

Technical, Managerial & Financial (TMF) Capacity Assessment Report

Colorado Department of Public Health and Environment
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FINAL

PRESENTED TO THE

FOREST VIEW ACRES WATER DISTRICT

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Stantec

TECHNICAL, MANAGERIAL & FINANCIAL (TMF) CAPACITY ASSESSMENT

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Appendix A TMF Capacity Checklist

1.0 Background

The 1996 reauthorization of the Safe Drinking Water Act required States to develop and implement a program to foster the technical, managerial and financial (TMF) capacity of public water systems. The Colorado Department of Public Health and Environment (CDPHE) have developed a strategy and a work plan to assist existing public water systems to comply with the Act's requirements. The Capacity Development Program uses set-aside funds from the Environmental Protection Agency to help public water systems evaluate and implement planning efforts to strengthen capacity weaknesses.

Public water systems are facing increased pressure to develop and protect water sources; upgrade, expand and operate treatment facilities; and maintain aging infrastructure. Customers expect quality drinking water that complies with regulations at a fair price. Adequate planning, good management and effective policies are required to meet these expectations. Operators and administrators need to be aware of the technical, managerial, and financial capacities of their water system and have plans to bolster their ability to produce safe drinking water to all its customers, both now and in the future. The purpose of this assessment is to help operators and administrators to understand the areas of weakness that threaten their system's capacity.

The Forest View Acres Water District (FVAWD) was identified by the CDPHE for TMF assessment in 2008. Independent evaluators, Greg Woodward, Ben Lengacher, and Jennifer Hill from Stantec Consulting, conducted an assessment of the FVAWD on February 27-28, 2008. The TMF assessment included an interview with a member of the Board of Directors (BOD), District Manager, and contract engineers to discuss the water system management and financial aspects. A water system tour was conducted the following week with the contract operator. The TMF limitations were discussed at a special BOD session after which Stantec prepared this draft report and provided it to the FVAWD for comment. Following the report, a second contractor, Malcolm Pirnie, will contact the system to schedule a site visit to begin assistance on improving limitations noted during the TMF assessment. Comments regarding the draft TMF report were received by the District and have been incorporated into this final report.

1.1 TECHNICAL CAPACITY

The technical capacity assessment covers:

- Sufficient and secure water supply rights
- Source water protection
- Federal and State standards compliance
- Clearly defined service area
- Operation and Maintenance plans

- ❑ Operator certification requirements
- ❑ Training and technical competency
- ❑ System water loss and conservation
- ❑ Accurate mapping of the water system
- ❑ Emergency planning, training, and safety programs
- ❑ Violations and plans to correct them
- ❑ Customer Service

1.2 MANAGERIAL CAPACITY

The management of a water system comes with legal obligations of ownership or governance. Administrators should understand the specific responsibilities they have as an overseer of the system. Employees and contractors should also have a clear understanding of their position within the management structure, especially the operator in responsible charge. Employees and system operators need enough time to conduct all the tasks required. Often conflicting priorities leave many important tasks undone or insufficiently executed. Written and up-to-date personnel policies and standard contracts should be available to ensure responsibilities are clear. A staffing chart and/or a communications chart are effective tools for defining chain of command.

All water systems should have written operational policies that clearly define practices and procedures in order to maintain quality, prevent injury, and minimize the potential for lawsuits. Operational policies include distribution system repair, system maintenance, communications between managers and employees, customer relations and notification, service connection metering, and cross-connection control.

Long-range planning is essential for managers and administrators to maintain a viable system. Master planning typically considers potential growth and water system requirements for the next 20 years with updates made every 5 years. A master plan also provides an inventory of equipment and infrastructure, life cycle costing, and a plan for capital improvements.

1.3 FINANCIAL CAPACITY

Financial capacity is assessed through budget statements and financial audits. Financial capacity is commonly expressed as profit (or loss). A water system should be operated as a business with a positive balance sheet. Revenues should be identified to cover current expenses, replacement costs for existing equipment and structures, provide a reserve fund and meet all contractual obligations. A cash fund or emergency reserve is also needed for emergencies or critical system failures.

The staff responsible for administration of the system should have a good understanding of the water system needs. The system administrators need to meet their fiduciary responsibility through accurate accounting, effective planning and well-thought, written policies. A capital improvements plan is useful in guiding managers on how to apply reserve and development funds.

2.0 General System Description

The Forest View Acres Water District ('FVAWD') is located in El Paso County and provides potable water to approximately seven housing subdivisions; the Villas, Shiloh Pines, Sundance Estates, lower Red Rocks Ranch, upper Red Rocks Ranch, Forest View Acres, and Cloven Hoof. The FVAWD is responsible for supplying potable water to approximately 700 to 800 users through 284 wet water taps.

2.1 EXISTING FACILITIES

The FVAWD utilizes surface water and ground water as their raw water supply. The Arapahoe treatment plant pumps groundwater from the Arapahoe Aquifer and treats it utilizing a Greensand process. Potassium permanganate (KMnO₄) and sodium hypochlorite are fed into the raw water supply prior to filtration to provide oxidation. The chlorine is fed with a Pulsatron pulse meter from one of two 55-gallon drums containing a 10% solution. The filtration system consists of three vertical media filters that run in parallel. Based on the level in the finished water storage tank, the operator manually starts the Arapahoe treatment system. The system runs automatically once operations begin and shuts off when the well shuts off. A pressure switch initiates backwash cycles based upon the differential pressure across the filters. The backwash water from the filtration process is directed into the sanitary sewer system eventually treated by the Palmer Lake District. Filtered water from the Arapahoe well is pumped by a 15 horsepower (Hp) vertical turbine pump to the booster station.

The booster station contains two inline centrifugal pumps, a 20 Hp pump and a 7.5 Hp pump. The ORC indicated that the 7.5 Hp pump has not been exercised since he started operating the system. The booster station increases pressure in the 4-inch transmission line and transmits it directly into the distribution system. The water system contains five pressure zones. The pressure into the WTP is approximately 110 psi and 80 to 90 psi into the storage tank.

The design capacity for the Limbaugh WTP is 150 gpm; however, this plant produces as little as 20 gpm and as much as 70 gpm. The surface WTP connects via a tee to the pipeline from the 250,000 gallon finished water storage tank to the distribution system. The Limbaugh WTP has not been operating since October of 2007 when one of the secondary filters failed. The current ORC attempted to begin operations at the WTP in January of 2008. This resulted in raw surface water bypassing the surface WTP and flowing directly into the distribution system. Simultaneously, head pressure from the surface WTP caused water levels in the storage tank to rise very quickly. This series of event was the cause of the January 2008 boil order.

The ORC believes that the transmission lines are frozen as adequate pressure does not exist to run the plant on gravity flow or pressurized pump flow and is waiting to begin operations again once the line thaws. Historically, the surface WTP has been the primary treatment facility for the FVAWD. The ORC indicated that this plant is currently utilized mainly during summer months when demands are high. The goal of the system is to utilize this WTP as the primary system as it is more economical that utilizing the Arapahoe treatment facility.

The WTP utilizes gravity flow and contains three primary pressure filters used ahead of two secondary pressure filters. Environmental Products designed the WTP as a pilot plant in Colorado initiated in January of 1995. The Hi-Rate Permanent Media Filter System uses garnet sand media designed to never need full replacement; however, the system conducted a full replacement of filter media during the winter months of 2007. Backwash water from the Limbaugh WTP is directed to a concrete backwash pond containing overflow piping. The capacity of this pond is not known and could be limiting the WTP production capacity. This filtration process requires a backwash cycle approximately once every two days when the WTP is running on a 24 hour operation cycle. The system has purchased a controller system that will automatically perform the needed backwashes. However, the operator plans to manually initiate the cycle and observe the backwash on both sets of the filters.

3.0 Technical Capacity

The assessment of technical capacity is based on five categories: water treatment capacity; existing water sources; water source capacity; water storage, pumping and distribution facilities; and violations. Each category is assessed through operator responses, assessor observations, and records of performance and operation.

3.1 WATER SYSTEM MAPPING AND TREATMENT CAPACITY

The FVAWD has a need for comprehensive mapping of the water system. Mapping was completed in 1992 that contains the location of the surface water intake, well locations, pump house locations, storage tank location, water lines, fire hydrants, hand valves, pressure reducing valves (PRVs), and utilities. The District has contracted RG Consulting Engineers (RG) to complete accurate and updated mapping of all water system infrastructure. The mapping should show the service area and boundaries and where growth is anticipated.

The water system has not established a procedure to ensure record plans or drawings are prepared and maintained for all new facilities. Record drawings exist for infrastructure built in the 1970s; however, these drawings have not been updated to include new infrastructure. Policies should be written and implemented requiring contractors to submit record drawings to the Board for approval of system repairs or replacements.

Considering the existing source water quality and potential sources of contamination, the available treatment technologies are appropriate to meet drinking water standards. The system is currently in compliance with Colorado's Primary Drinking Water Standards. The FVAWD received an award in May 2007 for the best tasting water in Colorado as part of a competition held by the Colorado Rural Water Association.

The system is not required to maintain a discharge permit for backwash water from the Limbaugh WTP. Evaporation and percolation are used to achieve de-watering in the backwash pond.

3.2 EXISTING WATER SOURCES

The FVAWD utilizes both surface water and groundwater supplies for their raw water. Surface water is obtained from the Monument Creek and groundwater is obtained from the Arapahoe Aquifer. The Arapahoe pump house pumps raw water from the Arapahoe Aquifer and treats it to remove excess iron. This pump house produces approximately 90 to 100 gallons per minute (gpm). The average production in July of 2007 was 100 gpm.

The FVAWD received a grant from the Colorado Energy and Mineral Impact Assistance Fund in the amount of \$200,000 and drilled a replacement well in 2004 near the original Dawson well after internal casing was found to be deteriorating beyond repair. Although the new Dawson well was drilled to 700 feet, 200 feet deeper than the original well, it was found to be insufficient to pull water from the Dawson Aquifer and is not currently being utilized.

The system has identified its source water area and does not own the land on which the intake is located. The surface water intakes are located within the Pike National Forest. Potential sources of contamination in the source water area include cattle grazing and abandoned mine sites. The CDPHE completed a source water assessment of the water system as part of Colorado's Source Water Assessment Plan (SWAP) per requirements of the 1996 Safe Drinking Water Act. At the time of the assessment the system consisted of two ground water sources and one active surface water source.

From the SWAP, the groundwater source assessment concluded that the total susceptibility of the groundwater sources was determined to be moderate and moderately low. Two primary factors are evaluated to determine a sources' susceptibility: the physical setting vulnerability and contaminate source threats. The physical setting vulnerability is evaluated by reviewing the ability of the watershed to lessen potential contamination concentrations in the source water by providing a sufficient barrier. The total physical setting vulnerability of the watershed containing the groundwater sources was determined to have a moderate and a moderately low susceptibility rating. Contaminant source threats are determined by evaluating discrete and dispersed contaminant sources. Discrete contaminant sources include facility-related operations that could cause the release of contamination to a small area. The assessment identified two discrete contaminant sources within the watershed; aboveground, underground, and leaking storage tank sites. Dispersed contaminant sources include broader land uses that could cause release of contaminants to large areas. Nine dispersed contaminate sources were identified in the watershed with moderate and moderately low susceptibility ratings. These sources included: pastures and/or hay, deciduous forest, evergreen forest, and those from nearby roads.

The active surface water source assessment concluded that the total susceptibility of the raw water source was moderately high. Two primary factors are evaluated to determine a sources' susceptibility: the physical setting vulnerability and contaminate source threats. The total physical setting vulnerability for the Monument Creek supply was determined to be moderately high. The assessment identified one discrete contaminant source, an existing or abandoned mine site, with a high susceptibility. Seven dispersed contaminate sources were identified with

moderately high and high susceptibility ratings. These sources included: commercial, industrial, or transportation land uses, deciduous forest, evergreen forest, and those from nearby roads.

The FVAWD has prepared a plan for protecting its source water area. The system would like to install a fence around the surface water intake to minimize the risk of damage to the raw water source and intake structure. Discussions will need to take place with the Pike National Forest to gain permission to do so. The system is in need of a wellhead protection ordinance to protect the area surrounding the systems wellhead, or the “head waters” of the well. The following methods can be used to protect groundwater resources used by the FVAWD:

- ❑ Preventing pollution;
- ❑ Establishing wellhead protection zones around the systems water supply wells;
- ❑ Prohibiting new facilities or activities that may pose a significant hazard to the FVAWD’s groundwater resources resulting from storage, handling, treating, using, producing, recycling, or disposing of hazardous materials;
- ❑ Imposing standards for storing, handling, treating, using, producing, recycling, or disposing of hazardous materials so as to preclude the introduction of such materials into the soil or groundwater;
- ❑ Establishing a monitoring program to detect the presence of contaminants in groundwater prior to their reaching the system’s water supply wells.

The following website contains example ordinance language to assist systems in preparing source water protection plans and ordinances:

<http://www.epa.gov/owow/nps/ordinance/mol7.htm>.

3.3 WATER RIGHTS CAPACITY

The system has proof of sufficient water rights to meet projected needs. Water rights owned by the FVAWD were investigated approximately two years ago by a water rights law firm. The District owns 1500 acre-feet per year of total water rights, 120 gpm of these rights are for the Monument Creek surface water rights. A member of the BOD indicated that the FVAWD has 3rd priority raw water rights on this source.

The FVAWD anticipates an addition of approximately 70 homes within the service boundaries. The system does not anticipate growth outside of the service area to occur in the near future. Any growth outside service boundaries must be accompanied by a formal inclusion process that includes the transfer of raw water rights from the property being included.

The drought conditions in the early 1990’s had a negative effect on the water system and restrictions were issued to users. The system issued temporary and voluntary water restrictions during May 2007. There are currently no restrictions in place. The FVAWD does not have a water conservation plan in place. The water system may want to consider preparing a plan for conservation in the event drought conditions occur or heavy irrigation is needed.

3.4 WATER PUMPING, STORAGE AND DISTRIBUTION FACILITIES

The FVAWD is currently utilizing one groundwater source to provide potable water to users. The Arapahoe pump house draws approximately 30 MG per year, or 57 gpm. The Dawson well, drilled to draw from the Dawson Aquifer, is not currently being utilized. The booster station located between the Arapahoe pump house and the Limbaugh WTP contains a 20 Hp pump and a 7.5 Hp pump. The 7.5 Hp pump was used to draw raw water from the Dawson well and is not utilized at this time. The Limbaugh WTP contains two booster pumps, one of which is missing a motor, that are used to increase the capacity of the WTP. All pumps within the system operate based on mercury switches that turn them on when water is received. The ORC indicated that electrical problems occurred with the booster pumps at the WTP but have been resolved.

The water system contains one finished water reservoir located near the Limbaugh WTP. This bolted steel tank has a storage capacity of 250,000 gallons. The tank is in need of major repairs as an inspection in 1996 determined that it had 17% corrosion in the tank floor. FVAWD has budgeted for these repairs in their 2008 budget.

The system distribution infrastructure is aging and contains areas with inadequately sized water mains and inconsistent pipe materials. The Villas contains inadequately sized distribution lines having diameters of 1-inches and 2-inches. The majority of the remaining distribution piping contains diameters of 6-inches. This limits the ability of the system to meet current flow demands as well as the required fire flow to those areas. The FVAWD experienced a major transmission line break during the summer of 2007 which resulted in a boil order to be issued to users. The ORC indicated that approximately five minor water main breaks or leaks had occurred in the two weeks previous to the site visit. The FVAWD has budgeted in the next year to replace approximately 1,200 linear feet (LF) of the transmission line between the Dawson pump well building and the area containing the two major breaks.

The FVAWD has estimated that leaks in the transmission line are a significant source of water loss within the system. The system also estimates that smaller leaks exist within the distribution system causing an increase in water loss. Water production in 2007 was 30 MG per year and the system only metered and billed for a production of 20 MG. In May of 2007, the Arapahoe Well shut down after the transmission pipe to the storage tank broke. The Contract Operator at that time was unable to pinpoint the location of the leak and the storage tank level dropped such that some users lost water pressure. With a full tank, approximately five days of storage exists to meet average residential demands without the well or surface water supplies online.

There are approximately 50 hydrants within the distribution system. Fire flow was determined to be insufficient by a recent investigation by the Insurance Services Office (ISO). The FVAWD was not supplied with the report stating what the current fire flow in the distribution system is. The Tri-Lakes Fire District can provide tanker trucks if the system were to experience an emergency.

3.5 VIOLATIONS

The Water Quality Control Division (WQCD) of the Colorado Department of Public Health and Environment (CDPHE) conducted a compliance inspection of the FVAWD on June 5, 2006.

The inspection determined that the water system had no significant deficiencies; however, the following minor deficiencies were identified:

- ❑ The system does not have a monitoring plan that details the system’s background information, sources, treatment and distribution system; and
- ❑ The system does not have a certified operator per Regulation 100.

The 2006 inspection also stated the following recommendations for the water system:

- ❑ A cross-connection control program should be prepared and implemented;
- ❑ The disinfection equipment located at the surface water treatment plant should be adjusted to maintain a constant chlorine residual at variable influent flow rates;
- ❑ Repair the broken backwash controller to ensure filters are backwashing correctly; and
- ❑ The Dawson Well does not provide adequate protection of source water. Ensure that modifications made to the water system are granted approval by the CDPHE.

The Operator in Responsible Charge (ORC) at the time of the 2006 compliance inspection failed to renew his water treatment and water distribution certifications. This deficiency was resolved soon after the inspection. Corrective action of the deficiency regarding a monitoring plan for the system has not been fulfilled. The system installed a disinfection segment for achieving adequate chlorine contact time to the first user and plans to install a chlorine dosing system to address recommendation No. 2 above.

A list of violations incurred by the FVAWD can be seen in Table 3.0.

Table 3.0 Water System Violations

Violation Date	Violation
2005	Failure to provide the CDPHE with a copy of the 2005 CCR.
1/23/2005	Failure to Monitor for Inorganics
2/15/ 2007	Failure to prepare, certify and/or deliver a CCR – Fine Assessed
1/10/2008	Failure to submit the November 2007 Monthly Operational Report

The FVAWD is working diligently with CDPHE officials regarding the recent boil orders issued due to main breaks. A plan has been established to notify residents in the event of a violation, and the BOD has asked to be copied on all WQCD correspondence to ensure that monitoring violations are received for their review.

4.0 Managerial Capacity

The managerial capacity extends beyond the day-to-day operations of the public water system. Effective management is a multi-faceted system of planning, decision making, organization, and policies. The managerial capacity was assessed through an interview with the District Manager, and a member of the BOD.

4.1 MANAGEMENT

Resolutions and ordinances for the District were prepared approximately 10 years ago. The District needs to ensure that those all are up-to-date and enforceable.

Election records do not suggest board stability and general public satisfaction with its policies. The FVAWD has experienced difficulty in finding residents to volunteer for board positions. Four out of five board positions are up for re-election for the 2008 fiscal year. Current board members are somewhat familiar with the water system. A recent tour of the water system was attended by board members as well as approximately 20 District residents. The Board of Directors consists of five members and regularly scheduled meetings are held once per month. Approximately eight special sessions are held annually in conjunction with regularly scheduled meetings.

The FVAWD has contracted Community Resource Services of Colorado (CRS) to provide management services for the District. CRS is responsible for preparing and distributing agendas and board packets prior to all board meetings and providing meeting minutes for review by board members. The contracted management firm attends all board meetings and the District Manager indicated that it is his goal for the system is to hold regularly scheduled meetings once every two or three months in the future to cut costs.

The contract operations firm, ECO Resources (ECO), prepares monthly operations and maintenance reports before the tenth of every month to be reviewed at board meetings. Representatives from ECO attend board meetings if requested to discuss any issues.

If changes in treatment technology change the certification requirements for the FVAWD treatment facilities, a contract operator should be hired that holds the appropriate certifications.

4.2 OPERATIONS

Maintaining operating certifications falls under the responsibility of ECO, who will provide at least the minimum certification level to maintain the water system, fulfilling requirements of Regulation 100. The minimum certification level required for the FVAWD treatment facility is a Class B Water Treatment Certification. The Operator in Responsible Charge (ORC) currently holds a Class B Water Treatment Certification and a Class 1 Water Distribution Certification. The assistant operator holds a Class C Water Treatment Certification. A member of the Board of Directors has obtained a Class D Water Treatment Certification and has a basic understanding of system operations.

The ORC, who lives within 30 minutes of the water system, visits the water system approximately one day per week. The assistant operator is responsible for the treatment facilities the remainder of the time. The current contract for operations is for approximately 30 hours per week. ECO is available to the District 24 hours per day for emergency purposes.

ECO is responsible for overall day-to-day operations of the water system, including the treatment plants and distribution system. Process changes fall under the responsibility of the ORC including adjustments to maintain adequate flows and pressures within the system. The assistant operator is permitted to make minor process adjustments.

Site visits by ECO personnel include observations of tank levels and ensuring that all chemical pumps are operating adequately. Chlorine residual testing is completing at each water pump station and in the distribution system. A daily log book is kept by the water system operators for recording operations such as shutting down pumps, changing meters, system repairs or replacements, and when meter readings are conducted. Daily log sheets keep records of effluent flows, booster pump flows, backwash flows, by-pass meter readings, raw and effluent water iron levels, chlorine residual, and tank levels. Handheld test kits are utilized at the Arapahoe Pump House to monitor chlorine, manganese and iron levels on a daily basis. ECO has prepared a sampling and monitoring plan, which must remain available upon request of the local health department or the CDPHE.

The water system does not contain a Supervisory Control and Data Acquisition (SCADA) system which allows for monitoring of the system through a computer interface. The Arapahoe pump house contains an alarm system that dials the ORC if the storage tank levels decrease or increase beyond set points, if the pressure within the system changes drastically, and if the chlorine levels reach the set low or high points. The Limbaugh WTP does not contain an alarm system.

The ORC and assistant operator are currently learning the workings of the treatment facilities and distribution system as record drawings do not exist and an operations manual has never been prepared. The system operators have sufficient water treatment understanding and experience to make proper operational decisions. As the operators are employed by a contract operations company, networking with other operators can be easily accomplished. The FVAWD has memberships with the American Water Works Association (AWWA) and the Special Districts Association (SDA), both of which provide networking opportunities and training materials for BOD members and interested residents. It is the responsibility of CRS to maintain various District memberships.

4.3 ORGANIZATION

The FVAWD has not prepared an organizational chart for the water system. As the District has contracted out much of the duties required to operate the system, a comprehensive organizational chart should be developed and distributed to all contractors. The organizational chart could correlate with the job descriptions to ensure responsibilities are clear to all staff involved with the water system.

The District Manager indicated that clear lines of communication exist between management and the system operator. The ORC and District Manager conduct phone calls with each other approximately three to four times per week regarding system operations. The operator is instructed to communicate emergency needs to the District Manager who then communicates those needs to the BOD.

The District has a procedure in place to monitor contractor performance. Annual contracts are in place with the management firm, engineering firm, and a contract operations company. The Board assesses each contract at year-end to ensure all required duties have been performed and each contract has been upheld. The contracts are terminated if communicated goals have not been upheld.

4.4 MASTER PLANNING

The FVAWD does not currently have a master plan to address infrastructure and capacity needs. The system has contracted an engineering firm to complete a master plan for the District. The contract for completing the master plan includes a hydraulic model of the distribution system, a capital improvements plan, and a water sustainability analysis. The master plan should project future water demands, comparing those to current capabilities and evaluating how to meet any inadequacies. The following website discusses master planning and the benefits of developing one for the water system:

<http://www.ceiengineers.com/planning/indexplanning.htm>.

An asset inventory was completed for the system by the previous ORC in December 2005. As part of the master plan, RG will be ensuring that the asset inventory includes all water system infrastructures. The asset inventory should project the anticipated repair or replacement expenses of infrastructure for the next 5 years at a minimum. The Environmental Protection Agency (EPA) provides an asset management best practices guide for water systems, which can be found at the following website:

http://www.epa.gov/safewater/smallsystems/pdfs/guide_smallsystems_assetmanagement_best_practices.pdf.

The system lacks an adequate emergency plan to address storms, floods, and major mechanical or electrical failures. The FVAWD has established initial procedures for responding to emergencies and is working with ECO to complete a comprehensive emergency response plan (ERP). It was indicated during the TMF evaluation that a template received by the Rural Community Assistance Corporation (FCAC) will be used to prepare the ERP. The following components of the emergency response plan should be included:

- ❑ Documentation of responses to disasters/emergencies that have historically occurred in the water system's service area, including main breaks;
- ❑ Designation of responsible personnel and provision of a clear chain of command and responsibilities (this is important with contract management and operations companies who will be responding to emergencies);

- ❑ Inventory of system resources that are used for normal operations and available for emergencies;
- ❑ A communications network that describes a designated location for an emergency operations center;
- ❑ Emergency contact information for equipment suppliers;
- ❑ Emergency phone and radio communication capabilities;
- ❑ Coordination procedures with governmental agencies;
- ❑ Emergency procedures to assess damage to water system facilities, analyze logistics on emergency supply activation and repairs, monitor progress of repairs and restoration, communicate with health officials and water users, and document damage and repairs.

A guidance manual to assist small water systems in developing plans for responding to emergencies can be found at the following website:

http://www.epa.gov/safewater/watersecurity/pubs/small_medium_ERP_guidance040704.pdf.

4.5 OPERATION AND MAINTENANCE (O&M) PLAN

The FVAWD does not currently have an operations and maintenance (O&M) plan that addresses how the system will be operated. The plan should be in a written form available for review at anytime. The O&M plan should be customized for the FVAWD system and written so as to allow it to be used as a training guide for new employees. The O&M Plan should include the following at the minimum:

- ❑ Written operational objectives and daily operational practices;
- ❑ Written emergency operational practices, as part of the ERP mentioned above;
- ❑ Standard Operating Procedures (SOPs) should be written for operations of the Arapahoe treatment plant and the surface water treatment plan;
- ❑ Procedures and schedules for flushing dead-end mains;
- ❑ Procedures to document repairs on water reservoirs and tanks;
- ❑ Procedures for repairing and replacing mains;
- ❑ Procedures for responding to consumer complaints;
- ❑ Procedures for maintenance and testing of backflow prevention devices;
- ❑ Schedule and procedures for inspecting and exercising water main valves;
- ❑ Procedures for maintenance and calibration of master flow meters;
- ❑ Written responsibilities, qualifications, and training of operating personnel; and
- ❑ Implementation of an adequate record keeping system.

Water quality goals for the system should be set that include turbidity limits and chlorine residual. The persons responsible for reviewing water quality records should ensure the goals are being met. As ECO has been hired by the District to provide contract operations and

compliance, the District should ensure water quality goals are communicated to contract operators.

Standard operating procedures should be written and utilized for water system operations. SOPs should address process control testing and adjustments. Schematics should be posted for operation of water system processes including the location of critical valves to isolate sections of the distribution system if a line break occurs.

Inspections and cleaning have not been consistently performed on the finished water reservoir. The most recent inspection of the storage tank was conducted in 1996. At this time, corrosion of the storage tank was determined to be 17%. Written procedures should be in place for routine inspections and cleaning. Annual budgets may include line items for reservoir maintenance to assist with routine scheduling and funding.

The FVAWD should ensure that contracts include written job descriptions and qualifications needed for each job.

The system should ensure that the management firm hired to conduct duties of a District Manager maintains an adequate recordkeeping system including at the minimum:

- ❑ O&M records;
- ❑ Equipment repair and replacement (e.g. well pumps, valves, meters, chemical feed pumps, and customer water meters);
- ❑ Compliance monitoring;
- ❑ Violations;
- ❑ Sanitary surveys;
- ❑ No less than 5 years of bacteriological testing records;
- ❑ No less than 10 years of chemical analyses conducted on the water system; and
- ❑ Water production.

The system may keep actual laboratory reports or data may be transferred to tabular summaries. Tabular summaries can be used to evaluate any trends on source water quality, which has a direct impact on the water production capacity of the system. The FVAWD should establish a record keeping system as part of the District policies.

4.6 SYSTEM POLICIES

The FVAWD does not currently have an adequate cross-connection control program. The system has discovered some illegal taps while conducting repairs and maintenance on system infrastructure. Taps not properly installed may pose potential cross-connections, thereby endangering the public health of system users. Current District policy is to remove all illegal taps upon their discovery.

A comprehensive cross-connection control program should include the following:

- ❑ A list identifying hazardous cross-connection, prioritized by degree of hazard;

- ❑ A public education component;
- ❑ Written requirements implemented into District policy stating user responsibilities i.e. “Users are required to install and maintain backflow prevention devices on potentially hazardous service connections and have them tested annually by a certified backflow prevention technician.”
- ❑ All testing and maintenance records are required to be kept for a minimum of three (3) years per Article 12 of the Colorado Primary Drinking Water Regulations.

A guidance document cross-connection control programs can be found at the following website: www.cdph.state.co.us/wq/Drinking_Water/pdf/Misc_Guidance/cross_connection_control.pdf.

There is not a written program to address water that is lost due to leakage within the FVAWD distribution system. Leakage within the distribution system is estimated at approximately 25% to 30%. ECO compares water usage per residence on a monthly basis to observe any abnormally high spikes in water usage. At least 20% of meters are inspected inside residences on an annual basis to ensure the existence of meters and properly working remotes. A meter replacement should be part of the annual budget for the water system.

ECO is responsible for maintaining a safety program for the FVAWD. The former ORC of the system posted appropriate Material Safety and Data Sheets (MSDSs) near chemicals in the water treatment buildings. All contractors of the FVAWD need to have a copy of the safety plan to ensure safety procedures are followed. The contract operator should ensure the following items have been included in the safety program:

- ❑ Written safety procedures that should be followed when servicing or maintaining equipment or distribution system infrastructure;
- ❑ Procedures should be written for handling chemicals; and
- ❑ An employee training program should be implemented to train employees to service equipment and handle chemicals.

The FVAWD does not have a formal system to log or track customer questions or complaints. Residents of the District are instructed to contact the District Manager with any comments, questions, or complaints. The District Manager should develop a system to record and document relevant information regarding customer complaints. Documentation should include the reporting individual and the situation causing the complaint. The resolution for each complaint should also be documented.

CRS is responsible for maintaining insurance coverage and has acquired general liability insurance with adequate coverage through the Special District Association (SDA). The water system filed a civil lawsuit against an employee in 2004 for embezzlement of District funds. A settlement was reached and the case has been closed.

5.0 Financial Capacity

The assessment of financial capacity considers the ability of a water system to be 'self-sustaining' with adequate resources and planning to provide safe drinking water to current and future customers. For a public water system, the budget and a recent audit are reviewed to determine whether rates combined with other revenue sources are sufficient to cover current and future (five-year) expenditures for the water system.

5.1 BUDGETING

Annual budgets are prepared for the water system. The majority of the budget for 2008 was prepared by a member of the BOD and was completed by the District Manager. Future budgets will be prepared by the management firm contracted by the District. Budget preparation of the FVAWD follows strict statutory requirements. A draft budget is submitted by October 1 of every year and approved by November 15. Budgets are adopted by the end of December to take effect January 1.

The FVAWD maintains a general fund, an enterprise fund, a debt service fund, and a capital improvement fund. The general fund pays for general day-to-day services needed for the water system. The enterprise fund supplies the needed revenue for district management, operations, and costs associated with water production. The capital improvement fund pays for all new projects within the water system. The debt service fund pays for past debt requirements of the FVAWD.

TMF evaluators reviewed the 2006 actual budget, the projected and estimated 2007 budget and the estimated 2008 budget. Comparing line items in these budgets for revenues and expenses, evaluators calculated an operating ratio. The operating ratio is a measure of whether operating revenues are sufficient to cover operations, maintenance, and replacement (O/M/R) expenses. Using this definition, the operating ratios for 2006, 2007, and 2008 were 1.88, 1.04, 0.77, and 0.90, respectively. An operating ratio of 1.0 is considered to be the minimum for a self-supporting fund. As an enterprise fund, there does not appear to be sufficient revenues to cover operating, maintenance, and repair of the FVAWD.

The FVAWD entered into a 20-year bond in 1985 that was used to fund improvements to the Limbaugh WTP and the Arapahoe pump house. A loan from the Department of Local Affairs (DOLA) provided the District in 2004. The monthly debt service charge to users exactly covers the annual payments on the two debts held by the District. As a result of the embezzlement, the District acquired additional debt to replenish the bond reserve account including legal fees, and recovery costs. The District has recovered all funds that were proven to be embezzled.

Evaluators calculated a coverage ratio for the 2006 actual budget, the 2007 projected and actual budgets, as well as the estimated 2008 budgets in the debt fund. The coverage ratio is a measure of the sufficiency of net operating profit to cover debt service requirements. Using this definition, the coverage ratios for 2006, both 2007 budgets, and 2008 were 1.99, 1.11, 1.31, and

1.17, respectively. A coverage ratio of a positive 1.25 is considered the minimum for a utility that is self-sustaining. As such, the current rate structure does not appear to be sufficient to cover O/M/R expenses and debt service requirements for the water fund.

A comprehensive financial plan is needed to track revenues and expenses over a five-year period to determine when rate and user fee increases are needed and how they will impact the water fund. This plan should be initiated with the follow-up contractor, Malcolm Pirnie, after completion of the system asset inventory discussed in section 4.4. The five-year plan would use the schedule from this asset inventory to identify required capital improvements and replacement projects. With numerous expenditures anticipated in the next five years to improve the system, the five-year plan can help prioritize what is feasible with the current rate structure.

5.2 CASH BUDGET

A cash reserve exists in the enterprise fund to cover unexpected expenditures, such as line breaks. The system currently collects \$10 per month from users that increase the reserve fund by approximately \$33,000 per year.

5.3 USER FEE REVIEW

A review of the rate structure is completed annually. The FVAWD Board of Directors voted to adopt a new rate and fee schedule for 2008. The following items contributed to the recent increase in fees:

- ❑ Water production costs and delivery;
- ❑ Operation costs (e.g. chemicals, electricity, and natural gas);
- ❑ Main repairs due to aging infrastructure and county fees;
- ❑ Contract management fees;
- ❑ Engineering fees; and
- ❑ Contract operations fees.

Tables 5.0, 5.1, and 5.2 show the rates and fees for 2006, 2007 and 2008, respectively. Water usage charges are based on the FVAWD selling 20 MG of water per year, which is based on historical water sales. Expenses for certified plant operations, chemicals, utilities, emergency operations, emergency main repairs, producing, treating, and delivering potable water are all factored into water usage fees as well.

Table 5.0 2006 Rate & Fee Schedule

2006 Itemized Charges	Fees per month
Water Usage – 5 Tiered Rate Structure (monthly meter readings)	\$3 / 1000 gallons (up to 5000 gal)
Service Fees (administration & operations)	\$43

Debt Services	\$26
MINIMUM MONTHLY CHARGES	\$72

Table 5.1 2007 Rate & Fee Schedule

2007 Itemized Charges	Fees per month
Water Usage (monthly meter readings)	\$8 / 1000 gallons
Enterprise Service	\$29
Debt Services	\$26
Capital Improvements	\$42
MINIMUM MONTHLY CHARGES	\$105

Table 5.2 2008 Rate & Fee Schedule

2008 Itemized Charges	Fees per month
Water Usage (monthly meter readings)	\$8 / 1000 gallons
Enterprise Service	\$39
Debt Services	\$26
Capital Improvements	\$42
MINIMUM MONTHLY CHARGES	\$115

The water system contains residential meters that are read by contract operators manually on a monthly basis. ECO takes all meter readings and forwards them to the billing entity, CRS. A recent audit conducted on residential meters determined that several meters are in need of replacement primarily because they are not efficiently recording water usage.

5.4 FINANCIAL AUDITS

A financial audit is conducted annually by an independent auditor. The FVAWD performs well in these audits.

5.5 FINANCIAL PLANNING / CAPITAL IMPROVEMENT PLAN (CIP)

The FVAWD has begun preparing a list of needed capital improvements for the water system. The contracted engineering firm, RG, is responsible for completing a capital improvement plan (CIP) in conjunction with the master plan. The CIP will factor in development and long-term growth potential.

CRS will be responsible for the capital improvement development management for the District. They will be assisting in designing and planning, facilitating all aspects of bid processes, and managing any project construction activities.

6.0 Findings

The technical, managerial and financial capacities of the Forest View Acres Water District were evaluated in order to identify areas of limited capacity. These evaluations were based on information obtained from the system tour, interviews, performance and design assessments, and the judgment of the evaluation team. Each of the factors was classified during the exit meeting as Tier I, II or III according to the following guidelines.

Tier I – First priority for follow-up assistance efforts

Tier II – Second priority for follow-up assistance efforts

Tier III – Long-term effort and/or a minor priority for follow-up assistance efforts

The TMF capacity limitations for the FVAWD were discussed with the Board of Directors and the District Manager during an exit meeting. The TMF limitations were rated by both the facility and by Stantec in the following table. The system was given the opportunity to edit or amend limitations prior to inclusion in the final report.

Rating	TMF Capacity Limitations
	Technical
III	<p>WATER TREATMENT CAPACITY; NEED FOR MAPPING</p> <p>The District needs to ensure mapping for the system is completed and includes source water supplies and all system infrastructures. Service area boundaries should also be clearly defined on this map.</p> <p>RG consultants has been contracted to prepare mapping for the water system.</p>
III	<p>DISTRIBUTION SYSTEM; INADEQUATELY SIZED MAINS</p> <p>The distribution system contains areas served with inadequately sized water mains and inconsistent pipe materials. This limits the ability of the District to provide current and future flows associated with growth as well as the required fire flow to those areas.</p>

Rating	TMF Capacity Limitations
	Technical Cont.
III	<p>EXISTING WATER SOURCES; NEED FOR WELL HEAD PROTECTION PLAN</p> <p>The District needs to prepare a well head protection plan for the Arapahoe groundwater source. This plan should identify potential sources of contamination this raw water supply.</p>
	Managerial
I	<p>MANAGEMENT; NEED TO UPDATE RULES AND REGULATIONS</p> <p>The District needs to prepare applicable resolutions and ordinances and ensure that those all are up-to-date and enforceable.</p>
III	<p>MASTER PLANNING; NEED FOR WRITTEN MASTER PLAN</p> <p>The system is in need of a master plan that addresses system infrastructure and capacity needs. The plan should address future water demands compared to current capabilities and should evaluate how to meet any inadequacies.</p> <p>RG consultants have been constructed to prepare a master plan for the water system.</p>
III	<p>MASTER PLANNING; NEED FOR ASSET MANAGEMENT PLAN</p> <p>An asset inventory was prepared by the previous ORC; however, the District needs to ensure that all system infrastructures have been incorporated into this inventory.</p>
III	<p>MASTER PLANNING; NEED FOR EMERGENCY PLAN/PROCEDURES</p> <p>The District is in need of an adequate emergency plan that addresses storms, floods, and major mechanical failures of the water supply, disinfection, and distribution system. The emergency response plan should also include:</p> <ul style="list-style-type: none"> □ Documentation of responses to disasters/emergencies that have historically occurred in the water system's service area; □ Designation of responsible personnel and provision of a clear chain of command and responsibilities; □ Inventory of system resources that are used for normal operations and available for emergencies; □ Communication network that describes a designated location for an emergency operations center; coordination procedures with governmental agencies for health and safety protection, technical, legal and financial assistance; and public notification procedures; and □ Emergency procedures to assess damage to water system facilities, analyze logistics on emergency supply activation and repairs, monitor progress of repairs and restoration, communicate with health officials and water users, and document damage and repairs.

Rating	TMF Capacity Limitations
	Managerial Continued
I	<p>OPERATIONS AND MAINTENANCE PLAN; NEED FOR O&M MANUAL</p> <p>Procedures need to be written for the water system in regard to the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Operational objectives, such as chlorine residual; <input type="checkbox"/> Daily operational practices; <input type="checkbox"/> Emergency operational practices; <input type="checkbox"/> Procedures and scheduling for flushing dead end mains; <input type="checkbox"/> Procedures and scheduling for reservoir inspection/maintenance; <input type="checkbox"/> Procedures for main repairs and replacements; <input type="checkbox"/> Procedures and scheduling for inspecting and exercising water main valves; <input type="checkbox"/> Customer complaint form that allows for the tracking of complaints and how they are handled; <input type="checkbox"/> Record keeping system for O&M activities and daily process control adjustments; and <input type="checkbox"/> Written sampling and monitoring plan for required bacteriological testing. <p>The contractors hired by the District should work together to complete a comprehensive O&M plan for the water system.</p>
I	<p>SYSTEM POLICIES; NEED FOR WRITTEN POLICIES</p> <p>The following policies should be written and put into place:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Cross-connection Control Program; <input type="checkbox"/> Program to address water loss; <input type="checkbox"/> Safety program; and a <input type="checkbox"/> System log or track, and address customer questions or complaints.
	Financial
I	<p>BUDGETING / CAPITAL IMPROVEMENT PLAN</p> <p>A capital improvement plan is needed for the FVAWD. A CIP will assist with long-term planning and budgeting.</p> <p>RG has been contracted by the District to prepare a CIP for the water system.</p>

Stantec

TECHNICAL, MANAGERIAL & FINANCIAL (TMF) CAPACITY ASSESSMENT

Appendix

July 7, 2008

APPENDIX A
TMF CAPACITY CHECKLIST