condition assessment of the District facilities. This report is intended to provide the requested condition assessment and evaluation along with observations of the District operations.

Causey Consulting (Consultant) was hired in May 2015 to conduct the assessment and evaluation of the District infrastructure and prepare the attached report for the Board of Directors. Causey Consulting conducted a field inspection with Mr. Fred Allen, President of the Board and Mr. Richard Hoag, Board member on July 9, 2015 (see Appendices A and B for the completed inspection reports). Further site visits were also conducted on May 26th and August 7, 2015 to photograph facilities. In addition interviews with the District bookkeeper, pump station maintenance service contractor, the City of Walnut Creek and the Contra Costa Water District were conducted to develop a further understanding of the operations and maintenance of the District facilities. Finally, both Mr. Allen and the Bookkeeper provide historical documents on the facilities to further assist in the evaluation of the maintenance and financial operations.

III. District Description

The District is a small, independent county water District serving rural properties located in the City of Walnut Creek and the surrounding unincorporated Contra Costa County area. The District was formed March 17, 1955, pursuant to the California County Water District Law, California Water Code Division 12, Section 30000 et seq. A five member, publically elected Board of Directors who volunteer their services and provide some of the operations and maintenance activities of the District, governs the District. The District serves an estimated population of 137 persons living on approximately 150 acres. A map of District's current boundary is shown in Figure 1 below. The District provides only untreated raw water to the rural service area for domestic use, landscape irrigation and commercial horse stables.

Figure 1: District Boundaries



The District has 55 connections utilizing untreated raw water for landscape irrigation, some commercial uses and four commercial stables. The District purchases untreated raw water from the Contra Costa Water District (CCWD) canal located along Oak Grove Road between Filbert Drive and Walnut Avenue in Walnut Creek (See Fig. 4). Approximately 20% of District's customers use District water purchased in their own homes and are responsible for any/all potable water treatment for these domestic uses.

Residential zoning within the District requires lots to be a minimum of one acre in size. The service area for the District is built out, and the current service population is not expected to increase. According to the Board President, in the 1980s, CCWD expanded their service area to the Castle Rock area and offered treated water service if connection fees were paid and meters were installed by prospective customers. Only 20% of the homes elected not to connect to CCWD and the rest are provided treated, potable water from CCWD in addition to the untreated raw water from the District.

IV. System Overview – General Asset and Operations Descriptions

A. General

The District operates a single-purpose water supply operation providing raw untreated water to its customers through water system infrastructure that includes a water pump station, approximately 22,700 linear feet of pipelines ranging from 1-1/2 inches to 8 inches in diameter and one approximately 125,000 gallon redwood water storage tank. The majority of these assets were installed new in 1955 and 1956 with the exception of the redwood storage tank that was purchased used and installed at that same time. The only major addition to the system occurred in the mid-1970s in the Comistas Drive area.

The District purchases all water sold from the CCWD raw water canal located at Oak Grove Road in Walnut Creek. There have been times when CCWD conducts maintenance on the canal and CCWD supplies treated water to the pump station and the District sells this water in the service area during these times. CCWD has recently indicated their desire to interrupt the availability of water in the canal annually in winter for maintenance and is working with the District to manage and coordinate this issue with the Board of Directors.

The District purchased 28,843,080 gallons in 2013, 20,728,000 gallons of water from CCWD in 2014 and has purchased 8,098,000 through June 2015. The average monthly purchases range from 3,795,787 gallons to a low of 553,000 gallons during the winter. CCWD has reduced the Districts purchases in the second half of 2015 to 20% of the gallons purchased in 2013. Figure 2 and 3 below provide graphs of the monthly and average water consumption form the monthly CCWD water bills.

Currently District employs several service contractors to assist with the operations, administration and billing of District activities on an as needed or reactive basis. The Board of Directors handles all meter reading, minor repairs to District facilities supported by service contractors for larger repairs. These service contracts include pump station and electrical operations and maintenance, major pipeline repairs and replacements and major tank and access road maintenance as needed to assure proper access and operation of the storage tank.

Due to the early date of installation of the District assets, no seismic evaluations have ever been conducted on these facilities and this report did not include any seismic evaluation as part of the scope of work. In addition, the Consultant has not been made aware of any formal evaluation of the structural integrity of the wooden storage tank as part of our evaluation. If this tank were to remain in service, it would be appropriate to consider a structural and seismic evaluation of the tank in the future.

Figure 2: Water Purchased, Gallons

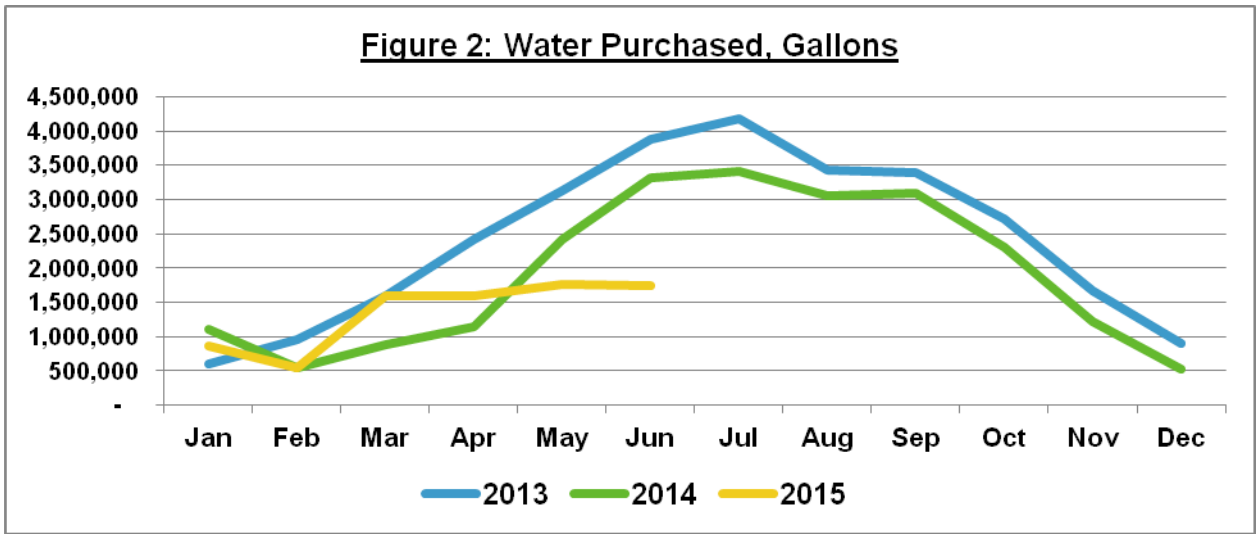
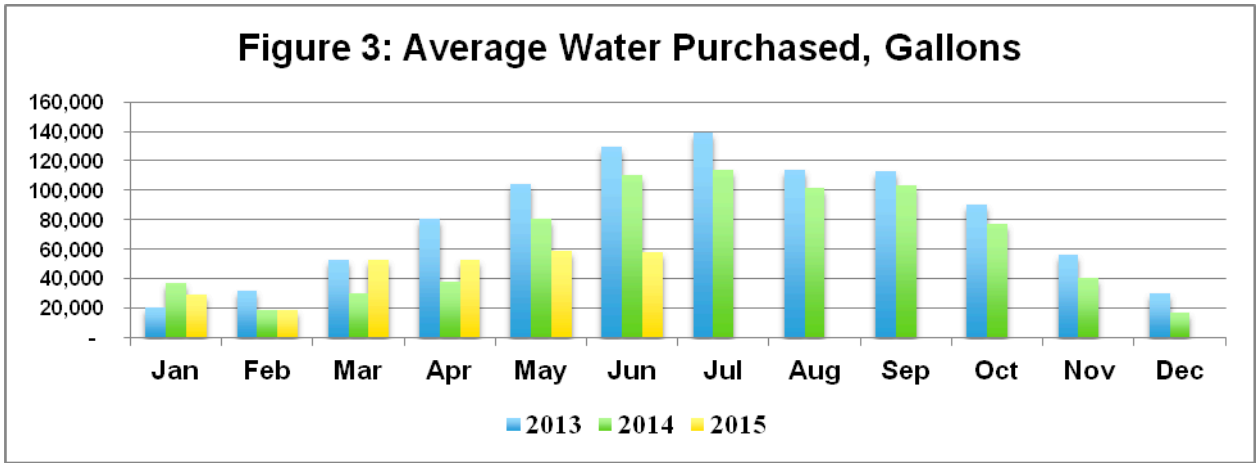


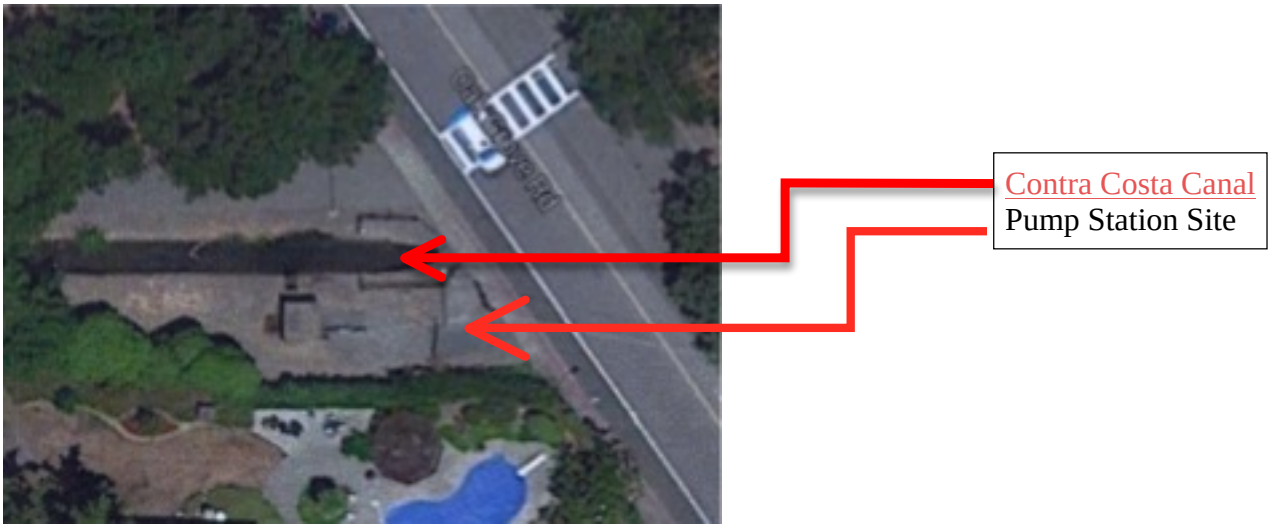
Figure 3: Average Water Purchased, Gallons



B. Pump Station

The District purchases all water distributed in the service area from the CCWD canal located along the southbound lane of Oak Grove Road in Walnut Creek between Filbert Drive and Walnut Avenue. See Figure 4 below. The pump station inlet is located on the west side of Oak Grove Road and the south side of the canal. The pump station is located within a six foot fenced area immediately adjacent to the canal which is on United States Bureau of Reclamation right-of-way. The fenced area does not prevent access to the pump house and discharge piping. There does not appear to be an easement or an access agreement between the District, the CCWD or the Bureau of Reclamation for the use of this site. Contacts at CCWD were not able to locate any original documentation for the use of this site for the pump facilities.

Figure 4: Pump Station Site



The area inside the fence includes a pump house, discharge piping, CCWD metering, dedicated telephone service for pump operation, and a PG&E 240/480 volt power drop to the pump house. The fenced site has no lighting inside the fence however there is a City street light located approximately 50 feet south of the canal right-of-way that does provide all of the lighting for the site. The discharge of the untreated water from the pump house is at an approximate elevation of 176 feet above sea level.

Raw untreated water enters the pump station through a bar screen in the concrete lining of the canal (See Fig 5). The water then enters the wet well where two (2) hollow shaft motors are available to pump the untreated water to the District service area and the terminal redwood stave storage tank described below. The wet well is 8.33' x 6' x 7.5 and contains an approximate maximum volume of 2800 gallons. The District operates only one pump at a time using the second pump as an emergency backup.

Figure 5: Pump Station Inlet Screen

The pump house is a wooden structure that is 8.75 feet by 8.83 feet with a single locked access door to the pumps and electrical controls facing Oak Grove Road (see Figure 6 below) and a locked roof opening for access for the removal and replacement of the motors and pumps .

Figure 6: Pump House and Discharge Pipe

The pump house contains two pumps, discharge piping, isolation valving, pressure gauges and all electrical controls for the pumps including a time clock and dedicated telephone line that transmits the float signals from the storage tank to turn the pumps on/off during normal operating hours (See Figures 7 and 8). The District's normal operating hours are from 6:00 PM to noon the following day. No pumping is done during the high-energy rate hours of noon to 6:00 PM.

Figure 7: Pump Controls in Pump House

Figure 8: Pump Motors in Pump House

The western exposure of the pump house provides ventilation and cooling for the motors and is screened to prevent access or vandalism to the inside of the pump house (See Figure 9).

Figure 9: Pump House Ventilation – Western Exposure

The main power supply to the pump house comes from a PG&E overhead electrical drop and transformer on a pole just to the east and across Oak Grove Rd. from the pump house. The pump house was installed during the original construction in 1956 and has had only minor maintenance or repairs to the structure since the original construction. The pump house has not been evaluated nor does it appear to contain any seismic reinforcement to withstand a major seismic event. To date the pump house has not been damaged or been affected by previous seismic activity. The overhead telephone wires from the float controls also terminate inside the pump house.

The pump house is open to the weather and does leak during the winter rains. The old wood is aged and cracked but continues to provide serviceable containment for the pump facilities. The inside of the pump house did evidence a large quantity of cobwebs and dust during the field inspection which should be dealt with on a regular basis to assure that the electrical components are not damaged or affected by insects or spiders. This is especially true for the electrical cabinet in the station as these bugs and spider cobwebs can create problems for the electrical components if allowed to remain in the cabinet.

The pump house contains two motor and pump combinations, one 35 horsepower and one 25 horsepower motors connected to hollow shaft pumps. The pump house does not contain any standby power capabilities as the Board has determined that they are able to operate from the storage reservoir if there is an electrical failure.

The discharge lines from the pumps are four inches in diameter and include isolation gate valves inside the pump house. There also is a pressure gauge on the discharge header. The discharge header exits the pump house, increases in size to six inches and remains above ground for approximately 15 feet before moving underground for the transmission to the service area along the eastern shoulder of Oak Grove Road. The discharge header includes two additional isolation valves and a CCWD meter and telemetry system for the raw untreated water purchased by the District. These pieces of equipment are fully exposed above ground and one of the gate valves is locked to prevent illegal operation (See Figure10 below)

Figure 10: Discharge Header from Pump House

C. Pipelines

The District provides all service through approximately 22,700 linear feet of polyvinylchloride (PVC) and asbestos cement (ACP) pipelines that were installed during construction of the District in 1956. A second set of pipes was installed during the District expansion to the Comistas Drive area in the 1970s. This distribution system of pipes ranges in size from eight (8) inches to one and a half (1-1/2) inches in diameter but no plans were provided to delineate the Comistas Court asset additions nor does the asset register include the valuing of these new assets. Table 1 provides information by material and size for District pipes – these are rough estimates from an existing map showing most of the pipes now in service and has not been field verified. From these records, it does not appear that any asset values for the Comistas service area pipelines and appurtenances was ever added to the asset register. We assume that the Board of Directors upon completion accepted those assets for maintenance. The estimated length of pipe in the Comistas area is 3,300 linear feet of mostly six inch ACP. The pipelines also contain a few strategically placed gate valves for system isolation and operations. Finally the system also includes nine (9) four inch (4) wharf hydrants for purposes of removing air from the system.

The District currently has a single large map of the piping system that is undated and does not include the Comistas Court addition. This map provides most of the information related to the piping system including metering locations for each of the properties at the time of the preparation of the map. It is recommended that the District update their mapping to include the entire piping system of the District. The District also has a copy of the original 1956 construction plans for the pipelines that provide sizes and approximate locations in the field.

All customers are required to have a water meter installed at their property line for the measurement of water purchased from the District. The Board members for billing of the customers read these meters quarterly. The billing is prepared and mailed by the District contract bookkeeper with follow-up by the Board members if accounts become delinquent for failure to timely pay.

All pipelines appear to be located in public rights-of-way and are generally located out of the paved roadway and on the shoulder of the roads except in the Comistas service area. The only exceptions are the pipelines to the Pine Creek area and to the storage tank. The pipe supplying the Pine Creek area crosses private property from a tee on Castle Rock Road and follows

property lines until the pipe reaches Pine Creek Road at which point it tees north and south to supply that area. The tank Fill and discharge line leaves Old Borges Ranch Road and follows a dirt and gravel road to the terminal storage tank at which point a PVC siphon discharges the untreated raw water near the inside bottom of the redwood tank (see Figure 11 below).

Figure 11: Raw Water Discharge Point

The original installed cost of all pipelines, hydrants, valves and engineering design in 1955/56 was approximately $46,100. These values are from the Transmission and Distribution System Asset register dated June 30, 2012 that includes the entire historical record of initial costs and depreciation.

Based upon the linear feet of pipe in Table 1 below, it is estimated that the current replacement value of all District pipelines ranges from $1,250,000 to $1,500,000 based upon present day construction values of between $50 and $75 per linear foot assuming most of the lines are not under paved streets. The costs for replacement under paved surfaces could easily double these per linear foot construction costs. At these estimated prices, the current District reserves could only replace approximately 2,000 linear feet of existing pipe before exhausting the entire reserve balance.

Table 1, Castle Rock County Water District System Pipe Information

Pipe Diameter	Asbestos Cement	Galvanized	PVC	Unknown	Total Feet	Total Miles	Percent of System
8 inch	6,400	0	0	0	6,400	1.21	28.16%
6 inch	13,201	0	0	952	14,153	2.68	62.27%
2 inch	0	563	563	0	1,126	0.21	4.95%
1-1/2 inch	0	1050	0	0	1,050	0.20	4.62%
Totals	19,601	1,613	563	952	22,729	4.30	100.00%

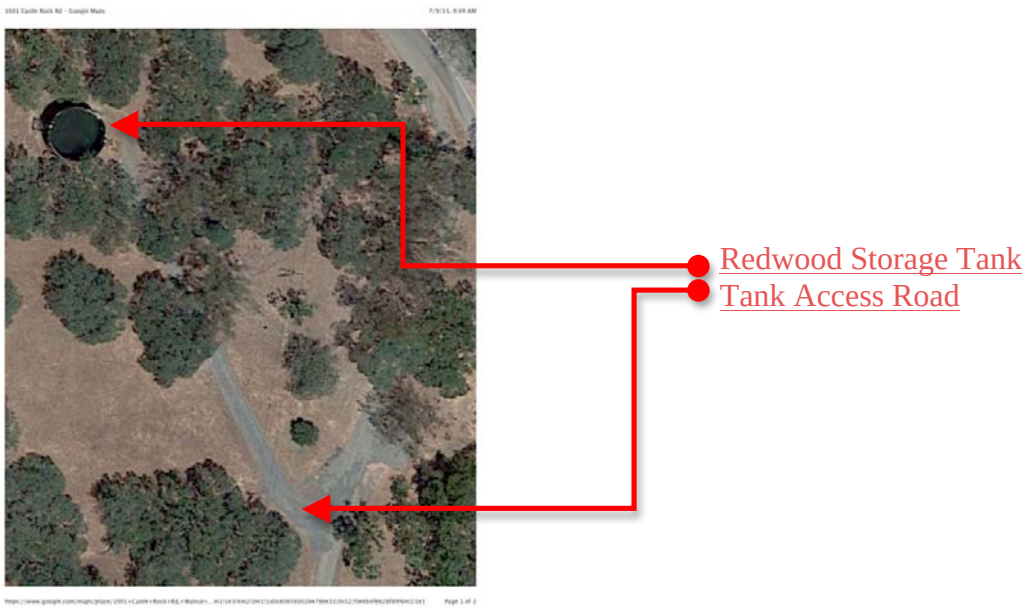
D. Water Tank

The District operates a terminal redwood stave storage tank located on a parcel of property owned by the City of Walnut Creek in the Borges Ranch Open Space (See Fig. 12 below). Contact with the City of Walnut Creek regarding the rights and responsibilities of the District for the use of this property were not found at the City or in the County records. In addition, it does not appear that the District was ever granted an easement for either the road or the tank site even though joint locks limit access to the parcel off of Borges Ranch Road.

The storage tank is accessed from Borges Ranch Road via a locked gate and gravel road that rises steeply to the tank site in the side of a hill. The tank sits on an excavated site that is surrounded by open grass fields and with a large number of oak trees. The storage tank is partially hidden by trees and the ground slopes from Borges Ranch Road up a steep slope approximately 100 feet above the roadway. The tank site is not fenced nor is it protected from hikers in the open space that can easily pass the locked gate at Borges Ranch Road leading to the steep tank access road.

This tank was purchased used and installed in 1956 and was placed on a 34-foot diameter reinforced concrete engineered foundation. The tank is an open reservoir 33 feet in diameter with twenty (20) foot tall walls with an estimated capacity of approximately 125,000 gallons. The walls of the tank are secured in place with steel circumferential tension hoops. The rods are ¾-inch threaded rods in horizontal rings spaced across the full height of the tank based upon the loads placed on the walls by the water in the tank.

Figure 12: Aerial Photo of Redwood Tank Site



Plans for this concrete foundation are included in the 1956 construction plans. The concrete base appears in good condition where visible as it rests on a rock base. Very minor spalling is localized to the eastern edge of the ring and no major cracks were seen during the field inspection of the exterior of the tank. No inspection of the interior of the tank was conducted as part of this work as the tank was in full operation at the time of the field inspection. The Board President indicates that the tank and the concrete base have never had any seismic problems or has experienced any known seismic damage. However there has never to his knowledge been any seismic evaluation of the storage tank before or since the original installation in 1956.

The inside of the tank is accessed by ladders (see Figure 13 and 14 below) along the southern exposure of the tank and over the top and back down the inside of the tank. The access ladders are secured within a five-foot fenced area topped with barbed wire (See Figure 15 below). The District has purchased a harness climbing system for anyone using the access system. The tank does not contain any access hatches or man ways for entry into the tank from ground level.

Figure 13: Tank Access Ladder, Ext.

Figure 14: Tank Access Ladder, Int.

Figure 15: Tank Ladder Security Fencing

The bottom of the tank is at an elevation of 415.5 feet above sea level and approximately 240 feet above the District pump station discharge according to the original construction drawings. The tank fill and discharge line runs up the outside of the tank from the isolation valve to the top of the redwood and then back down the inside of the fiberglass insert to a discharge point about one foot above the floor of the tank. At the top of the storage tank the siphon changes direction and moves inside the tank at an approximate elevation of 436 feet above sea level. The tank is filled and discharged through a four (4) inch PVC siphon (See figures 16 and 17 below)).

Figure 16: Tank Siphon Piping, Ext.

Figure 17: Tank Siphon Piping, Int.

The siphon originates from a tank isolation valve just below the bottom of the tank on the northern exposure (see Figure 18 below) that sits atop a metal pipe system where the fill/discharge asbestos pipe transmission line rises from the ground. This gate valve and pipe angles appear old and in need of corrosion protection as evidenced by the current leakage from the foot valve inside the tank which is leaking directly onto this gate valve and pipe configuration. The gate valve is protected from vandalism or illegal use by a chain and lock to prevent the operation of the valve by unauthorized persons.

Figure 18: Tank Shut Off Valve and Fill Line

A foot valve inside the tank is used during cleaning and maintenance to drain the tank and remove any built up debris on the floor of the tank (See Figure 19 below). The current foot valve is leaking and in need of replacement to assure a tight seal and prevent leaking onto the isolation valve, etc.

The tank includes a series of valves and discharge pipes below the northern exposure of the tank for the cleaning and removal of debris from the tank (see Fig19). These facilities access the tank through the concrete base and provides a foot valve used only during maintenance activities described below.

Figure 19: Tank Foot Valve, detail

The tank operates with a recently installed float system that provides a signal to the pump station by dedicated telephone line to start and stop the pumps based upon defined elevations in the tank and the time of day. This latter point assures that the District does not incur excessive pumping charges and is governed by a time clock in the pump house. We understand that the Districts operates the reservoir between thirty and fifty percent of tank capacity at all times.

The redwood tank has in the past leaked through the redwood staves such that the District found it necessary to tighten the circumferential rods and add a full height fiberglass liner inside the tank. This liner was added in 2002 and has been patched and repaired every time the tank is drained and cleaned since it was installed. In addition, the District has also found the liner pulled away from the redwood on several occasions and have had to insert filler materials between the

fiberglass and the redwood. During the visual inspection of the tank, at least two holes in the redwood showed evidence of the liner pulled from the interior wall of the tank.

The District asset register provides the initial cost of the wooden tank at approximately $5,100 for the concrete foundation and the used wooden tank. It is not possible to tell if this cost is just for the construction at the site or whether it includes the purchase and transportation of the tank to the site. California and San Francisco Bay Area redwood tanks have been known to remain in service for 30 to 60 years[1] some estimating with proper maintenance it could be as much as 100 years. Clearly the District's redwood storage tank is now approaching the end of it useful service life.

Current estimates for new 50 to 60,000-gallon storage tanks range from $1.50 to $2.00 per gallon for purchase of a new terminal storage tank assuming the use of the original concrete foundation is evaluated for seismic stability. These prices do not include the removal of the existing tank staves and circumferential rods. Installation and connection to the system in the field would increase the cost by one and half to two times the tank purchase price. The redwood in the tank may be able to be resold and reused after demolition and the Board should consider this in their evaluations of a replacement.

E. Miscellaneous Assets Information

Land

The District does not hold fee title to the lands on which the tank and the pump station are located. The City of Walnut Creek and the United States Bureau of Reclamation own these properties respectively. Both of these facilities were sited during the original construction in 1955 and 1956 and District holds no known easements rights or agreements with the two property owners with regard to the rights and requirements for the use of the sites. The tank access road also crosses the City parcel and has no formal access easement granted for this use.

Most District piping appears to be located within public rights of way in the City of Walnut Creek or Contra Costa County. The only exceptions are the pipe system supplying the Pine Creek service area that crosses private property to service the Pine Creek customers. It is not known if easements have been granted to the District for the use of these utility rights-of-way on the private parcels.

Hydrants and Isolation Valves

The District operates the piping system utilizing few isolation gate valves placed at strategic locations in order to be able to isolate specific portions of the service area. These valves are the same size as the pipe they are attached to. The District has no formal valve exercise program and reacts to problems opening and closing valves only when problems using a valve appear. Additionally, the District has no valve replacement policy for these assets other than run to

[1] Castlewood Domestic Water Yank Engineering Assessment Final Report January 20, 2009, Winzler & Kelly

failure. Two replacements of six and eight-inch valves in 2009 cost approximately $5,700 apiece.

The distribution system includes nine (9) wharf hydrants (See Fig. 20 below) used to bleed air from the system or to assist with maintenance needs in particular areas of the District. These hydrants appear to be used very seldom and there is no regular maintenance program for the hydrants or a replacement philosophy for these hydrants when they fail.

Figure 20: District Wharf Hydrant

Water Meters

The District owns none of the water meters connected to the District distribution system. The meter located at the pump station is owned, operated and remotely read by the CCWD. The District does not read or verify CCWD readings from this meter. CCWD reads the meter monthly and bills the District shortly thereafter for all water through the meter for the preceding billing period.

All customer water meters are located on private property and are the responsibility of the property owner for installation, operation, maintenance and renewal and replacement. These meters are used by the District to bill customers based upon meter readings provided to the District bookkeeper by the volunteer Board members. Each Board member is assigned a specific number of meters to read on a quarterly basis. If problems are found with the meter or the connection to the public water system, the property owner is notified of the problem and directed to make necessary repairs or replacement.

V. Operations and Maintenance Programs

A. General Overview

The District maintenance philosophy is generally reactive for the pipelines and the pump station and run to failure in the distribution system. Time has proved to the Board that regular maintenance on the redwood tank is required to assure continued service life as more fully described below. Review of the historical revenues and expenditures for maintenance and repairs in Table 2 have averaged less than 5% of the annual operating budget while capitalization of replaced assets have averaged similar amounts in the past ten years. This indicates annual expenses of about $10,000 per year for maintenance and renewal and replacement of the assets, which supports the current Board philosophy of reserves levels

assuming that the storage tank or a large length of pipe does not require replacement. It is the Boards policy to capitalize system improvements that cost more than $300 and have a useful service life of more than one year as stated in the most in the 2013/2014 District Audit.

The Board maintains reserves at or above twice the annual operating expenses in anticipation of all maintenance or renewal and replacement needs of the District. The Board does not have nor maintain policies for the interruption of services or contingency plans for emergencies as only a few numbers of properties rely on the water for domestic uses and because the Board believes that the wooden tank can provide water for short periods in an emergency. They also believe that the volunteer nature of the Board can quickly move to deal with issues and reported problems as they appear.

Finally, the Board has had few maintenance issues or replacement expenses through the years and therefore does not feel the need for a defined maintenance or renewal and replacement program (See the list of all District maintenance and replacement history at the end of each of the Inspection Reports in Appendices A and B). However due to the age of the storage tank and the asbestos cement pipe, it is recommended that the Board begin the process of planning for the ultimate replacement of the storage tank and old ACP pipe as they could be approaching the end of the useful service life.

B. Pump Station

The pump station is maintained utilizing service providers that are called when a problem or maintenance need is identified by a Board member or as a result of calls from customers or others that observe problems in the field as they pass the station. There is no defined maintenance program for the inlet and the pumping or electrical equipment at the pump station. There is no standby contract with service providers for emergency response as customers can operate without water for short periods of time as the storage tank empties. There are no known contingency plans for customer notification for long water supply outages either from the loss of the redwood tank or an extended nor limited available canal water. This philosophy has been proven to be acceptable for the operation and maintenance of the pumping infrastructure to the current time.

Of current concern is the condition of the pump house that has had no major repairs or improvements in the memory of the current Board or from the historical maintenance records attached to the Pump Station Field Inspection Report. The pump house shows signs of deterioration and the current locking mechanism on the access door is minimal and shows signs of needing repair. While the pump house has since inception not experienced any vandalism or other malicious mischief, it does present an attractive target especially since the current fencing allows complete access to the pump house at all times. The interior of the pump house is open to the weather and the station has a significant number of cobwebs throughout the interior. These should be removed regularly because they can cause problems for the electrical components.

The pumps and electrical systems appear to have received recent major maintenance and visually appear in good shape. Contact with the most often-used maintenance contractor indicates that there have been no problems with the pumps or electrical components in the last several years

and a review of the maintenance records support this conclusion. The electric panels and time clocks appear clean and well maintained (see Figure 7). All wiring and conduits appear new and in good shape.

The discharge lines from each of the pumps and from the pump house appear in good shape with minor corrosion. The valves appear to have only primer coatings and should be painted with a finish coat to assure they reach the expected service life for these mechanical components. In addition, there is no valve exercise program but rather valves are just replaced when they will not shut off or close properly. The above ground metal discharge pipes have not had any corrosion protection added and it is suggested that these pipes also receive an exterior coating of paint to assure that corrosion is minimized.

The two (2)-isolation valves exterior of the pump house are open to anyone entering the site. Currently one of these valves is locked with a chain and lock. The second gate valve should also be secured to prevent the operation of the valve without District knowledge (See Fig 10)

C. Water Storage Tank and Access Road

In recent years the Board of Directors has determined that regular evaluation and maintenance to the 60+-year-old wooden storage tank is necessary to assure proper operation and reliability. Typical maintenance involves the draining of the tank, removal of all muck and debris from the floor of the tank and inspection and repair of the fiberglass liner and foundation and repair of any other equipment associated with the tank. This maintenance activity has occurred generally every year or two and has required repairs to the fiberglass liner in multiple locations each time. As the tank is never operated to it full depth, repairs to the fiberglass are still accomplished for the full height of the tank. With each cleaning and repair, the foot valve on the floor of the tank and the isolation valving are inspected and repaired if necessary. During the field inspection in July, it was observed that the foot valve was leaking and is in need of replacement . The tank isolation valve is infrequently operated and is not exercised except when required and we assume with each tank cleaning. The valve is however chain locked and protected from vandalism.

The exterior redwood of the tank is in fair to good condition with apparent deterioration especially at the base where the redwood meets to concrete foundation. It appears that the redwood here has rotted especially near the siphon and isolation valve on the north side of the tank. The iron circumferential rods supporting the redwood are all rusty and have not have been operated in many years. A few rods near the top of the tank in several places appear to have pulled away from the redwood. It is reported that several years ago the rods were tightened and at the same time they were secured to the side of the tank by brackets to assure that the rods would not slip down the side of the tank as the tank shrank.

Regular maintenance has also been done on the level control system inside the tank that controls the pumps. Finally the District has a dedicated telephone line that transmits level signals to the pump house. This overhead telephone line which signals the pump is operated and maintained by the local phone company.

The storage tank operates daily filling and withdrawing water for the service area as demands require. It is reported that the tank always operates less than full based on the float system that turns the pumps off and on as the water level reaches predetermined levels in the tank. The operating levels were not provided. Water is purchased daily even when CCWD shuts down the canal for maintenance and repairs typically during the winter and provides the District with treated water at the pump station. CCWD reads the District meter monthly and bills for all water purchased by the District. Historical water purchases from the CCWD monthly bills are detailed earlier in this report in Figures 2 and 3. Recently the Board suspected that they were experiencing larger water losses. They brought in a service contractor to assist in the evaluation and location of potential water losses. This effort has identified several leaks that have been repaired.

The tank access road (See Fig. 12) is steep and over the years has required maintenance to retain accessibility to the tank. The current road especially at the bottom is rutted where a sharp right turn off of the City dirt road is required. In addition, the road surface up the slope is gravel and dirt that appears to be in need of repair again. It was stated during the inspection that a four-wheel drive vehicle is required to access the tank site. It appears that the condition of the road during wet weather could create access concerns. The road has been regraded in 2007, 2008 and 2012 and should be considered for repair currently.

A. Pipelines

The majority of the distribution pipelines operated by the District are made of (ACP) with some small diameter PVC lines. There is not formal maintenance program for any pipelines in the service area. The industry standard estimated useful service life for ACP is 75 years. This suggests that the ACP currently in the system is approaching the end of the theoretical life in the next 15 years or so. There is no Board policy for the renewal and replacement of any of the distribution lines.

Current Board practice is for a Board member to respond to notification of leaks or pipeline problems, to assess the problem and fix it if at all possible or to call service contractors or local labor to accomplish the repair. These service calls are handled on a time and materials basis without benefit of any service contracts with the service provider. Most leaks have been found to date at or near the private meters. There have only been two major leaks in the ACP. One in the discharge line at the pump station just after the line goes underground that required the replacement of a short length of pipe with cast iron. The second leak was caused by PGE when placing a new power pole near the front of Northgate High School campus. The majority of the District pipelines have not experienced leaking that would indicate a serious pipeline problem even though the pipe is reaching the end of its useful life.

In the past five years there have been several leaks along the Pine Creek Road system in both the ACP and PVC. These leaks while small maybe indicative of concerns with the long term ACP pipes useful life and a reason for consideration regarding the future of the lines in this area.

VI Financial Background

As part of the condition assessment of the District infrastructure, it was necessary to review and evaluate the financial resources of the District including the long term asset registers, the most recent five year audit reports and other historical maintenance records delineating the services provided by outside contractors. Particularly because the position of the Board of Directors is that they have sufficient resources to be able to deal with any reasonable losses of system infrastructure. In addition it was necessary to understand the actual expenditures for operations and maintenance. Causey Consulting received financial information from the annual audits to understand the revenues, expenses and retained earnings or reserves of the District. Table 2 provides the District's financial history from 2008/2009 through 2013/2014 – the most recently completed audit.

The District has operated in the black in four of the five year of record. After 2012/13 shortfall, the Board took steps to increase revenues to assure that contributions are being made to the reserves of the District. The records indicate that the Board generally operates with a reserve balance of approximately $155,000 that has not recently been less that two times the annual operations and maintenance expenditures.

Table 2, Historical revenue and Expense, Castle Rock County Water District

	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	Averages
Revenues							
Water Sales	58,086	47,469	48,733	56,596	49,509	57,638	53,005
Service Fees	-	-	-	-	13,320	13,670	4,498
Other	-	-	-	-	-	283	47
Property Taxes	11,473	10,393	11,187	10,837	12,011	11,548	11,242
Tax Administration Fee	(124)	(123)	(118)	(109)	(112)	(112)	(116)
Total Revenue	69,435	57,739	59,802	67,324	74,728	83,027	68,676
Expenditures							
Water Purchase	48656	23666	40513	44897	57868	50890	44,415
Power Purchased - Pumping	5165	3739	4607	5461	6653	7241	5,478
Audit	2000	2000	2000	2000	2500	4500	2,500
Election	416	0	399	0		0	163
Repairs	3435	3204	2539	1854	1771	3340	2,691
Book Keeping	0	1397	982	1011	1394	2853	1,273
Liability Insurance	343	2012	2015	2023	2012	2028	1,739
License & Permits	0	0	0	0	415	0	69
Office Supplies	554	233	639	542	760	1124	642
Transmission & Distribution	388	356	415	378	348	444	388
Bad Debts	0	0	0	1735	0	194	322
Depreciation	4118	4622	4883	4907	4953	3606	4,515
Loss on Replacement of Check Valve	679	0	0	0	0	0	113
LAFCO	0	0	0	0	0	37	6
Total Expenses	65,754	41,229	58,992	64,808	78,674	76,257	64,286
Net Income	3,681	16,510	810	2,516	(3,946)	6,770	4,390
Retained Earnings/Reserves	142,211	158,721	159,531	162,047	158,101	164,871	157,580
Reserves as % of Annual Expend	2.163	3.850	2.704	2.500	2.010	2.162	2.451

VI. Renewal and Replacement of Assets

The District operates on a cash basis and has developed sufficient reserves to believe that they can handle the renewal and replacement needs of the District from those reserves over the next several years. The reserves have ranged from 3.85 times annual expenditures to a low of 2.0 times annual expenditures. The majority of pump station and pipeline replacement needs have been handled from these reserves as two pump replacements have occurred in the past ten years at costs of between five and ten thousand dollars.

The replacement and repairs of pipelines to date have been minor and easily handled by the Board members who do not charge for their time or through the use of casual labor or contractors. All repair activities have been on a small scale to very short lengths of pipe or valve connections. The issue for the Board with regard to pipelines is an extended length failure of the ACP due to an earthquake or other natural disaster. Replacing water lines in the six and eight inch size can cost between $50 and $75 per linear foot depending on the location and depth of the line and without need for replacement of asphalt over the pipe trench. If asphalt is required these figures could double.

The District Board has not to date considered or developed a formal written program for the renewal or replacement of the District assets. The current philosophy is to run to failure which is acceptable as long as a complete asset replacement is not required at the end of the assets useful service life. Most assets have been in operations since at least 1955 and are approaching the end of their useful service lives. The District could need to replace the pump house, mechanical equipment, significant lengths of pipe and a new water tank – if any or several of these major facilities fail, the current reserves might not be adequate for replacement of a storage tank or even 10% of the pipes. If that were to happen the District would be required to secure other sources of funds (loans, bonds, commercial paper, etc.) that are not currently available or even considered by the Board of Directors. The District can however handle the replacement of the pumping facilities or a short pipeline repair, as those costs are minor compared to a large pipeline or storage tank loss.

VII . Summary and Recommendations/Findings

The District operates a complete water system designed to provide untreated water from the Contra Costa Water District to 55 parcels in a 150-acre service area located in County of Contra Costa and the City of Walnut Creek. The service is provided through assets owned and operated by the District including a pump station, transmission and distribution lines along with a terminal redwood reservoir located on properties owned by other public agencies. The attached facilities assessment and evaluation requested by the Contra Costa County LAFCO is intended to provide a more complete understanding of the facilities and the operations and maintenance of the District. Based upon the field inspections, service provider interviews, historical records and the information in this report, the following are recommended actions for consideration by Board of Directors:

1. The District should open discussions with the City and CCWD to assure that they are aware of any rights and responsibilities for the facilities they are operating on the two sites
2. The District maps are very old and do not include the entire piping system and should be updated and/or completely redone to reflect the entire piping system operated by the District. This should include both pipe sizes and pipe materials along with estimated installation dates.
3. The District Board should discuss and develop a policy for the replacement of system assets based upon sound engineering information and historical operations and maintenance expenses especially for the redwood storage tank that will be the largest single expenditure at replacement.
4. The District should inventory and create an asset register for all pumping, electrical and timer components in the pump house.
5. The District should schedule at least annual inspections of the electrical and mechanical systems in the pump station.
6. Chain and lock the second gate valve on the outside discharge header outside the pump house.
7. The District should consider a valve exercise program for at least the isolation valves at the pump station and the storage tank.
8. The District should establish a regular pump house and electrical panel-cleaning program to assure that bugs and inspects do not cause failures of the electrical components.
9. Emergency phone numbers should be placed on the fence at the pump house for the reporting of unusual events or problems noticed by local passerby's.
10. The shrubs along the southern fence need attention and pruning.
11. The hinges on the access door to the pump house need either repair or replacement to strengthen access to the interior of the pump house by other than appropriate persons.
12. While the main distribution pipes do not reflect current problems except in the Pine Creek area, the District should begin a process to plan for future replacements of portions of the ACP in the system prior to reaching the end of the pipes service life.
13. Develop a system to map all pipeline leaks and meter leaks to be able to visually see areas of concern for pipeline problems.
14. The storage tank is reaching the end of its useful service life and contingency plans should be prepared for the full replacement of the storage tank or a seismic evaluation of the tank done to assure survival of a major earthquake in the area.
15. The foot valve inside the redwood tank needs to be replaced and the isolation and pipe fittings outside the tank should have corrosion protect applied to these metal components.
16. The access road to the redwood tank needs to be evaluated and possibly considered for repair before the next winter.

VIII. Reservations

The opinions and recommendations stated in this report are based upon limited field observations and discussions with service providers and the Chair of the Board of Directors of the District. There is no claim, either stated or implied, that all conditions were observed. This report does not address any portions of the redwood tank structure or pump station facilities other than those mentioned nor does it provide any warranty, either expressed or implied, of any portion of the facilities discussed.

IX. Appendices

a. Pump Station Inspection Report
b. Redwood Storage Tank and Access Road Inspection Report

Appendix A
Pump Station
Inspection Report

Pump Station Condition Inspection Report

Inspection Information	
Inspection date	July 9, 2015
Inspection participants	Fred Allen, Paul Causey, Causey Consulting
Facility name	Castle Rock Pump Station
Facility address	None
Comments	Station in place since 1955 on Bureau of Land Management Property operated by Contra Costa Water District; copies of pump station pictures provided to the District on CD.

Background Information	
Equipment failures	None in the past three years
Alarm history (attach copy)	None
Major maintenance activities (attach list if applicable)	See attached listing of past activities
Pending work orders (attach copies)	None
Operating problems (attach copy of operating log)	None
Maintenance History	See attached list
Comments	All maintenance is reactive and only identified when problems are reported to the Board of Directors who deals with the situation either personally or through service providers.

Security Features	
Fence and gate	Fencing along roadway with a gate but there is a passage way into the station that does not secure the site.
External lighting	None on site; Street light south of the site provides only light.
Visibility from street	Pump house and discharge piping completely visible through the open chain link fence
Doors and locks	Pump house has one door with hasp and lock; discharge gate valve secured with lock and chain
Intrusion alarm(s)	None depends on calls to the Board of directors from residents or others noticing problems.
Signs with emergency contact information	None;
Other security features	Stainless steel bar screen in canal flow line.
Comments	District should consider adding contact phone numbers to the fence for anyone noticing problems at the station - this will assure timely attention to problem situations; currently rely on others to report security problems.

Safety Features and Equipment	
Signage (automatic equipment, hearing protection, etc.)	Only signs deal with the high voltage from the electric pump motors. No other signage at the site.
Emergency communication	None
Equipment hand guards	None

Hand rails and kickboards	None
Platforms and grating	None
Tag out and lock out equipment	No known policy – relies on service contractors
Hearing protection	None
Comments	

External Appearance	
Fence	Good
Landscaping	Vines and bushes are overgrown along the southern fence line of the site and should be trimmed – they do not impair the operation of the station but could cause problems during removal of pumps and motors from the pump house.
Building	Wooden frame building is deteriorating and has not had significant improvements since installation. Wood is old and does not show any maintenance other than minor board replacements. It appears that the pump house structure leaks in the winter storms.
Control panels	Recently updated and clean
Other external features	Discharge piping is exposed and shows signs of minor corrosion – gate vales should be painted to further protect these components. Old corroded bar screen disposed of behind the pump house is an attractive nuisance and needs to be removed.
Comments	

Building/Structure	
PS building	Wood frame structure
Control room	All electrical controls in cabinet in the pump house in a closed enclosure
Wet well dimensions, feet	8.3 x 6 x 7.5
Wet well volume, volume	2800
Other structures	Stainless steel bar screen and turnout from the canal into the wet well of the pump station.
Comments	Canal in and around the turnout needs major maintenance to the concrete lining of the canal.

Instrumentation and Controls	
Control panel	Located in the pump house in a 2-foot by 4-foot locked metal cabinet.
Run time meters	None
Flow meter	Contra Costa Water District meter outside in the discharge header.
Alarms	None
SCADA	Pump on/off controls only based upon storage tank float system – signals via dedicated phone lines from the tank.
Other instrumentation and controls	Pumps operate on a timer to assure that no pumping occurs during the peak electrical periods of the day from noon to 6:00 PM
Comments	Control panel has many cobwebs and could use general cleaning.

Electrical and Switch Gear	
Power drop	PGE high voltage drop from power pole across the street.
Transformers	Pole mounted next to the pump house.
Transfer switches	None
Emergency generator and generator connection	None
Starters	
Variable frequency drives	None
Electrical cabinets	Small two by four foot metal cabinet inside the pump house
Conduit and wire ways	New conduit and wiring inside the pump house
Other electrical	Time clock for daily pump sun times
Comments	

Motors	
Lubrication	
Insulation	
Operating current	240/480
Vibration and alignment	
Other	
Comments	

Pumps	
Lubrication	
Vibration and alignment	
Seals	
Indicated flow and discharge pressure	
Shutoff head	
Corrosion and leakage evidence	None
Drive shaft	
Other	
Comments	

Valves and Piping	
Valve operation	Only as needed; no formal exercise program; check valves replaced in the past. Four-inch valves in pump house transitioning to six-inch discharge header outside the pump house.
Valve condition	Appear relatively new but are not painted.
Pipe condition	Appear okay but minor corrosion; needs to be painted to provide additional corrosion protection; all piping has no corrosion protection from the elements.
Pipe support	Concrete blocks – appear in good shape with minor corrosion.
Comments	

Other	
Lighting	None on site
Support systems (air, water, etc.)	Outdoor water taken from the discharge piping; no other support systems
Signage	Only high voltage signs
Comments	

Basic Asset Information	
Number of pumps	2
Pump #1 capacity, gallons per minute	280 @ 336 feet
Motor #1 horsepower	30
Pump #1 manufacturer	WPI Vertical Hollow Shaft Pump Motor
Pump voltage	240/460
Motor #2 manufacturer	General Electric GE V3188 VHS
Motor #2 horsepower	25
Motor #1 RPM	3600
Meter Size, inches	6
Meter owner	Contra Costa Water District; CRCWD take no meter readings
Discharge line, inches	4” in the pump house; 6” outside the pump house

Castle Rock County Water District
Pump Station Maintenance History

4/56	Construct Pump House
5/1/88	Replace time clocks for both pumps
7/9/01	Replaced pump packing
7/31/01	Discharge pipe leak in transite
8/7/01	Rewind pump motor
11/9/01	Adjust packing

3/15/02	Adjusted packing
8/16/02	replaced pump #1
12/11/02	Rebuilt pump #1; replaced packing
8/26/03	Replace 30hp motor; replace bearings
12/8/03	Replaced both 5” columns; replaced basket strainer; replaced 25 hp VHS motor
12/8/03	Replaced check valve
6/21/04	Replaced on/off switch; added new 4”x4”x4” enclosure
6/21/04	Clean canal screens
10/6/04	Inspect Pump #2 not starting; repack Pump#1
4/05	New pump switches and wiring cleanup
5/16/05	Replace both motor starters
11/13/07	Troubleshoot stuck check valve; repair broken 4” waterline
11/13/07	Replace gate valve and swing check valve
9/10/08	Replaced 4” check valve
1/15/10	Pulled 20 hp motor; trimmed bushes and hedges
2/23/10	Repair and rebuild 20 hp motor; replace breaker
10/27/10	Installed new stainless steel screens at channel inlet
5/07/12	Inspect pump station site; rotary seal leaking
5/18/12	Installed new screens on canal inlet
9/26/12	Replaced rotary seals, brass ball valve and pulled and replaced pump
4/2/13	Service call; adjusted packing on Pump #1 and replaced connections to Pump #2
Spring 13	CCWD cleaned the canal
9/30/13	Cleaned bar screen

Inspection Photos: Provided to District on a separate CD

Appendix B

Redwood Storage Tank and Access Road Inspection Report

Castle Rock County Water District Storage Tank Condition Inspection Report

Inspection Information	
Inspection date	July 9, 2015; August 3, 2015; May 26, 2015
Inspection participants	Fred Allen, Paul Causey, Richard Hoag; last two Causey only
Facility name	Castle Rock County Water District Storage Tank
Facility address	APN
Comments	Cut sheet of the field photos of the tank and tank site photos provided to District on a CD.

Background Information	
Equipment failures	None minor leaks in the fiberglass lining evaluated annually
Alarm history (attach copy)	None
Major maintenance activities (attach list if applicable)	Annual tank cleaning and patching of the fiberglass lining; review of the float control during cleaning. List attached below.
Pending work orders (attach copies)	Replacement of the mud valve in the tank currently leaking
Operating problems (attach copy of operating log)	None; see maintenance history attached below
Comments	Redwood tank is 60 years old and minor wood deterioration is evident at the outside base of the tank sealed from inside by the fiberglass liner.

Security Features	
Fence and gate	Locked gate access at Borges Road with multiple locks leading to the tank access road. No fencing around the tank site. Access ladders on the outside of the tank are enclosed inside five foot fencing with 3-strand barbed wire around the ladder assembly.
External lighting	None
Access road	Gravel with drainage swale along the south side – steep access to the tank requires four-wheel drive vehicle.
Visibility from street	Minor from Borges Ranch Road on the siphon side of the tank; partially obscured by oak trees; approximately 100 feet above the roadway.
Intrusion alarm(s)	None
Signs with emergency contact information	None
Other security features	Tank is on City owned property and well above the road.
Comments	Road needs to be regraded.

Safety Features and Equipment	
Signage (automatic equipment, hearing protection, etc.)	None currently – recommend placement of signs at the tank site with emergency call numbers if there is a problem with intrusion.
Emergency communication	None
Equipment hand guards	None
Hand rails and kickboards	None
Platforms and grating	None
Fire resistance and safety in and around the tank	Area is generally clear of grass and trees. Tanks could suffer fire damage from grass fire in the area – no formal policy on fire protection for the tank currently in place.
Comments	District owns climbing harness used when accessing the inside of the redwood tank.

External Appearance	
Storage tank	Tank is 60 plus years old and shows wear and tear especially along the concrete foundation of the tank. Tank was installed in 1955 and was purchased used and installed on a new concrete base. Circumferential metal rods not operated in many years (possibly since 2002) and may be difficult to tighten or loosen in current condition. Interior of the tank open to the atmosphere appears from photographs to be in reasonable shape and is inspected regularly in recent years. The fiberglass liner inside the tank seals minor holes in the redwood.
Tank foundation	Engineered concrete foundation appears in good shape and not deteriorating but has minor spalling.
Landscaping	All natural for the unimproved site owned by the City of Walnut Creek.
Control panels	None
Access road	Access road is steep and is composed of 3/4” rock with a small drainage swale on the south side that is now full of dirt and leaves.
Other external features	Brand new fill and suction siphon visible up the side of the tank. New ladder system installed on the backside of the tank from the access road including climbing harness for access up the outside of the tank. Float controls

Comments	Ladder system may not meet current code for access ladders. Redwood tank life estimated at 40 to 60 years in Northern California proper regular maintenance may allow longer life even up to 100 years; redwood could be approaching end of useful life depending on age at time of acquisition and installation by CRCWD in 1955. Recommend having a redwood tank expert to evaluate the current state of the redwood tank. Tank and foundation have never been evaluated for seismic loading; it is not known if any structural analysis was conducted prior to the original installation.

Building/Structure	
Redwood Tank	Tank in service 60 plus years for CRCWD and shows minor signs of deterioration especially at the bottom where the tank sits on the concrete pad from standing rain water – tank useful life could be in the range of 100 years with regular maintenance. Unknown how long it was in service prior to CRCWD acquisition and installation at the current sight.
PS building	None
Control room	None
Tank Area housekeeping	Area around the tank generally clear with some tree branches hanging over to the tank.
Landscaping cleared away from tank	In a small area immediately around the base concrete base that the tank sits on.
Other structures	Climbing ladders on the inside and outside for only access to the tank for cleaning and maintenance.
Comments	District reports no damage from any earthquake activity

Instrumentation and Controls	
Control panel	None
Run time meters	None
Flow meter	None
Alarms	None
SCADA	Float control from the tank to the pump house via dedicated telephone line from the tank. Currently no active way to determine depth of water in the tank and no electronic elevations transmitted to the pump house – simple on/off signal transmitted only.
Other instrumentation and controls	None
Comments	Float system replaced in Spring 2011

Electrical and Switch Gear	
Power drop	None
Transformers	None
Transfer switches	None
Conduit and wire ways	Telephone drop from Borges Ranch Road used to send signals to the pumps for on/off control only.
Other electrical	None
Comments	None

Valves and Piping	
Valve operation	No program for frequent exercise or operation of the valve at the base of the tank; isolation gate valve is locked closed with a chain and lock system to deter vandalism.
Valve condition	Valves look rusty and old; could use a new coat of paint; valves are exposed to the weather and apparently have no corrosion protection.
Pipe condition	Siphon is relatively new and is a single piece of PVC;
Pipe support	Okay
Other	Foot valve in the floor of the tank needs to be resealed as has a minor leak.
Comments	

Other	
Water level indicator	None
Support systems	Four (4) inch PVC siphon system for fill/discharge of untreated water replaced in 2005.
Tank staves	Old and rusty; appears to not have been operated in many years since installation of the fiberglass liner; staves have been secured in place several years ago; last time staves were tightened was in approximately 2005
Access ladder	New exterior ladder system and climbing harness purchased and installed in 2012. Fully enclosed at ground level with chain link fencing.
Signage	None
Access hatches/manways	None
Overflow piping	4” PVC Siphon used for both fill and discharge.
Overflow channel	Current channel down access road filled with rock, dirty and leaves.
Tank coatings/corrosion protection	No exterior coating just untreated redwood with metal staves. Interior of the tank has full fiberglass liner installed in February 2002. Tank has no coatings or corrosion protection. All valves are uncoated open to the elements on the cleaning outlet at the bottom of the tank.

Sediment in tank	Tank currently cleaned regularly which also removes all sediment in the tank. In 2005 almost three feet of sediment was removed. Since that time the District has cleaned the interior of the tank on a regular basis to reduce and assure that the full capacity is available.
Comments	Access ladders should be evaluated for code compliance especially where the climber must move to the ladder on the inside of the tank.

Basic Asset Information	
Tank manufacturer	Unknown
Tank diameter, feet	34 feet
Tank height, feet	20 feet
Tank material	Redwood with fiberglass liner and foam anywhere liner has pulled away from the wood.
Tank roof materials	None
Tank foundation	Reinforced concrete 34 feet in diameter on rock base.
Tank coating	None
Tank volume, gallons	Approximately 125,000
Overflow containment	Drainage swale along south side of the access road.
Tank installation date	1955 in service 1956; installed used
Overflow pipe diameter, inches	4 inches, discharges approximately one foot above the floor of the tank.
Tank openings/Access ways	None
Earthquake prevention devices	Never evaluated for earthquake stability – no damage experienced to date from any earthquake activity in the area.
Liquid level gauges	None
Tank internal inspection frequency	Targeted annually generally
Tank cleaning frequency	Targeted annually generally
Inlet piping size	4 inch
Discharge piping size	4 inches - same as the inlet siphon
Foundation information	Reinforced concrete placed on gravel base
Water sampling ports	None
Tank isolation valve, size	4 inches
Tank isolation valves, type	Gate valve
Tank drain opening, inches	4
Access road material	Gravel and graded dirt.
Access Road Width, Feet	

Castle Rock County Water District
Wooden Storage Tank and Access Road Maintenance History
July 2015

Tank Access Road

2014	Drainage Ditch repairs
2007	Access road repairs
2008	Additional road repairs
11/26/12	Regraded access road

Tank Maintenance History

9/22/92	Rebuild redwood liner
2/10/93	Rebuild redwood liner
2/4/94	Tighten tank bands
4/3/94	Install two sir relief valves
5/2/98	Seal tank cracks
2/15/02	Overhaul tank
2/02	Installed full fiberglass tank liner; patch three leaks in wood; added ladder inside tank; fenced external ladder
6/4/04	Replace on-off switch
2/20/05	Drained/clean and repair internal fiberglass
4/16 05	Repairs to bottom and sides of tank; patched fiberglass; replaced siphon piping; fiberglass half of tank bottom
April 05	Drained/cleaned heavy sediment from tank; removed 18,000 gallons of muck
10/17/07	Replace 4” isolation gate valve
8/13/08	Drained/cleaned tank; repaired fiberglass
2/15/09	Replace 6” shut off valve
5/9/09	Drain and clean tank; repair fiberglass; install new bracket and redwood for float
11/30/09	Repair crack along bottom of tank; repair fiberglass
5/30/10	Repair fiberglass; drain and clean tank
4/16/11	Drained/cleaned tank; replaced float system; repaired fiberglass; internal ladder
2/1/12	Replaced exterior ladder assembly

2/1/12	Drained/cleaned tank; repair fiberglass; replace mud valve in floor of tank; repair crack in tank shell
3/9/14	Drained/cleaned tank; repaired fiberglass

Inspection Photos: Provided to District on a separate CD