BOARD OF FIRE COMMISSIONERS
TRUCKEE MEADOWS FIRE PROTECTION DISTRICT (TMFPD)

TUESDAY 9:00 a.m. OCTOBER 17, 2017

PRESENT:

Bob Lucey, Chair
Marsha Berkbigler, Vice Chair
Vaughn Hartung, Commissioner
Jeanne Herman, Commissioner

Jan Galassini, Chief Deputy County Clerk
Charles Moore, Fire Chief
David Watts-Vial, Deputy District Attorney

ABSENT:

Kitty Jung, Commissioner

The Board convened at 9:01 a.m. in regular session in the Commission Chambers of the Washoe County Administration Complex, 1001 East Ninth Street, Reno, Nevada. Following the Pledge of Allegiance to the flag of our Country, the Clerk called the roll and the Board conducted the following business:

17-152F **AGENDA ITEM 3** Public Comment.

There was no response to the call for public comment.

17-153F **AGENDA ITEM 4** Commissioners'/Fire Chief's announcements, requests for information, topics for future agendas, and statements relating to items not on the Agenda.

Truckee Meadows Fire Protection District (TMFPD) Chief Charles Moore stated retired Fire Chief Mike Brown requested his presentation regarding the Verdi Fire to be deferred until the November meeting. He said Agenda Item 7 regarding the National Weather Service presentation was pulled from the agenda and would be brought back at a future meeting. He stated he and Deputy District Attorney David Watts-Vial met with their counterparts from Sierra County, California, to discuss the renewal of a contract for service with the TMFPD. He indicated there were questions about the current contract cost of $10,000; whether it was enough, too much, or if it was close to what should be charged. He said there were two small areas within Sierra County, one area in Cold Springs and one in Verdi, California, that would be reviewed. He stated staff was working on a methodology to make the cost equal based on what taxpayers were paying in Nevada as compared to California. Staff would work on the new agreement and present it to the Board in November. He provided documents, which were placed on file with the Clerk.

AGENDA ITEM #5A

Commissioner Hartung stated he attended several fire prevention open houses on October 14th. He said he started at the City of Sparks Fire Station pancake feed. He expressed interest in the County's participation in the annual event in the future. He also attended events in Lemmon Valley, Sun Valley and Spanish Springs where the Regional Aviation Enforcement Unit (RAVEN) had a static display. He said Chair Lucey visited the Arrowcreek Station and Commissioner Herman attended other area events. He asked Chief Moore about the timing for station upgrades, especially for Station 17. He stated the living quarters at that station were in desperate need of some upgrades.

Chair Lucey commended Commissioner Hartung for spending so much time at the fire prevention open houses and said he was a strong advocate at all the events. He wanted discussions about the placement of future fire stations to occur. He said the Regional Governing Board was reviewing the Regional Plan update and discussed the City of Reno's placement of new and future fire stations. He wanted information about the discussions between the TMFPD and the City of Reno regarding future stations, locations, proximity to other stations and whether they agreed with the joint plan for both districts. He stated station placement needed to be strategic because the budget was reliant on citizens in the unincorporated areas. He thanked Interim Fire Marshal Denise Reynolds for putting together the fire prevention open house event. He thanked Mrs. Moore for her contribution as "Sparky" at the Arrowcreek Station and said it was a successful family event.

Commissioner Berkbigler said she appreciated her teammate's participation at the fire prevention events. She spoke regarding the possibility of moving the TMFPD into a General Improvement District (GID) in order to take advantage of some of the GID rules. She stated staff encountered some complications with the State Department of Taxation and what transpired with the C-tax. She said staff was working with the District Attorney and said Chief Moore continued his work on the issue. She requested the District Attorney to be included in the review of the entire plan. She noted there could be some additions to the plan that needed to be included.

CONSENT ITEMS

17-154F **5A** Approval of minutes from the September 19, 2017 meeting.

17-155F **5B** Discussion and possible direction to staff to research, solicit proposals if required, and recommend new timekeeping, payroll and human resource information systems (HRIS) for the Truckee Meadows Fire Protection District.

There was no public comment on the Consent Items.

On motion by Commissioner Hartung, seconded by Commissioner Berkbigler, which motion duly carried with Commissioner Jung absent, it was ordered that the Consent Agenda Items 5A through 5B be approved. Any and all Resolutions or Interlocal Agreements pertinent to Consent Agenda Items 5A through 5B are attached hereto and made a part of the minutes thereof.

17-156F **AGENDA ITEM 6** I.A.F.F. Local 3895 Report

International Association of Firefighters (IAFF) Local 3895 Treasurer Mark Thyer stated they were participating in a joint fundraiser with the Incline (IAFF) Local 2139 to benefit children in Northern Nevada. He said the fundraiser was a Black Jack tournament that would be held on November 30th at the Hyatt Regency in Incline Village. He noted the leaves were turning colors; it was getting cooler and said he was thankful the fire season was slowing down. He stated staff was proud of their work suppressing fires during the summer, but they were glad the season was ending. He said the department was seeking a change in payroll programs that would work more effectively with their existing system. He said the Board would continue to receive updates about the progress.

There was no public comment or action taken on this item.

17-157F **AGENDA ITEM 8** A. Discussion and possible direction to staff on the Fire Chief Report to include the following items related to fire district operations:

1. Station 14 and 39 update
2. Run card matrix discussion
3. Green waste disposal and Collection and Open burning
4. 2017 calendar year records for mutual and auto aid
5. Woodchuck fire cause

B. Career Statistics and Report for July 2017

C. Volunteer Statistics and Report for July 2017

Truckee Meadows Fire Protection District (TMFPD) Chief Charles Moore stated Station 39 received a much-needed upgrade. He complimented Capital Projects Manager Bill Wardell who did an outstanding job coordinating the plans and the contractor for the upgrade project. The station was in disrepair from woodpecker damage, the paint had deteriorated, the stone veneer was falling off, the kitchen was dysfunctional, and it had one restroom that was not gender friendly. He said the repairs cost $330,000 and the building resembled a new station. He invited the Commissioners to tour Station 39. He stated the work on Station 14 was starting to progress, the masonry was going in, and he believed it would be framed and enclosed by the end of January, 2018. He noted they were on schedule for a May or June grand opening. He said he was pleased with the progress.

Chief Moore spoke regarding Agenda Item 8A2 and said Chair Lucey requested a discussion about run cards. He stated a run card matrix was old technology and the TMFPD needed to progress to automatic vehicle location (AVL). He explained with AVL the closest agency would be dispatched to respond. He said the run card process worked by determining the number of engines that needed to be dispatched to a particular call, such as a structure fire where four engines would be needed. The dispatcher would determine the closest TMFPD engines to respond to the call. He stated the City of Reno was dispatched automatically for structure and brush fires based on the agreement implemented two years ago. He stated they were on the verge of implementing a process by which the closest unit would be dispatched to the City of Sparks. He noted the City of Sparks upgraded their stations to include paramedic services so there would be no difference in service when a medical call was dispatched. He hoped the relationship with Sparks and the implementation of AVL service would demonstrate to the region what was possible with that type of technology. The technology was in place for AVL, but the Global Positioning System (GPS) needed to be installed in the fire engines, police cars and ambulances. He said once the GPS was installed a dispatcher could locate the closest unit to respond to a call. He thought the trial run with the City of Sparks would occur within approximately 30 days. He stated the boundaries were more complicated with the TMFPD and the City of Reno because fire stations were located closer to the partnering agencies' jurisdictions in many areas. He said discussions occurred regarding the Washoe Valley and the Duck Hill Road areas. There was an automatic aid agreement with the Carson City Fire Department, Regional Emergency Medical Services Authority (REMSA) and the TMFPD related to medical calls. He stated the Carson City Fire Department was dispatched to structure fires along with TMFPD. Carson City was on a different dispatching system than Washoe County and for AVL to work effectively, both agencies needed to be on the same software program and use the same AVL technology.

Commissioner Berkbigler asked Chief Moore if this issue was something that should be addressed at the Legislature. She stated in Las Vegas there were numerous fire departments and they were able to interact with each other. She said it appeared they were all on the same software system and ran the same technology. She indicated she did not like asking the Legislature to resolve issues involving the County, but she was concerned the County would be unable to accomplish AVL throughout the region without their help.

Chief Moore thought Carson City wanted to implement AVL, but it could be an issue updating to Tiburon. He noted it could be a financial issue because Tiberon was a substantial investment. He did not believe any technological impediments existed with Reno, Sparks, the TMFPD and law enforcement agencies. He thought before the issue was conveyed to the Legislature it needed to be discussed with the other agencies to determine if there was interest. He stated Chief Chris Maples from the City of Sparks was interested in AVL. He said sending multiple engines to a diabetic emergency was wasting resources when one paramedic engine was fully capable of responding to a medical call. He stated multiple engines were dispatched to medical calls daily and he thought these issues needed to be addressed with the other agencies and their Boards or Councils.

Commissioner Berkbigler said the Board needed to initiate meetings with key players at the Cities and address the issues. She thought it was possible to accomplish AVL with the agencies working together.

Chair Lucey indicated the issue needed to be addressed because he thought the current process was ineffective and complicated. He said the regional agencies needed to establish a unified dispatch system.

Commissioner Berkbigler asked for information regarding the dispatch study that was conducted to be brought back to the Board for review. She wanted to know what the next steps would be. She said the Board had provided enough time to compile the information and she wanted the item to be on the agenda of the next Board of County Commissioners meeting.

Commissioner Hartung stated technology could perform faster and more accurately than a human to determine the closest engine. He noted the software determined the responder without considering jurisdictional boundaries or prejudice. He said constituents did not care about the complicated jurisdictional boundaries; they only wanted someone to respond to their emergencies. He stated he was happy to speak with the agencies in Sparks and schedule formalized meetings to discuss the particulars of AVL.

Chief Moore stated Agenda Item 8A3 was regarding green waste disposal, collection and open burning. He said he understood there could be some rain in the near future, but he was concerned about open burning due to the number of fires burning in the Western United States. He stated open burning regulations and approvals needed to be reviewed and possibly revised. He thought one of the solutions was the green waste disposal program he had been working on, which included the use of a burn box to dispose of green waste safely. He said he appreciated the Health District was working with him in regards to the application for utilizing the burn box. He stated the Environmental Protection Agency (EPA) required a large application fee for using the simple burning device. He stated the Health District was prepared to reduce the large fee to a much smaller fee and said he was moving forward with the process. He announced a soft rollout of the green waste program would occur on Saturday, October 28th and Saturday, November 18th. Green waste would be collected at Station 221 in Silver Lake, Station 223 in Lemmon Valley and Station 16 on East Lake Boulevard. He said the soft rollout was meant to determine whether citizens would take advantage of the program and bring in their green waste for chipping, burning or recycling. He noted he planned to develop a program in the spring with dumpsters located in certain areas for the collection of green waste. He stated he was working on acquiring land from the Bureau of Land Management (BLM) to process the materials collected in a location away from populated areas. He said he was excited and would be advertising the program to the public. He hoped the public would utilize the program and would not fill their trashcans with green waste. He said Waste Management (WM) had agreed to partner with the TMFPD for the program and their goal was to reduce the amount of excess green waste that would be burned. He noted they would be working on the program over the winter and said the

program would improve air quality and reduce fire risk. He said 12 fires occurred last spring from pile burning that went out of control. One of his goals was to eliminate the need for pile burning, although he understood ranchers and farmers would need to burn their ditches which could continue without restrictions. He stated restrictions would apply to homeowners pile burning and this program would help eliminate the need for excessive burning.

Commissioner Hartung stated he was supportive of the green waste dumpster program, but he was concerned the dumpsters would be used for other items besides green waste. He said in an area where dumpsters were previously placed for green waste collection, there were complaints they attracted rats to the area.

Chief Moore stated the dumpsters would be in secure locations and would have specific times to drop off. He said the dumpsters would be fenced off and monitored by volunteers.

Commissioner Herman commended Chief Moore for his solutions to some of the larger issues in the area. She was concerned about the State burns that would occur in the southwest part of the County and she hoped they would be able to control their burns this year. She said the area suffered two huge fire years, but she had no complaints about the fire protection in her district.

Chief Moore stated Agenda Item 8A4 was about the tabulation requested by Commissioner Hartung regarding the year-to-date mutual aid report. He said it was fairly even across the board. He noted they responded to many BLM calls because they were close to their jurisdictions. He said it was a very active year and thanked all the mutual aid partners who responded to calls.

Chief Moore stated Agenda Item 8A5 was regarding the investigation of the Woodchuck fire. He said the investigation determined the fire was started by a backhoe that struck a rock creating a spark. The construction workers attempted to control the fire with extinguishers, but the fire quickly grew too large to contain. He indicated it was a red flag day for fire hazards and he was working on ideas to inform the contracting community about fire safety. He said the fire was ruled an accident and was thankful that no structures were damaged, although there was damage to some equipment, fences and trees.

Commissioner Hartung commended Chief Moore and the regional partners for their response and for extinguishing the fire that could have been a devastating event. He asked if the Board needed to revisit the requirements for red flag days for construction sites. He wondered if contractors should be required to have a water truck on site until a structure was self-sustaining on the outside. He thought options to help prevent fires on construction sites could be discussed.

Chief Moore stated he was invited to speak to the Associated General Contractors (AGC) about a different topic, but he thought it would be the perfect opportunity to educate people about the dangers of red flag days. He said he was a proponent of education before enforcement because he thought the majority of people were responsible and wanted to do their jobs safely.

Commissioner Hartung said the addition of a water truck on-site could have extinguished the fire before it grew larger than the construction crew could handle.

Chair Lucey asked Chief Moore if a water truck on-site could have been helpful to extinguish the fire.

Chief Moore stated it would depend whether the construction crew was knowledgeable about extinguishing fires and if the truck could maneuver through the terrain to reach the fire in an expedient manner. He said he could not positively determine if it would have been beneficial to have a water truck on-site. He stated establishing defensible space around a construction site would be helpful to lessen fire hazards.

Chair Lucey stated the AGC meeting would be a great opportunity to discuss fire safety with a number of builders in the community. He thought the discussion could provide feedback and options that could be useful for fire hazard issues. He noted that fortunately the Woodchuck fire was extinguished before much damage occurred. He stated Senator Heidi Gansert's home backed up to the area and part of her property was burned. He said many homes could have potentially been lost in the fire. He indicated multiple challenges occurred that day including high winds and the absence of a water-drop helicopter.

Chief Moore stated Agenda Items 8B and 8C were the monthly reports and response activity for July.

Commissioner Berkbigler said she continued to be amazed at the consistent level of activity in Spanish Springs and Sun Valley. She wondered if the number of staff and engines needed to be increased in those areas.

Chief Moore replied there was a definite need for additional resources. He believed resources should be concentrated where the highest risks and service demands were. He said they experimented over the summer by adding a rescue crew located at Station 15. He noted the experiment was effective and allowed simultaneous responses to calls while the Station 14 staff remained in the south. He thought the next improvement to service levels could be to staff a rescue unit permanently and base it in Sun Valley.

Commissioner Hartung stated he supported the idea of rescue crews. He said a senior facility was located in Spanish Springs and it created an increased number of medical calls. He noted having two or three rescue crews travel throughout the region could improve the ability to respond to medical emergencies and serve as additional staff

for fire responses. He thought sending rescue and fire engine crews to every medical call was a waste of resources.

Commissioner Berkbigler said she agreed with Commissioner Hartung and thought the staffing issues needed to be addressed before the next budget season. She said funding for additional resources needed to be discussed. She wondered if this was an example of what was needed to provide resources in high call areas. She stated Sun Valley and Spanish Springs had a huge population of seniors and multiple senior care facilities. She said senior facilities increased medical response calls and she was concerned protection in those areas were lacking.

Chair Lucey agreed with Commissioner Berkbigler that Sun Valley and Spanish Springs responded to more emergency medical service (EMS) calls than other areas. He said the areas that could continue to grow were Sparks, Spanish Springs, North Valleys and Cold Springs. As the growth continued over the next 10 to 20 years, there would be a need for additional stations. He said until new stations were added, appropriate staffing levels needed to be considered.

Commissioner Hartung agreed with Chair Lucey about the necessity of appropriate staffing levels. He said any new stations would be built with three bays to include a rescue unit along with two engines. He stated the costs to build a new station with the additional bays was less than adding bays to existing stations.

On the call for public comment, Ms. Christina Conti stated she was the EMS Oversite Program Manager. She said regarding Agenda Item 8A2, the region put together an EMS strategic plan and the partner agencies had two representatives from dispatch and operations involved in the process. She stated AVL was included in the plan. She said she was looking to Chief Moore to champion the effort with her. She indicated a survey was conducted regarding the AVL capabilities within the region. She stated she looked forward to working with Chief Moore on this project.

On motion by Commissioner Hartung, seconded by Commissioner Berkbigler, which motion duly carried with Commissioner Jung absent, it was ordered that Agenda Item 8 be approved.

17-158F **AGENDA ITEM 9** Discussion and possible approval to authorize staff to negotiate the sale or lease of Property at 12300 Old Virginia Road, APN 140-010-04, currently station 14.

Chief Moore stated the construction of Station 14 was well under way. Staff recommended the disposal of the existing site to coincide with the completion of the new station. The property was surrounded by the City of Reno and was not in the position to service County citizens. He stated there was a willing buyer for the property. Staff was seeking direction and approval to dispose of the property. He recommended beginning with an appraisal of the property to establish market value. He said the options for the

Board would be to sell the property outright or to lease it. He said staff recommended selling the property to offset the costs of the new Station 14.

Commissioner Hartung stated he had no problem selling the property. He said when the appraisal was received he wanted to understand what appraisers and real estate professionals thought about the property and if it would be profitable to wait for the real estate market to increase before selling the parcel.

On the call for public comment, Mr. Ken Krater with K Krater Consulting, stated the Karadanis Family and their partnership group who owned the SouthTowne Crossing Shopping Center had supported the new fire station and thought it was great what Chief Moore was able to accomplish the in the past two years. He said regarding the sale of property, Nevada Revised Statute (NRS) 244.281 stated a Board of County Commissioners could sell or lease any real property owned by the County without complying with revisions of NRS 244.282, 244.283, to a person who owned real property adjacent to the real property to be sold or leased if the Board had determined by Resolution that the sale would be in the best interest of the County and the real property was a remnant that was separated from its original parcel due to the construction of a street, alley, avenue or other thoroughfare, or portion thereof, or flood control facility or other public facility. He thought this was important because the Karadanis Family owned all of the surrounding area around the fire station and the realignment of Old Virginia Road that was required by the construction of the new freeway and off-ramp. There were remnants of the property that could not be developed because of the location and configuration. He stated SouthTowne Crossing, LLC had been great neighbors and believed they had gone out of their way to improve the traffic flow for the fire station. He said they constructed a free right hand turn lane from Damonte Ranch Parkway westbound to Old Virginia Road northbound as well as dual southbound left turn lanes in the interest of promoting better traffic flow in the area. He stated they knew the challenges the fire crews had as they tried to get fire engines in and out of the area. The other issue was the development of the fire station parcel included some issues regarding the capacity of the driveway. He stated SouthTowne Crossing, LLC had plans to construct a roundabout to sustain the capacity and traffic issues. He indicated if they were able to purchase the parcel from the County it would be of greater value integrated into the shopping center than it would be if sold as a stand-alone parcel. He noted there were utility issues including a major sewer interceptor on Old Virginia Road that would have to be dealt with and could be a significant burden to any other developer or owner. He stated there was a long-standing offer to the County for the property based on a price of $15 per square foot or appraised value, whichever was higher. He said they wanted the County to get the best return for the property.

On motion by Commissioner Hartung, seconded by Commissioner Berkbigler, which motion duly carried with Commissioner Jung absent, it was ordered that an appraisal be performed on the parcel and professional opinions to be brought back to the Board as a future Agenda Item.

17-159F **AGENDA ITEM 10** Commissioners'/Fire Chief's announcements, requests for information, topics for future agendas, and statements relating to items not on the Agenda.

Commissioner Hartung requested a discussion regarding updating the Regional Plan and the standards for future fire stations.

Chair Lucey asked for further discussion with the Board regarding automatic vehicle location and dispatch.

17-160F **AGENDA ITEM 11** Public Comment.

Mr. Sam Dehne spoke regarding the Nevada Air National Guard receiving two firefighting C-130 planes and the creation of more jobs in the community because of the planes.

* * * * * * * * * * *

10:07 a.m. There being no further business to discuss, the meeting was adjourned without objection.

BOB LUCEY, Chair
Truckee Meadows Fire
Protection District

ATTEST:

NANCY PARENT, Washoe County Clerk
and Ex-Officio Clerk, Truckee Meadows
Fire Protection District

Minutes Prepared By:
Doni Gassaway, Deputy County Clerk

TRUCKEE MEADOWS FIRE PROTECTION DISTRICT

STAFF REPORT

Board Meeting Date: December 5, 2017

Fire Chief CM
Finance CV
Legal DW
Risk Mgt DE
HR N/A

DATE: November 7, 2017

TO: Truckee Meadows Fire Protection District Board of Fire Commissioners

FROM: Charles A. Moore, Fire Chief
Phone: (775) 328-6123 Email: cmoore@tmfpd.us

SUBJECT: Discussion and possible approval of a revised Mutual Aid Agreement between Secretary of the Air Force acting by and through the Commander, Nevada Air National Guard pursuant to the authority of 42 U.S.C. § 1856a and the Truckee Meadows Fire Protection District. (All Commission Districts)

SUMMARY

Discussion and possible approval of a revised Mutual Aid Agreement between Secretary of the Air Force acting by and through the Commander, Nevada Air National Guard pursuant to the authority of 42 U.S.C. § 1856a and the Truckee Meadows Fire Protection District.

Strategic Objective supported by this item: *Safe, Secure and Healthy Communities*

PREVIOUS ACTION

September 19, 2017 the Board approved a Mutual Aid Agreement between Secretary of the Air Force acting by and through the Commander, Nevada Air National Guard pursuant to the authority of 42 U.S.C. § 1856a and the Truckee Meadows Fire Protection District.

BACKGROUND

Approval of the Mutual Aid Agreement will continue the practice of sharing critical resources in a timely and cost efficient manner. The agreement also outlines common expectations, operating protocols, shared responsibilities, and mutual aid parameters during incidents involving the Truckee Meadows Fire Protection District and the Air National Guard. After the initial agreement was taken to the Board of Fire Commissioners in September, a couple revisions were requested by the Air National Guard. Staff is in agreement with the revisions, therefore the Agreement has been revised and subsequently approved by the Air National Guard as the signature indicates on the attached agreement.

The two revisions to this agreement are outlined as follows:

The removal of an automatic renewal of 20 years replaced with an annual review process.

The effective date of the agreement was changed from a static date to a references a date correlating with the last signature executed on the agreement.

FISCAL IMPACT

There is no fiscal impact to this item.

RECOMMENDATION

It is recommended that the Board approve a revised Mutual Aid Agreement between Secretary of the Air Force acting by and through the Commander, Nevada Air National Guard pursuant to the authority of 42 U.S.C. § 1856a and the Truckee Meadows Fire Protection District.

POSSIBLE MOTION

Should the Board agree with staff's recommendation a possible motion would be:

"I move to approve a revised Mutual Aid Agreement between Secretary of the Air Force acting by and through the Commander, Nevada Air National Guard pursuant to the authority of 42 U.S.C. § 1856a and the Truckee Meadows Fire Protection District."

MUTUAL AID IN FIRE EMERGENCY SERVICES (US)

This Mutual Aid Agreement (the "Agreement"), is made and entered into this 1st day of October 2017, between the Secretary of the Air Force (the "Air Force") acting by and through the Commander, ***Nevada Air National Guard*** pursuant to the authority of 42 U.S.C. § 1856a and the ***Truckee Meadows Fire Protection District ("TMFPD")***. Together the Air Force and TMFPD are hereinafter referred to as the "Parties".

WITNESSETH:

WHEREAS, each of the Parties hereto maintains equipment and personnel for the suppression of fires and the management of other emergency incidents occurring within areas under their respective jurisdictions; and

WHEREAS, as set forth in 42 U.S.C. § 1856 the term 'fire protection' includes personal services and equipment required for fire prevention, the protection of life and property from fire, firefighting, and emergency services, including basic medical support, basic and advanced life support, hazardous material containment and confinement, and special rescue events involving vehicular and water mishaps, and trench, building, and confined space extractions; and

WHEREAS, the Parties hereto desire to augment the fire protection capabilities available in their respective jurisdictions by entering into this Agreement.

NOW, THEREFORE, in consideration of the mutual covenants, obligations and agreements herein established, the Parties hereby agree as follows:

a. The authority to enter into this Agreement is set forth in 42 U.S.C. § 1856a, and 15 U.S.C. § 2210, the regulations implementing same at 44 Code of Federal Regulations Part 151 and Air Force Instruction 32-2001, *The Fire Protection Operations and Fire Prevention Program.*

b. This Agreement shall serve as the agreement between the Parties for securing to each mutual aid in fire protection services as defined above.

c. On request to a representative of the Nevada Air National Guard fire department by a representative of the TMFPD Fire Department, fire protection equipment and personnel of the Nevada Air National Guard Fire Department will be dispatched to any point within the area for which the TMFPD Fire Department normally provides fire protection services as designated by the representatives of the TMFPD Fire Department.

d. On request to a representative of the TMFPD by a representative of the Nevada Air National Guard Fire Department, fire protection equipment and personnel of the TMFPD Fire Department will be dispatched to any point within the jurisdiction of the Nevada Air National Guard Fire Department as designated by the representative of the Nevada Air National Guard Fire Department.

e. Any dispatch of equipment and personnel by the Parties pursuant to this Agreement is subject to the following conditions:

(1) Any request for aid hereunder shall include a statement of the amount and type of equipment and personnel requested and shall specify the location to which the equipment and personnel are to be dispatched, but the amount and type of equipment and the number of personnel to be furnished shall be determined by the responding organization. The requesting organization shall ensure access to site for the responding organization.

(2) The responding organization shall report to the officer in charge of the requesting organization at the location to which the equipment is dispatched, and shall be subject to the orders of that official.

(3) The responding organization shall be released by the requesting organization when the services of the responding organization are no longer required or when the responding organization is needed within the area for which it normally provides fire protection.

(4). Hazardous Materials incident response shall include the response to, and control and containment of any release or suspected release of any material suspected to be or known to be hazardous. Where the properties of a released material are not known, it shall be considered hazardous until proven otherwise by the requesting organization using all technical resources available. Cleanup and removal of contained hazardous materials shall be the responsibility of the requesting organization.

(5) In the event of a crash of an aircraft owned or operated by the United States or military aircraft of any foreign nation within the area for which the TMFPD Fire Department normally provides fire protection services, the chief of the Nevada Air National Guard Fire Department fire department or his or her representative may assume full command on arrival at the scene of the crash.

(6) Where local agencies do not assign an incident safety officer, an Air Force representative will be assigned to act as the incident safety officer for Nevada Air National Guard Fire Department to observe Air Force operations.

f. Each Party hereby agrees that its intent with respect to the rendering of assistance to the other Party under this Agreement is not to seek reimbursement from the Party requesting such assistance. Notwithstanding the above, the Parties hereby recognize that pursuant to the Section 11 of the Federal Fire Prevention and Control Act of 1974 (15 U.S.C. § 2210) and Federal regulations issued there under (Title 44 of the Code of Federal Regulations, Part 151), TMFPD is permitted to seek reimbursement for all or any part of its direct expenses and losses (defined as additional fire fighting costs over normal operational costs) incurred in fighting fires on property under the jurisdiction of the United States. Furthermore, under the authority of 42 U.S.C. § 1856a, and pursuant to any applicable state or local law each Party hereby reserves the right to seek reimbursement from the other for all or any part of the costs (defined as additional fire fighting costs over normal operational costs) incurred by it in providing fire protection services to the other Party in response to a request for assistance.

g. Both Parties agree to implement the National Incident Management System during all emergency responses on and off installations in accordance with National Fire Protection Association (NFPA) Standard 1561.

h. Each Party waives all claims against the other Party for compensation for any loss, damage, personal injury, or death occurring as a consequence of the performance of this Agreement. This provision does not waive any right of reimbursement pursuant to paragraph f above.

i. All equipment used by TMFPD Fire Department in carrying out this Agreement will, at the time of action hereunder, be owned by it; and all personnel acting for TMFPD under this Agreement will, at the time of such action, be an employee or volunteer member of TMFPD.

j. The rendering of assistance under the terms of this Agreement shall not be mandatory; however, the Party receiving a request for assistance shall endeavor to immediately inform the requesting Party if the requested assistance cannot be provided and, if assistance can be provided, the quantity of such resources as may be dispatched in response to such request.

k. Neither Party shall hold the other Party liable or at fault for failing to respond to any request for assistance or for failing to respond to such a request in a timely manner or with less than optimum equipment and/or personnel, it being the understanding of the Parties that each is primarily and ultimately responsible for the provision of fire protection services needed within their own jurisdictions.

l. Should a dispute arise between the Parties under or related to this Agreement, the Parties agree that within 30 days after notice of the dispute from one Party to the other, the Parties shall attempt to resolve the dispute through negotiations. If such negotiations reach an impasse, the Parties agree that within 60 days after Notice of an impasse, they shall attempt to resolve the matter through any method or combination of non-binding alternative dispute resolution (ADR) methods available under the Administrative Dispute Resolution Act of 1996, Pub. L. No. 104-320 (codified at 5 U.S.C. §§ 571-583). The cost of any third party neutral shall be divided equally between the Parties, and the selection of any third party neutral shall be by agreement of the Parties. If such ADR proceeding does not result in resolution of the dispute, the Parties may separately pursue any remedy available to a Party under the law. However, both Parties agree that the initiation of formal litigation does not preclude further attempts at resolving the dispute through alternative dispute resolution methods. Both Parties agree that the terms of this clause shall be considered the "Administrative Remedies" that must be exhausted, prior to institution of any formal litigation.

m. All notices, requests, demands, and other communications which may or are required to be delivered hereunder shall be in writing and shall be delivered by messenger, by a nationally-recognized overnight mail delivery service or by certified mail, return receipt requested, at the following addresses:

Truckee Meadows Fire Protection District
1001 East Ninth Street,
Building D, 2nd Floor
Reno, Nevada 89520

Nevada Air Guard
152 AW/CES/CEF
1776 National Guard Way
Reno, Nevada 89502

TERMS OF THE AGREEMENT

n. This Agreement shall become effective on the date of the last signature to the Agreement and will remain in effect for 5 years from that date (the "Term"). This agreement is to be reviewed by both parties annually. Either Party may unilaterally terminate this Agreement during the Term by sending notification of its intent to terminate to the other Party at least one hundred and eighty (180) days in advance of the proposed date of termination. Such notification shall be in the form of a written submission to the other Party.

o. Upon becoming effective, this Agreement shall supersede and cancel all previous agreements between the Parties concerning the rendering of assistance from one to the other for the purposes stated in this Agreement.

p. The modification or amendment of this Agreement, or any of the provisions of this Agreement, shall not become effective unless executed in writing by both Parties.

q. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original.

IN WITNESS WHEREOF, The Parties have caused this Agreement to be executed by their duly authorized representatives on the dates shown below:

TRUCKEE MEADOWS FIRE PROTECTION DISTRICT

By:_____

Marsha Berkbigler
Vice-Chair Board of Fire Commissioners

Date:_____

THE UNITED STATES OF AMERICA
by the Secretary of the Air Force

By:_____

Eric Wade, Col
Commander, 152d Airlift Wing

Date: 3 OCT 2017

_____

Felix Castagnola, COL, USA
USP&FO for Nevada

_____

William R. Burks, Brig Gen, USAF
The Adjutant General, NVMD

MEMORANDUM

November 27, 2017

To: Board of Fire Commissioners
Truckee Meadows Fire Protection District

Fm: Charles A. Moore, Fire Chief

Re: Fire Chief's Report

Please find statistical summaries for career and volunteer responses for August 2017 attached to this Memorandum.

I will provide a verbal report of the District's Green Waste Program at the meeting. A summary of facility projects (requested by Commissioner Hartung) is included on the following page. The District contemplates the need to finance larger facility projects while other smaller projects would likely be funded from cash.

The facility projects discussion is intended to identify needs and does not necessarily contemplate the ability to fund each project in the year specified.

Facility Needs Projection

November 27, 2017

Facility	Estimated Start	Estimated Completion	Justification
Station 37 - Hidden Valley	Preliminary planning has started	2019	Station 37 is a modular building for living quarters. The modular building was authorized as a SUP which expires in 2018. The vehicle bays are very small - TM has only one type 1 engine that will fit in the bay. A permanent structure is required.
Admin/Warehouse/Fleet	Conceptual - District staff is looking for a building to purchase and will engage a design professional to study options.	2020	The District rents administrative space from the County and logistics/warehouse and fleet space by way of a lease with a private party. The District has outgrown its space within the County and has no space to add more staff. Combined rent between admin and warehouse is approximately $200k annually. The plan for a new facility contemplates using existing rent for finance capacity toward a new facility.
Station 14 - Holcomb Ranch	Construction underway	June 2018	The Board authorized this station to be relocated to better serve County constituents and replace the dilapidated existing facility. This project was funded with cash.
Station 13 - Stead	Not established	2022	The existing station is old and may need relocation.
Station 17	Not established	2025	The station interior needs updating. The station will need replacement in 10 years or less. It could be rebuilt on the existing site or a new site as determined by study.
Station 30 - Bowers	Not established	2025	Existing condition is poor on the exterior. This land is leased from the State of Nevada.
Volunteer Station 351 Verdi	Preliminary planning has started	2023	The current building is not suitable for a viable volunteer program. TMFPD does not own land at this location.
Volunteer station 227 Pleasant Valley	Preliminary planning has started	2020	The current building is not suitable for a viable volunteer program. TMFPD does not own land at this location.

TRUCKEE MEADOWS FIRE PROTECTION DISTRICT
MONTHLY REPORT

August 2017

The following report contains non-audited figures based on data extracted from the District's incident reporting system and Washoe County E-Comm Dispatch.

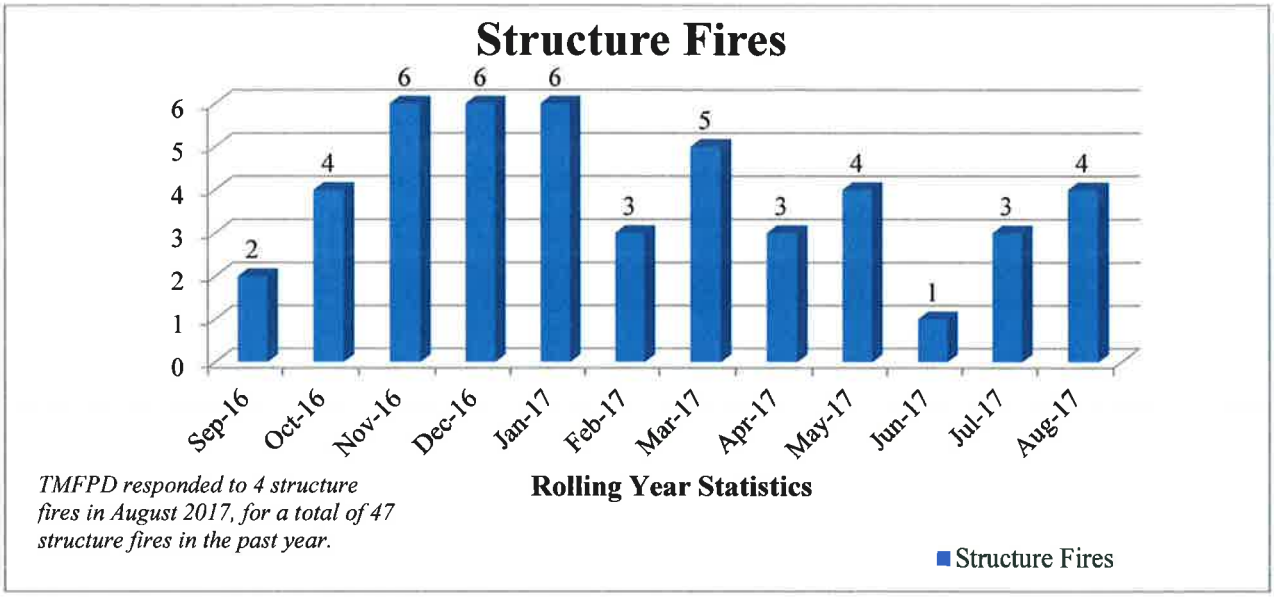
Monthly Call Volume by Station & Type

INCIDENT TYPE	STATION/DISTRICT												
	13- Stead	14- Damonte Ranch	15- Sun Valley	16- E. Washoe Valley	17- Spanish Springs	18- Cold Springs	30- W. Washoe Valley	35- Verdi/Caughlin	36- Arrowcreek	37- Hidden Valley	39- Galena Forest	Other	TOTAL
Structure Fire			3		1								4
Wildland Fire	4	1	2	1	9	1	3	5	1	4	1	6	38
Vehicle/Trash/Other Fire	3		2		5	2				2	1		15
Emergency Medical Services	64	34	184	29	106	55	7	27	32	22	9		569
Motor Vehicle Accident	7	4	8	2	10	7	6	1		3	2	1	51
Rescue					1			1			1		3
Haz-Mat/Hazardous Condition			3		4		1	1	3				12
Public Assist	6	4	24	5	6	3	1	4	1		2		56
Good Intent Call	20	16	35	8	41	13	5	6	4	34	10	3	195
Activated Fire Alarm			3		6	1	1	1	3		3		18
Severe Weather Related		1										5	6
Other													0
AUGUST 2017 TOTAL	**104**	**60**	**264**	**45**	**189**	**82**	**24**	**46**	**44**	**65**	**29**	**15**	**967**
AUGUST 2016 TOTAL	**102**	**68**	**232**	**28**	**134**	**78**	**13**	**47**	**36**	**53**	**15**	**11**	**817**

In the month of August 2017, the TMFPD responded to 967 incidents, for a cumulative total of 10,140 incidents in the past twelve months.

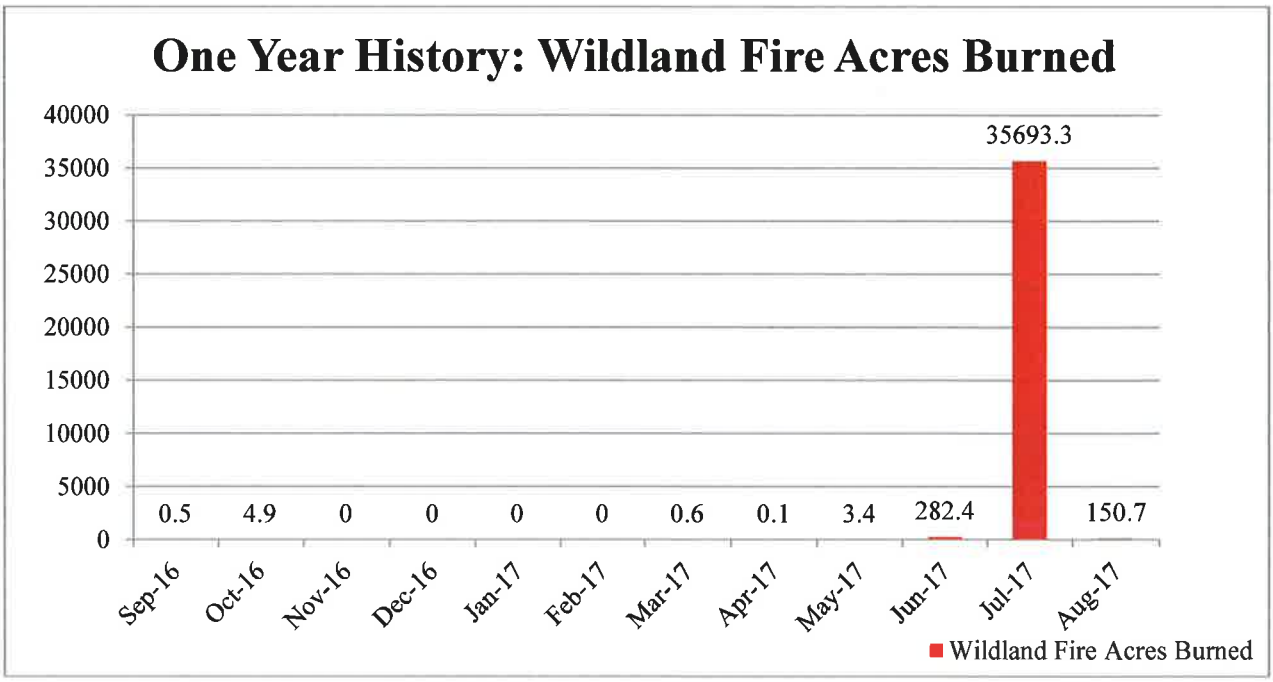
AGENDA ITEM # 8B

Structure Fires – August 2017



TMFPD responded to 4 structure fires in August 2017, for a total of 47 structure fires in the past year.

Structure fires represent traditional structure fires, and do not include structures that were lost as the result of a largescale wildland fire.



In the month of August 2017, 150.7 acres were burned. As of August 30, 2017, 36,135.9 acres burned in the past 12 months.

Mutual Aid Given and Received - August 2017

Mutual Aid Given & Received by Department		
DEPARTMENT	**AID GIVEN**	**AID RECEIVED**
Bureau of Land Management	0	0
California Department of Forestry	1	0
Carson City FD	1	1
Eastfork FD	1	0
Nevada Division of Forestry	2	0
North Lake Tahoe FPD	0	2
North Lyon County FPD	0	0
Pyramid Lake Fire	2	0
Reno FD	12	1
Reno/Sparks Indian Colony	2	1
Sierra County, CA	0	0
Sparks FD	6	4
Storey County FPD	1	5
Truckee Fire, CA	0	0
US Forest Service	1	0
TOTAL	**29**	**14**

Mutual Aid Given & Received by Department		
DEPARTMENT	**AID GIVEN**	**AID RECEIVED**
Bureau of Land Management	0	0
California Department of Forestry	1	0
Carson City FD	1	1
Eastfork FD	1	0
Nevada Division of Forestry	2	0
North Lake Tahoe FPD	0	2
North Lyon County FPD	0	0
Pyramid Lake Fire	2	0
Reno FD	12	1
Reno/Sparks Indian Colony	2	1
Sierra County, CA	0	0
Sparks FD	6	4
Storey County FPD	1	5

Truckee Fire, CA	0	0
US Forest Service	1	0
TOTAL	**29**	**14**

Mutual Aid Given & Received by Department		
DEPARTMENT	**AID GIVEN**	**AID RECEIVED**
Bureau of Land Management	14	3
California Department of Forestry	0	0
Carson City FD	1	0
Eastfork FD	0	0
Nevada Division of Forestry	0	1
North Lake Tahoe FPD	1	0
North Lyon County FPD	0	0
Pyramid Lake Fire	4	2
Remsa	0	0
Reno FD	2	5
Reno/Sparks Indian Colony	0	0
Sierra County, CA	1	0
Sparks FD	5	4
Storey County FPD	2	3
Truckee Fire, CA	0	0
US Forest Service	5	1
TOTAL	**35**	**19**

The TMFPD received aid 19 times from neighboring agencies and provided aid 35 times based on NFIRS reporting standards. Additional responses to/from the TMFPD may have occurred but did not meet the NFIRS definitions for automatic or mutual aid. Only incidents where representatives from two or more entities are on scene together qualify as aid given or received by an agency. When one entity handles an incident for another jurisdiction without assistance, the incident is not classified as auto/mutual aid according to NFIRS, and neither are responses where one entity cancels its response prior to arriving at the incident.

SIGNIFICANT INCIDENTS

Significant incidents for the month are reported below. The number of incidents reported in the Call Volume Table may not exactly match the narrative provided below; i.e., a structure fire that is limited to a small out building is reported in the Call Volume, however it does not warrant inclusion below.

Station by Commission District		
Station	**District**	**Commissioner**
Station 13 – Stead	5	Herman
Station 14 – Damonte Ranch	2	Lucey
Station 15 – Sun Valley	3/5	Jung / Herman
Station 16 – East Washoe Valley	2	Lucey
Station 17 – Spanish Springs	4	Hartung
Station 18 – Cold Springs	5	Herman
Station 30 – West Washoe Valley	2	Lucey
Station 35 – Mogul	5/1	Herman/Berkbigler
Station 36 – Arrowcreek	2	Lucey
Station 37 – Hidden Valley	2/4	Lucey/Hartung
Station 39 – Galena Forest	2/1	Lucey/Berkbigler

Stations are predominantly within the Commissioner's District as listed above.

Incidents:

Structure Fire – Station 15 (Sun Valley); 6175 Dutch Flat
Commissioner District 5
2 in/2 out Required
Mutual Aid Received from Reno Fire

On August 1st at 9:31 hours, crews responded to a report of a structure fire. Upon arrival crews encountered multiple points of heavy exterior fire impinging on one structure and immediately threatening another structure as it traveled through grass and sage brush. Crews were able to knock down the fire, but there was significant damage to the vacant residence.

3 TM Engines, 1 TM Rescue Unit, 1 TM Chief, 1 TM Battalion Chief, 1 TM Training Unit and 14 TM personnel responded to this incident.

Wildland Fire – Station 39 (Galena Forest); Whites Creek Trailhead
Commissioner District 1
Automatic aid given to USFS

On August 1st at 13:39 hours, crews responded to a wildland fire in the area of the Whites Creek Trailhead. The 30 acre fire was within the USFS jurisdictional boundaries and was burning in heavy fuels which included timber and mountain mahogany. The fire was suppressed with hose-lays, hand-lines and aircraft. Resources were requested for structure protection as a precautionary measure for fire spread outside control lines. Multiple agencies were assigned to suppress the fire.

2 TM Brush Engines, 1 TM Water Tender, 4 TM Battalion Chiefs, 2 TM Chiefs, 12 TM personnel and TM volunteers responded to this incident.

Wildland Fire – Station 37 (Hidden Valley); 2375 E. Prater Way
Commissioner District 4
Automatic Aid between BLM, Sparks, and TMFPD

On August 6th at 15:21 hours, crews responded without incident to a working wildland fire threatening residential structures. Resources from TMFPD assisted with suppression and structure protection. The fire burned 2,816 acres, 870 within the TMFPD. Resources continued to assist with mop up the following day. No injuries were reported during this incident.

4 TM Brush Engines, 2 TM Battalion Chiefs and 14 TM personnel responded to this incident.

Structure Fire – Station 17 (Spanish Springs); 22 Pelican Court
Commissioner District 4
Mutual aid with SFD

On August 7th at 18:30 hours, lightning struck a house causing major structural damage and heat damage.

2 TM Engines, 1 TM Rescue Unit 1 TM Battalion Chief 1 SFD Ladder Unit and 12 TM personnel responded to this incident.

Wildland Fire – Station 36 (Arrowcreek); 4800 Sierra Country Road
Commissioner District 2
Automatic aid received from USFS

On August 10th at 10:15 hours, crews responded to a wildland fire and arrived on scene first to find a 10x10 spot under pines trees next to a garage that were burning slowly. Minden was contacted as the address is directly across the street from the Galena USFS station. They advised an engine was self-dispatching to the location. USFS E411 arrived first on scene and got water on the fire. All other units were canceled and no structures were lost.

3 TM Brush Engines, 1 TM Engine, 1 TM Training Captain, 1 TM Battalion Chief and multiple TM personnel responded to this incident.

Wildland Fire – Station 17 (Spanish Springs); in Hungry Valley off the dirt extension of Chickadee
Commissioner District 4
Mutual aid with BLM and RSIC

On August 13th at 17:22 hours, crews responded to a 70 acre wildland fire in Hungry Valley. The fire suppression efforts were aided by a road system on all sides of the fire. As units arrived on scene, they were assigned to anchor, flank and pinch the fire. BLM arrived on scene with 5 engines and assumed command of the fire and replaced local resources.

3 TM Brush Engines, 3 TM Water Tenders, 1 TM Training Unit, 1 TM Rescue Unit, 1 TM Battalion Chief, 13 TM personnel and TM volunteers responded to this incident.

Wildland Fire – Station 37 (Hidden Valley); 1-80 Fwy W/B at the Orchard Exit
Commissioner District 4
Automatic aid received from Story County Fire & Pyramid Lake Fire

On August 17th at 00:52 hours, units were dispatched to a reported vehicle fire that was spreading into the wildland from the vegetated area between the westbound on-ramp and the freeway. Units from TMFPD, Storey County, and Pyramid Lake responded to the incident. The vehicle was found to be fully involved upon arrival involving 1/4 acre of wildland. Units from each agency arrived on scene and quickly contained the fire to the vehicle and the 1/4 acre involved.

2 TM Brush Engines, 1 TM Water Tender, 1 TM Battalion Chief and multiple TM personnel responded to this incident.

Vehicle and Wildland Fire – Station 37 (Hidden Valley); 1-80 at Mustang
Commissioner District 4
Automatic aid from SCFPD

On August 18th at 22:20 hours, crews responded to a vehicle rollover with injuries. The vehicle ignited spreading into the wildland. The fires were extinguished and one patient was transported to the hospital for further evaluation.

1 TM Engine and 3 TM personnel responded to this incident.

Wildland Fire – Station 17 (Spanish Springs); Hungry Valley Open Space – OHV Area
Commissioner District 4
Automatic aid given to BLM

On August 20th at 11:16 hours, units were dispatched to a wildland fire originally reported as Eagle Canyon Drive and Calle De La Plata. The fire location was updated to Hungry Valley. An

off-road vehicle had caught fire out in the open space area. This started a wildland fire in the flats involving grass and sage brush. Units from Lemmon Valley, Sun Valley, Spanish Springs, Sparks Fire, and Hungry Valley Reservation quickly knocked the fire down keeping it at 10 acres. The jurisdiction is tribal and BLM. BLM resources arrived on scene and a transition of command and mop-up forces were done to quickly release the Sparks and TMFPD units. No structures were lost, no injuries.

3 TM Brush Engines, 1 TM Water Tender, 1 TM Rescue Unit, 1 TM Training Captain, 1 TM Battalion Chief, 1 Sparks Brush Engine, multiple TM personnel and TM volunteers responded to this incident.

Wildland Fires (multiple reports due to lightening) – Station 35 (Mogul); Verdi Area, Crystal Peak, Hunter Creek Trail
Commissioner District 5/1
Automatic aid given to USFS and received from NDF

On August 22nd at 14:53 hours, a thunderstorm came through Washoe County from south to north and created several fires around the region, including Carson City, Sparks, and Rancho Haven. Several strikes and small fires were reported in the Verdi area. These reports were prioritized and extinguished based on spread rate, risk to property or life, jurisdiction, and the availability of resources. Callers were telephoned or spoke to by TMFPD personnel and Washoe Dispatchers to collect information, insure they were aware the fires were in check, and to maintain a status reporting system. Each fire was either handed over to its responsible jurisdiction, handled directly by TMFPD personnel, or a combination thereof that evening or the next day. All fires were declared extinguished by the following day.

Multiple TM apparatus , TM personnel and volunteers responded to this incident.

Wildland Fire – Station 13 (Stead); Argosy Road/Red Rock Road
Commissioner District 5
Automatic aid given to BLM

On August 22nd at 15:30 hours, a wildland fire was sparked by lightning during lightning storm with numerous other simultaneous incidents. Crews responded with little rain in the area and a fire moving rapidly toward homes. Area of origin was remote and difficult to access. Notifications made to residents to prepare to evacuate and structure protection was established. Prior to the fire reaching private property, rains moved into the area and largely extinguished the fire. Fire was 100% BLM and was turned over to them upon arrival. 65 total acres estimated.

2 TM Battalion Chiefs, 4 TM Brush Engines, 1 TM Patrol Unit, 2 TM Water Tenders, 30 TM personnel and TM volunteers responded to this incident.

Wildland Fire – Station 37 (Hidden Valley); I80 at Vista Blvd.
Commissioner District 4
Automatic aid given to Sparks Fire

On August 22nd at 15:49 hours, crews responded to assist Sparks Fire Department with a wildland fire at I80 and Vista. This was a lightning caused fire that burned 514 acres.

1 TM Brush Engine, 1 TM Battalion Chief and 1 TM Rescue Unit responded to this incident.

Wildland Fire – Station 35 (Mogul); Mogul Fire Station
Commissioner District 5
Automatic aid from Reno Fire
Mutual aid from USFS

On August 23rd at 14:08 hours, crews responded to a wildland fire that was started behind Station 35. Upon initial report from station 35 the fire was 1/2 acre in size and burning at a rapid rate of spread in light grass. TM and RFD both had 2 alarms responding to this incident. TM requested additional apparatus from Minden Dispatch and requested Air Tankers, a Type II Helicopter and a hand crew to respond. The fire was contained at 124 acres. No structures were damaged during this incident. 1 firefighter did suffer a medical emergency but was not transported to the hospital. TMFPD worked the incident for 2 additional days and the fire was controlled on August 25, 2017 at 14:11 hours.

Multiple resources responded to this incident.

Wildland Fire – Station 13 (Stead); Bird Springs Road 1 mile east of Red Rock Road
Commissioner District 5
Automatic aid given to BLM

On August 29th at 14:15 hours, units were dispatched to a possible wildland fire as a result of thunderstorms. A total of five Type III engines from TMFPD and BLM were dispatched. As units arrived on scene a second fire in Rancho Haven was reported threatening structures and splitting up the response. The Bird Springs Fire was approximately 7 acres in size with no threat to structures in the BLM jurisdiction. A rainstorm eventually came through and drenched the fire area significantly slowing it down enough for crews to contain the fire. The scene was eventually released to BLM crews to manage the task of overhaul.

1 TM Brush Engine, 1 TM Water Tender, 1 TM Battalion Chief and multiple TM personnel and volunteers responded to this incident.

Training:

- EMS Training - Patients with Special Needs
- EMS Training - Pediatric Emergencies
- Active Assailant Training
- SCBA Air Consumption Drill
- Hearing Conservation
- Building Construction
- Lockout Tagout Training
- WET Training
- Driver Training
- Rescue and Extrication
- Incident Response Safety Training
- Rope Rescue Training
- Forcible Entry Training
- TRIAD Hazmat Training

Accomplishments:

- Tour of the new FedEx facility
- Brown School Public Education Program
- Hired 7 new firefighters to start academy September 5th

TRUCKEE MEADOWS VOLUNTEER FIRE STATION
MONTHLY REPORT

August 2017

The following report contains non-audited figures based on data extracted from the District's incident reporting system and Washoe County E-Comm Dispatch.

Monthly Call Volume by Station & Type

VOLUNTEER RESPONSE: INCIDENT TYPE / STATION/DISTRICT	221-Silver Lake VFD	223 - Lemmon Valley VFD	225 - Wadsworth (Pyramid Lake VFD)	227, 237, 301 - South Valleys VFD	229 - Palomino Valley Auxiliary	240 - Red Rock VFD	242 - Gerlach VFD	351 - Verdi VFD	TOTAL
Structure Fire									0
Wildland Fire	5	7		2	2		5	5	26
Vehicle/Trash/Other Fire							1		1
Emergency Medical Services						2	4		6
Motor Vehicle Accident		9		4		1	3		17
Rescue								1	1
HazMat/Hazardous Condition		1					1		2
Public Assist						1			1
Good Intent Call	2	3	1	2		1	5	1	15
Activated Fire Alarm							1		1
Severe Weather Related						1			1
Lightning Plan	3	1		2				3	9
Other									0
AUGUST 2017 TOTAL	**10**	**21**	**1**	**10**	**2**	**6**	**20**	**10**	**80**

In the month of August, 2017 the Truckee Meadows Volunteers responded to 80 incidents. (Wadsworth Volunteers operate under Pyramid Lake Volunteer Fire Department. Incidents listed for the Wadsworth Volunteer Station 225 are specific to responses in the Truckee Meadows Fire Protection District boundary, and do not include responses into tribal territory.)

AGENDA ITEM # 8C

SIGNIFICANT INCIDENTS

Significant incidents for the month are reported below. The number of incidents reported in the Call Volume Table may not exactly match the narrative provided below; i.e. a structure fire that is limited to a small out building is reported in the Call Volume, however it does not warrant inclusion below.

Station by Commission District		
Station	**District**	**Commissioner**
Station 13 – Stead	5	Herman
Station 14 – Damonte Ranch	2	Lucey
Station 15 – Sun Valley	3/5	Jung / Herman
Station 16 – East Washoe Valley	2	Lucey
Station 17 – Spanish Springs	4	Hartung
Station 18 – Cold Springs	5	Herman
Station 30 – West Washoe Valley	2	Lucey
Station 35 – Mogul	5/1	Herman/Berkbigler
Station 36 – Arrowcreek	2	Lucey
Station 37 – Hidden Valley	2/4	Lucey/Hartung
Station 39 – Galena Forest	2/1	Lucey/Berkbigler

Stations are predominantly within the Commissioner's District as listed above.

Incidents:

Wildland Fire – Station 39 (Galena Forest); Whites Creek Trailhead
Commissioner District 1
Automatic aid given to USFS

On August 1st at 13:39 hours, crews responded to a wildland fire in the area of the Whites Creek Trailhead. The 30 acre fire was within the USFS jurisdictional boundaries and was burning in heavy fuels which included timber and mountain mahogany. The fire was suppressed with hose-lays, hand-lines and aircraft. Resources were requested for structure protection as a precautionary measure for fire spread outside control lines. Multiple agencies were assigned to suppress the fire.

2 TM Brush Engines, 1 TM Water Tender, 4 TM Battalion Chiefs, 2 TM Chiefs, 12 TM personnel and TM volunteers responded to this incident.

Wildland Fire – Station 17 (Spanish Springs); in Hungry Valley off the dirt extension of Chickadee
Commissioner District 4
Mutual aid with BLM and RSIC

On August 13th at 17:22 hours, crews responded to a 70 acre wildland fire in Hungry Valley. The fire suppression efforts were aided by a road system on all sides of the fire. As units arrived on scene, they were assigned to anchor, flank and pinch the fire. BLM arrived on scene with 5 engines and assumed command of the fire and replaced local resources.

3 TM Brush Engines, 3 TM Water Tenders, 1 TM Training Unit, 1 TM Rescue Unit, 1 TM Battalion Chief, 13 TM personnel and TM volunteers responded to this incident.

Wildland Fire – Station 17 (Spanish Springs); Hungry Valley Open Space – OHV Area
Commissioner District 4
Automatic aid given to BLM

On August 20th at 11:16 hours, units were dispatched to a wildland fire originally reported as Eagle Canyon Drive and Calle De La Plata. The fire location was updated to Hungry Valley. An off-road vehicle had caught fire out in the open space area. This started a wildland fire in the flats involving grass and sage brush. Units from Lemmon Valley, Sun Valley, Spanish Springs, Sparks Fire, and Hungry Valley Reservation quickly knocked the fire down keeping it at 10 acres. The jurisdiction is tribal and BLM. BLM resources arrived on scene and a transition of command and mop-up forces were done to quickly release the Sparks and TMFPD units. No structures were lost, no injuries.

3 TM Brush Engines, 1 TM Water Tender, 1 TM Rescue Unit, 1 TM Training Captain, 1 TM Battalion Chief, 1 Sparks Brush Engine, multiple TM personnel and TM volunteers responded to this incident.

Wildland Fires (multiple reports due to lightening) – Station 35 (Mogul); Verdi Area, Crystal Peak, Hunter Creek Trail
Commissioner District 5/1
Automatic aid given to USFS and received from NDF

On August 22nd at 14:53 hours, a thunderstorm came through Washoe County from south to north and created several fires around the region, including Carson City, Sparks, and Rancho Haven. Several strikes and small fires were reported in the Verdi area. These reports were prioritized and extinguished based on spread rate, risk to property or life, jurisdiction, and the availability of resources. Callers were telephoned or spoke to by TMFPD personnel and Washoe Dispatchers to collect information, insure they were aware the fires were in check, and to maintain a status reporting system. Each fire was either handed over to its responsible jurisdiction, handled directly by TMFPD personnel, or a combination thereof that evening or the next day. All fires were declared extinguished by the following day.

Multiple TM apparatus , TM personnel and volunteers responded to this incident.

Wildland Fire – Station 13 (Stead); Argosy Road/Red Rock Road
Commissioner District 5
Automatic aid given to BLM

On August 22nd at 15:30 hours, a wildland fire was sparked by lightning during lightning storm with numerous other simultaneous incidents. Crews responded with little rain in the area and a fire moving rapidly toward homes. Area of origin was remote and difficult to access. Notifications made to residents to prepare to evacuate and structure protection was established. Prior to the fire reaching private property, rains moved into the area and largely extinguished the fire. Fire was 100% BLM and was turned over to them upon arrival. 65 total acres estimated.

2 TM Battalion Chiefs, 4 TM Brush Engines, 1 TM Patrol Unit, 2 TM Water Tenders, 30 TM personnel and TM volunteers responded to this incident.

Wildland Fire – Station 13 (Stead); Bird Springs Road 1 mile east of Red Rock Road
Commissioner District 5
Automatic aid given to BLM

On August 29th at 14:15 hours, units were dispatched to a possible wildland fire as a result of thunderstorms. A total of five Type III engines from TMFPD and BLM were dispatched. As units arrived on scene a second fire in Rancho Haven was reported threatening structures and splitting up the response. The Bird Springs Fire was approximately 7 acres in size with no threat to structures in the BLM jurisdiction. A rainstorm eventually came through and drenched the fire area significantly slowing it down enough for crews to contain the fire. The scene was eventually released to BLM crews to manage the task of overhaul.

1 TM Brush Engine, 1 TM Water Tender, 1 TM Battalion Chief and multiple TM personnel and volunteers responded to this incident.

TRAINING AND ACTIVITY

STATION	ACTIVITY	CREWS	HOURS PER	TOTAL HOURS
Lemmon Valley #223	Rolled wildland hose deployment, toll sharpening, hose pack rebuilding	7	2.5	17.5
	CPR refresher training	7	4	28
	Discuss and deploy Zone/Structure Protection	8	1.5	12
	7.2 – 24' Extension Ladder (single person) exercise	2	1	2
	Completed a Mayday/search and rescue drill. Downed firefighter/removal of firefighter	7	2	14
	Smoked out the bays of Station 223, completed a search and rescue drill along with mayday radio communications	7	2	14
	EVOC	4	1	4
	NFPA 1021 Incident Response Safety	1	2	2
	NFPA 1001 Rescue and Extrication	3	1	3
	Hearing Conservation	2	1	2
	Respiratory Protection	1	1	1
	CAPCE Pediatric Emergencies Basic	1	2	2
	CAPCE Patients with Special Challenges	1	1	1
	CAPCE Musculoskeletal Injuries Basic	1	1	1
	CAPCE Medical Extrication and Rescue	1	2	2
	CAPCE Operating an AED	1	1	1
	CAPCE Patient Abuse and Assault	1	2	2
	Hazard Communication	1	1	1
1	Driving Safety	1	1	1
	Driver's License Class 'C' with 'F' Endorsement Written Test	5	1	5
	Lock-Out/Tag-Out	1	1	1
	RT-130 Annual Wildland Fire Safety Refresher (MOD #4)	1	2	2
Lemmon Valley #223 Total				**127.5**

Palomino Valley #229	Rolled wildland hose deployment, toll sharpening, hose pack rebuilding	2	2.5	5
	CPR refresher training	2	4	8
	Discuss and deploy Zone/Structure Protection	2	1.5	3
	Completed a Mayday/search and rescue drill. Downed firefighter/removal of firefighter	1	2	2
	Smoked out the bays of Station 223, completed a search and rescue drill along with mayday radio communications	1	2	2
Palomino Valley #229 Total				**20**

Red Rock #240	EVOC	2	1	2
	SCBA Air Consumption Drill	5	2	10
	CAPCE Medical, Ethical, and Legal Issues	1	1	1
	CAPCE Kinematics of Trauma	1	1	1
	CAPCE Obstetrical Emergencies Basic	1	1	1
	Haz Mat Drill	2	1	2
	Respiratory Protection Policy Review	2	1	2
	Progressive Hose Packs	2	1	2
	Washoe County Safe Driving	1	1	1
Red Rock #240 Total				22

Silver Lake #221	Rolled wildland hose deployment, toll sharpening, hose pack rebuilding	2	2.5	5
	Hearing Conservation	1	1	1
	NFPA 1021 Incident Response Safety	4	1	4
	NFPA 1001 Rescue and Extrication	2	1	2
	Discuss and deploy Zone/Structure Protection	3	1.5	4.5
	7.2 – 24' Extension Ladder (single person) exercise	2	1	2
	Completed a Mayday/search and rescue drill. Downed firefighter/removal of firefighter	2	2	4
	Smoked out the bays of Station 223, completed a search and rescue drill along with mayday radio communications	2	2	4
	EVOC	4	1	4
	CAPCE Patient Abuse and Assault	1	2	2
	CAPCE Musculoskeletal Injuries Basic	1	1	1
	CAPCE Medical Extrication and Rescue	1	2	2
	CAPCE Managing Multiple Casualty Incidents	1	1	1
	Lock-Out/Tag-Out	1	1	1
Silver Lake #221 Total				37.5

South Valleys #227 & #301	EVOC	7	1	7
	CAPCE Pediatric Emergencies Basic	1	2	2
	CAPCE Patients with Special Challenges	1	1	1
	Bloodborne Pathogens Safety	1	1	1
	NFPA 1021 Incident Response Safety	2	1	2
	NFPA 1001 Rescue and Extrication	2	1	2
	Hearing Conservation	1	1	1
South Valleys #227 & #301 Total				16

Verdi #351	Review of operations and equipment at Station 351, water supply locations in Verdi	4	2	8
	EVOC	2	1	2
	Station and vehicle maintenance (E-351 and WT-351). Checks of apparatus and station equipment	2	2.5	5
	Hydrant connections with E-351 and WT-351, 3' supply hose, pump/tank flush, driving and positioning on scene	2	1	2
	CAPCE Medical Extrication and Rescue	1	2	2
	CAPCE Musculoskeletal Injuries Basic	1	1	1
	CAPCE Altered Mental Status	1	1	1
	SCBA Air Consumption Drill	2	2	4
	NFPA 1001 Rescue and Extrication	1	1	1
	NFPA 1001 Building Construction	1	1	1
	NFPA 1021 Public Education Programs	1	1	1
Verdi #351 Total				**28**

TRUCKEE MEADOWS FIRE PROTECTION DISTRICT

Fire Chief_CM
Finance__CV
Legal__DW
Risk Mgt__DE
HR__DW

STAFF REPORT

Board Meeting Date: December 5, 2017

DATE: November 2, 2017

TO: Truckee Meadows Fire Protection District Board of Fire Commissioners

FROM: Charles A. Moore, Fire Chief
Phone: (775) 328-6123 Email: cmoore@tmfpd.us

SUBJECT: Discussion and possible approval of an Employment Agreement for Scott M. Gorgon to include salary and benefits for the position of Fire Deputy Chief of Truckee Meadows Fire Protection District and authorize the Chairman to sign the same. (All Commission Districts)

SUMMARY

Discussion and possible approval of an Employment Agreement for Scott M. Gorgon to include salary and benefits for the position of Fire Deputy Chief of Truckee Meadows Fire Protection District and authorize the Chairman and Fire Chief to sign the same.

Strategic Objective supported by this item: *Valued, Engaged Employee Workforce*

PREVIOUS ACTION

January 17, 2017 the Board of Fire Commissioners approved to create a Deputy Fire Chief position and authorized Staff to negotiate an employment agreement to be brought back to the Board for approval.

BACKGROUND

Two recruitment efforts for Fire Deputy Chief were conducted in 2017. Mr. Gorgon was selected through this process and has accepted the position of Fire Deputy Chief pending the approval of a negotiated employment contract with a starting annual salary of $162,000.00 by the Board of Fire commissioners

FISCAL IMPACT

The fiscal year 2018 impact associated with the hiring of a Deputy Chief is estimated at approximately $129,000. The position to include salary and benefits was budgeted has been approved within the FY2017/2018.

RECOMMENDATION

It is recommended that the Board of Fire Commissioners approval of an Employment Agreement for Scott Gorgon to include salary and benefits for the position of Fire Deputy Chief of Truckee Meadows Fire Protection District and authorize the Chairman and Fire Chief to sign the same.

POSSIBLE MOTION

Should the Board agree with staff's recommendation a possible motion would be:

"I move to approve an Employment Agreement for Scott Gorgon to include salary and benefits for the position of Fire Deputy Chief of Truckee Meadows Fire Protection District and authorize the Chairman and Fire Chief to sign the same."

EMPLOYMENT AGREEMENT

THIS EMPLOYMENT AGREEMENT is made and entered into this 5th day of December, 2017 by and between the Truckee Meadows Fire Protection District Board of Fire Commissioners, hereinafter referred to as "District" or "Employer", and Scott M. Gorgon, an individual, hereinafter referred to as "Employee", both of whom do hereby agree as follows:

WHEREAS, Employer and Employee express their desire to fill the position of Deputy Fire Chief, an at will position with the District, and the Employer expresses their desire to appoint Scott M. Gorgon as its Deputy Fire Chief; and,

WHEREAS, it is the desire of Employer to provide certain benefits and to describe certain conditions of employment and working conditions of Employee as set forth herein; and,

WHEREAS, it is the desire of Scott M. Gorgon to accept the position of Deputy Fire Chief of District as set forth herein; and,

NOW, THEREFORE, in consideration of the mutual covenants herein contained, the Parties agree as follows:

1. DUTIES OF EMPLOYEE

Employer hereby appoints Employee, and Employee agrees to serve, as an at will Employee, to the position of Deputy Fire Chief for Truckee Meadows Fire Protection District and as such will perform the duties and have the responsibilities as set forth in the attached job class specification. Employee will perform other legally permissible and proper duties as the Fire Chief shall assign from time to time including acting as the Fire Chief in his absence.

2. TERM AND TERMINATION

A. TERM

This Agreement begins on December 11, 2017 and terminates at 11:59 p.m. December 31, 2020, unless sooner terminated at the will of the Employer or Employee as provided herein.

B. TERMINATION BY EMPLOYEE

Employee may terminate this Agreement at any time by giving 30 days' notice, at which point Employer may require immediate termination but shall pay the Employee 30 days' pay and benefits in lieu of the notice and require immediate termination of employment.

C. TERMINATION BY EMPLOYER

As Employee is employed as an at will employee of the District, Employer may terminate this Agreement and Employee's employment at any time and may require immediate termination

of the Employee but the Employer shall pay the Employee six months' salary as severance pay upon termination.

Employee shall not be entitled to severance pay if Employer terminates Employee, in part or in total, for conviction of a crime involving moral turpitude and/or if Employee engages in conduct which constitutes a violation of law or policy governing the conduct of public officers. Nor shall Employee be entitled to severance pay at the conclusion of the term of this Agreement.

D. DUTIES AND RIGHTS UPON TERMINATION

Upon termination of employment, Employee shall (i) immediately cease doing any business of the employer, (ii) leave the premises and (iii) return all equipment, files, documents, keys, identification cards, credit cards, and property belonging to Employer. If Employee is given pay in lieu of notice as described above, Employee shall remain available for consultation during the pay in lieu period.

3. SALARY

Employee shall be paid a base annual salary of $162,000. On each anniversary of the effective date of this Agreement, the Fire Chief shall consider Employee's performance. Following the evaluation conducted pursuant to paragraph 7, the annual salary of Employee may be adjusted by the District consistent with the cost-of-living adjustment provided to all other unclassified and non-represented employees of the District. In addition, following the evaluation conducted pursuant to paragraph 7 below, Employee's salary may be increased for performance by up to 5% of Employee's then current salary not to exceed the maximum of the established range of the position.

Employee is not eligible for Overtime, however in recognition of the requirement that Employee may be required to respond to emergency situations outside of a 40-hour work week, Employee may earn compensatory time at straight time on an hour for hour basis, in quarter hour increments, for time responding to emergency calls after working 40 hours in the work week. The work week is defined as 12:01 a.m. Monday through 12:00 midnight Sunday. Holiday pay, annual leave, and sick leave do not count toward the 40-hour threshold for compensatory time eligibility. Compensatory time may not be accrued in excess of 240 hours. Compensatory time beyond 240 hours shall not be accumulated or recorded. Employee shall not receive a cash payment for any accumulated compensatory time in any circumstance.

Employee is not eligible for longevity pay.

4. BENEFITS

A. Employee's compensation and benefits shall not be reduced at any time during the term of this Agreement except (i) to the degree that District requires an across the board reduction of salaries related to unclassified non represented employees (ii) if Employee is incapacitated and cannot perform his duties hereunder and has exhausted available leave; or (iii)

as a result of disciplinary action for professional malfeasance, violation of law, or violation of the policies or directives of Employer.

B. Employer shall pay 100% of Employee group medical plan, including health, dental and vision, and, should Employee elect dependent coverage, Employer shall pay 50% of the premium for such coverage, unless waived by the employee.

C. Any and all examinations required by the Nevada Revised Statutes relating to District employment which are performed by a District designated physician will be paid by the District at no cost to the employee. There will be no loss of pay or any accrued leave to the employee, if as a result of the physical examination, further testing is required. Any additional costs for testing shall be paid by the District.

D. It is the responsibility of the Employee, at the District's expense, to obtain an annual physical examination for the "Heart and Lung Bill" provisions of NRS Chapters 616A through D and 617.

E. Employee is eligible to participate in the deferred compensation program that District has implemented (currently Voya).

F. Employer will purchase $25,000 of life insurance for employee.

5. EXCLUSIVE EMPLOYMENT

Employer agrees that Employee, on his own time, may instruct at the National Fire Academy and for the Nevada System of Higher Education; and such time off for this activity shall not be unreasonably withheld. Except for the previously stated activity, the District shall be his sole employer and that Employee shall not engage in any other employment of any kind, including independent contractor work.

6. RETIREMENT

A. Employee shall remain enrolled in the Nevada State Public Employees Retirement System (PERS) - Police/Fire option, if eligible. Employer shall pay the Employee's contribution to PERS in the same fashion as non-represented employees of the District. Pursuant to NRS 286.421, when an employer-paid contribution plan has a contribution rate adjustment, the Employee shall be required to cost share 50% in the contribution rate, including contribution rate increases in the same manner as the other non-represented employees of the District.

7. EVALUATIONS

A. The Fire Chief, with Employee's input, agrees to adopt priorities and expectations for Employee and the Fire Chief agrees to do so each year thereafter so long as this agreement is in effect. The Fire Chief's adoption of priorities and expectations for Employee shall coincide with Employee's evaluation as provided in paragraph B below. The priorities and expectations may be added to or deleted as the Fire Chief may determine, after consultation with Employee.

B. Each year prior to or as near as possible to the anniversary date of this Agreement, the Fire Chief will review and evaluate Employee's performance. The evaluation shall be based upon priorities and expectations as developed and provided for in Paragraph A above.

8. VEHICLE AND USE

Employee will be issued a District vehicle and Employee may use the vehicle in accordance with District policy. The employee shall be allowed home storage of the vehicle. In the event that Employee is required by the Fire Chief to use a personal vehicle for the conduct of District business, Employee will be reimbursed for each mile traveled at the current rate established by the current applicable IRS rate of the Board of Fire Commissioners, whichever is greater.

9. UNIFORM ALLOWANCE

Employee shall receive a clothing or uniform allowance in the amount of $1,000.00 annually, payable in two (2) equal semi-annual installments. The District shall one time reimburse the Employee for the cost of a Class A (Dress Uniform) in an amount not to exceed $900.

10. REPAIR/REPLACEMENT OF PERSONAL PROPERTY

Employee shall be reimbursed for the cost of repairing or replacing authorized and necessary personal property which is damaged or destroyed if such personal property is lost at fires or related emergencies in the performance of his duties. The list of authorized personal property shall include and be limited to eyewear, watches, contact lenses, and other personal items approved by the Fire Chief. Reimbursement amounts shall be limited to two hundred dollars ($200.00) per claim and two thousand ($2,000.00) per calendar year.

11. MOVING EXPENSES

Employee shall be reimbursed reasonable moving expenses in accordance with Washoe County Code 5.3581.

12. NOTICES

When required by the Agreement, notice by Employee shall be in writing and shall be by personal service by the District Fire Chief, or sent by regular mail to the Fire Chief, in which case notice shall be deemed effective on the date of the mailing.

When required by the Agreement, notice by Employer shall be by personal service on Employee, or sent by regular mail to Employee, in which case notice shall be deemed effective on the date of mailing.

13. LEAVE

A. Employee shall be entitled to eleven (11) paid eight (8) hour Holidays per year pursuant to NRS 236.015.

B. Employee shall accrue 120 hours per year of sick leave at a rate of approximately 4.615 hours per pay period.

Upon death, retirement, or permanent disability, Employee shall be compensated for total accrued sick leave in excess of 300 hours at the rate of one (1) hour's pay at his regular hourly rate for every two (2) hours of sick leave accrued to a maximum payment of 800 hours. No payment shall be made for accrued sick leave of 300 hours or less.

Employee is not eligible for Personal Leave.

C. Eligibility for paid vacation begins (6) months from date of employment with the Truckee Meadows Fire Protection District. Vacation time is earned on a graduated basis:

0 - 3 Years	96 Hours
3 - 5 Years	136 Hours
5 - 10 Years	152 Hours
10 - 15 Years	176 Hours
15 - 20 Years	192 Hours
20 + Years	200 Hours

No more than 240 hours of vacation leave may be carried forward at the end of the calendar year. Amounts in excess of 240 hours as of the end of the payroll period encompassing December 31st shall be forfeited with the following exception: If Employee, on or before October 15, requests permission to take annual leave and the employee's request is denied for any reason, the employee is entitled to payment for any annual leave in excess of 240 hours which the employee requested to take and which the employee would otherwise forfeit as the result of the denial of the employee's request.

Upon termination of employment, Employee shall be compensated at his hourly base rate of pay for all accumulated and unused vacation time hours.

14. DISTRIBUTION OF COMPENSATION DUE TO DECEASED EMPLOYEE

If employee dies while owed compensation by the District, the employer agrees that such compensation, to include wages, payment for accrued vacation leave, payment for sick leave cash out shall be distributed in an expedient and legal fashion pursuant to NRS 281.155.

15. PROFESSIONAL DEVELOPMENT

The Employer agrees to pay for reasonably necessary required emergency medical technician expenses. All reasonably required safety equipment shall be provided at the expense of the employer. At the approval of the Fire Chief, Employer agrees to pay for seminars and training programs directly related to improving the employee's proficiency in performing the assigned duties of Deputy Fire Chief. Reimbursable expenses shall include fees for seminars and training, lodging, meals, and transportation.

16. LABOR RELATIONS

Employee shall not have the ability to enter into "side agreements" with any of the Labor Associations recognized by the District.

17. WAIVER

Waiver of any provision herein shall not be deemed a waiver of any other provision herein, nor shall waiver of any breach of this Agreement be construed as a continuing waiver of other breaches of the same or other provisions of this Agreement.

18. APPLICABLE LAW AND EXCLUSIVE FORUM

The Parties agree that this Agreement is entered into in the State of Nevada and shall therefore be governed by the laws of Nevada without resort to conflict of laws principles. The Parties also consent to jurisdiction in the state and federal courts of Nevada and agree that such courts shall have exclusive jurisdiction over disputes arising out of the interpretation of this Agreement.

19. SEVERABILITY

If any provision of this Agreement is held to be illegal, invalid, or unenforceable by a court of competent jurisdiction, the Parties shall, if possible, agree on a legal, valid, and enforceable substitute provision that is as similar in effect to the deleted provision as possible. The remaining portion of the Agreement not declared illegal, invalid, or unenforceable shall, in any event, remain valid and effective for the term remaining unless the provision found illegal, invalid, or unenforceable goes to the essence of this Agreement.

20. ENTIRE AGREEMENT

This Agreement constitutes the entire Agreement between the Parties and may only be modified by a written amendment signed by all Parties hereto and executed with the same formalities as this Agreement.

IN WITNESS WHEREOF, The Parties have executed this Agreement this 5th day of December, 2017.

EMPLOYEE

Scott M. Gorgon _____ Date

FIRE CHIEF

Charles A. Moore _____ Date

BOARD OF FIRE COMMISSIONERS
TRUCKEE MEADOWS FIRE PROTECTION DISTRICT

Bob Lucey, Chair _____ Date

APPROVED AS TO FORM:

Deputy District Attorney _____ Date

TRUCKEE MEADOWS FIRE PROTECTION DISTRICT

STAFF REPORT

Board Meeting Date: December 5, 2017

Fire Chief CM
Finance CV
Legal DW
Risk Mgt DE
HR ___.

DATE: November 8, 2017

TO: Truckee Meadows Fire Protection District Board of Fire Commissioners

FROM: Charles A. Moore, Fire Chief
Telephone: (775) 328-6123, Email: cmoore@tmfpd.us

SUBJECT: Approve the 2018 Health Benefits Program for District employees, dependents and retirees at an estimated annual cost of $1,579,206 and authorize the Chairman of the Board of Fire Commissioners to execute all insurance contracts and service agreements pertinent to the Health Benefits Program. (All Commission Districts)

SUMMARY

Staff is recommending Board of Fire Commissioners authorization to approve the 2018 Health Benefits Program for District employees, dependents and retirees at an estimated annual cost of $1,579,206 and authorize the Chairman of the Board of Fire Commissioners to execute all insurance contracts and service agreements pertinent to the Health Benefits Program.

Strategic Outcome supported by this item: *Sustainability of our financial, social, and natural resources.*

PREVIOUS ACTION

April 22, 2014 - The Board of Fire Commissioners approved a Health Benefits Program for FY 2014/15 for the District.

May 19, 2016 – The Board of Fire Commissioners approved a Health Benefits Program for a term of 18 months for the District to bring the plan to a calendar year to allow for a possible HSA Option in the future.

July 19, 2016, the Board of Fire Commissioners approved a supplemental Employee Assistance Program through the ESI Group (the EAP) for District employees and volunteers at an estimated Prorated cost of $1,446.65 for the remainder of the 2016 Calendar year.

November 15, 2016 – The Board of Fire Commissioners approved a Health Benefits Program for calendar year 2017 for the District and approved the addition of the High Deductible Health Plan (HDHP) with a Health Savings Account (HSA).

February 21, 2017 - The Board of Fire Commissioners approved the renewal for a supplemental Employee Assistance Program through the ESI Group for District employees and volunteers at an estimated cost of $3,472.00 for 2017 Calendar year.

BACKGROUND

The current Truckee Meadows Fire Protection District health insurance plan is set to expire December 31, 2017. All coverage information referenced in this section is based on bids received from Hometown Health by the District's broker, LP Insurance Services. The bids were evaluated by the Health Benefits Committee which consists of members of the employee associations and Administrative staff to include the Fire Chief. The Committee has completed its annual review of the bids received.

From the bid results, several different plan options were evaluated which included PPO, HMO and a High Deductible Health Plan with a HSA. Hometown Health offered a renewal of the current plan with a 21% increase in cost from the past 12 months. After careful consideration, the Committee recommends to stay with Hometown Health so that member plan benefits would not decrease and so that members would not have to change provider networks. We received the renewal bids from, VSP (our current Vision plan Provider) and Standard Life (our current life insurance provider) at a no increases and Guardian (our current dental provider) with a 9% increase. The Committee recommends continuing with these three providers. The Committee also re-evaluated the Flexible Benefit Plan (Section 125) and recommends staying with American Fidelity who would continue to provide voluntary supplemental benefit plans to employees at no charge to the District in addition to being our HSA Administrator.

Additionally, the District's current EAP program through the ESI Group for District employees and volunteers is set to expire on December 31, 2017. The EAP through ESI meets our needs more efficiently as this program is tailored for first responders and understands the type of issues that they face on a daily basis. Staff has utilized this program for the last 18 months, and would like to renew this policy for 2018.

Group Health Plan
The cost of the fully-insured plan premium, with no change in carrier, results in an estimated 21% increase from the current premium for fiscal year 2018.

PPO Network
The network selection recommended by Hometown Health PPO is in network and First Health for the out of network option.

High Deductible Health Plan
The cost of the HDHP by Hometown Health has the same in and out of Network options and the premium is cost neutral with the Group Health plan. The District will contribute to the Health Savings account on a biannual basis.

Health Saving Account
The District proposes to use Discovery Benefits as the third party administrator p the HSA, and will contribute biannually the Cost difference between the PPO and the HDHP minus any administration fees to a HSA in the employee's name.

Dental Insurance
The cost of the fully-insured dental premium, with no change in carriers, results in an estimated 9% increase from the current premium for calendar year 2018.

Life Insurance
The cost of the fully-insured life premium, with no change in carrier, results in no increase in cost for 2018.

Vision Insurance
The cost of the fully-insured VSP vision premium, with no change in carrier, results in no increase in cost for 2018.

Flexible Benefit Plan (Section 125)
The Flexible Benefit Plan provides employees the ability to direct a part of their pay, on a pre-tax basis into a special account that can be used to reimburse them for dependent day care and/or unreimbursed medical expenses.

FISCAL IMPACT

Funding for the Health Benefits Program is included in the Fiscal Year 2017-18 budget. The estimated annual net cost is $1,579,206.

RECOMMENDATION

It is recommended that the Board of Fire Commissioners approve the 2018 Health Benefits Program for District employees, dependents and retirees at an estimated annual cost of $1,579,206 and authorize the Chairman of the Board of Fire Commissioners to execute all insurance contracts and service agreements pertinent to the Health Benefits Program.

POSSIBLE MOTION

Should the Board agree with staff's recommendation, a possible motion would be:

"Move to approve the 2018 Health Benefits Program for District employees, dependents and retirees at an estimated annual cost of $1,579,206 and authorize the Chairman of the Board of Fire Commissioners to execute all insurance contracts and service agreements pertinent to the Health Benefits Program."

Hometown Health Providers Insurance Company, Inc.
Alternative Benefit Plan Options

Hometown Health

Group Name: TRUCKEE MEADOWS FIRE PROTECTION DISTRICT
Group Number: 3041
Rate Effective Date: 1/1/2018
Broker: LP Insurance User
Blended Rate Indicator: No

Current Plan - Benefit Plan 1

Medical Plan	Pharmacy Plan	Vision Plan	Rate Change	Premiums by Tier: Employee	EE & Spouse	EE & Child	EE & Children	Family	Overall Total
16 LG PPO 15-90 CINS P D0500X2 A9;RX $10/$30/$50	Included in Medical	None	21.0%	30	3	3	7	42	85
				$ 650.39	$ 1,166.04	$ 1,166.04	$ 1,700.74	$ 1,700.74	$ 109,844.11

Alternative	Custom Plan	Alternative Benefit Options: Medical Plan	Pharmacy Plan	Vision Plan	Rate Change	Premiums by Tier: Employee	EE & Spouse	EE & Child	EE & Children	Family	Overall Total
1		16 LG PPO 25-80 CINS P D1000X2;RX $15/$40/$60	Included in Medical	None	7.4%	$ 577.36	$ 1,035.12	$ 1,035.12	$ 1,509.79	$ 1,509.79	$ 97,511.35
2		16 LG PPO 25-80 CINS P D1500X2 A3;RX $15/$40/$60	Included in Medical	None	2.8%	$ 552.35	$ 990.28	$ 990.28	$ 1,444.38	$ 1,444.38	$ 93,286.77

Current Plan - Benefit Plan 2

Medical Plan	Pharmacy Plan	Vision Plan	Rate Change	Premiums by Tier: Employee	EE & Spouse	EE & Child	EE & Children	Family	Overall Total
16 LG PPO HD-NA CINS E D2600X2 HSA;HSA RX Plan	Included in Medical	None	21.0%	20	2	3	2	11	38
				$ 498.32	$ 893.40	$ 893.40	$ 1,303.08	$ 1,303.08	$ 31,373.40

Alternative	Custom Plan	Alternative Benefit Options: Medical Plan	Pharmacy Plan	Vision Plan	Rate Change	Premiums by Tier: Employee	EE & Spouse	EE & Child	EE & Children	Family	Overall Total
3		16 LG PPO HD-NA CINS E D3500X2 HSA;HSA RX Plan	Included in Medical	None	16.7%	$ 480.46	$ 861.39	$ 861.39	$ 1,256.39	$ 1,256.39	$ 30,249.32
4		16 LG PPO HD-NA CINS E D4000X2 HSA;HSA RX Plan	Included in Medical	None	7.0%	$ 440.60	$ 789.92	$ 789.92	$ 1,152.15	$ 1,152.15	$ 27,739.58

e current plan was automatically cross-walked to a similar, compliant plan.

Signature Required for Acceptance			
Authorized Company Representative (please print)	**Title**	**Signature**	**Date**

This renewal of premium rates is based on information reviewed as of the date of this quote.
Rates may be adjusted based on final enrollment and/or new or differing information discovered within seventy days after the Effective Date.
Vision benefits are offered by Vision Service Plan (VSP). VSP is solely responsible for providing vision benefits provided under their vision benefit plans.
Certain combinations of plans may not be sold together and may be subject to additional charges.
A final binding rate quote and contract, if approved by Hometown Health, will be delivered to a Company representative authorized to accept health insurance contracts.
All insurance contracts have a duration of twelve months unless otherwise stated
Key benefits listed above do not constitute a comprehensive list of benefits and are listed as a reference only. Coinsurance benefits are applied after all associated deductibles have been paid.
Certain limits and exclusions not described above may apply. Refer to the Evidence of Coverage and Summary of Benefits for a more detailed description of the benefits for each plan.
In the event of a conflict between this information and the final binding contract, the binding contract will prevail.

Please fax (775-982-3747) or return to Hometown Health 30 days prior to the Effective Date.

RENEWAL INFORMATION FOR

TRUCKEE MEADOWS FIRE PROTECTION DISTRICT
GROUP PLAN # 00477445

RENEWAL PERIOD
January 1, 2018 - December 31, 2018

What you'll find in this package

Renewal Premiums At-a-Glance

EMPLOYER-SPONSORED COVERAGE		
Coverage	**Current Annual**	**Renewal Annual**
Dental	$128,172	$139,706

KEY POINTS OF INFORMATION REGARDING PLAN PRICING

Product-specific rates shown in this package have been determined based on a number of factors, including:

- Employee age and gender
- Changes in group size
- Group location
- Claims experience (when applicable)

GUARDIAN®

COLLEGE TUITION BENEFIT

College Tuition Benefit Rewards Statement

As of 09/15/2017

Plan Number: 00477445
Plan Name: TRUCKEE MEADOWS FIRE PROTECTION DISTRICT
CTB Effective Date: June 15, 2015
Current Lines of Coverage with CTB: Dental
Total Accumulated Rewards For All Lines of Coverage: $262,000

Dear Guardian Planholder,

Thank you for being a valued Guardian customer. This statement provides a snapshot of the total points earned by your members as a result of being enrolled in one or more of the coverages listed above. What a great way to help your members save money on college education.

To make sure points are credited to members, they can visit www.Guardian.CollegeTuitionBenefit.com and register using the following information:
User ID: Plan number
Password: Guardian

As a reminder, the service fee for the College Tuition Benefit is $0.45 per Employee per month (PEPM) for each coverage which is reflected in the total premium billed although it is a separate charge from the insurance premium.

The example below demonstrates how employees can save with the College Tuition Benefit.
One Tuition Reward = $1 in tuition reduction. Please send any questions via email to admin@collegetuitionbenefit.com.

See how Guardian plan participants can earn even more rewards to help them save with multiple Guardian products:

Guardian Insurance Product	Sign-up Bonus	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	TOTAL
Dental	$500 per child	$2,000	$2,000	$2,000	$4,500*	$2,000	$2,000	$2,000	$16,500
Life		$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$14,000
Hospital Indemnity		$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$14,000
Critical Illness		$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$2,000	$14,000
TOTAL	$500	$8,000	$8,000	$8,000	$10,500	$8,000	$8,000	$8,000	$58,500

*Year 4 = Bonus year with dental

Visit https://guardian.collegetuitionbenefit.com/ for more information

Sincerely,

The Guardian Life Insurance Company of America

Renewal Rates At-a-Glance

This plan is currently offered for Insurance Class 1

DENTAL PLAN RATES - PPO VU0Y					
		CURRENT		**RENEWAL**	
Tier	**Enrolled Employees**	**Monthly Rate**	**Annual Premium**	**Monthly Rate**	**Annual Premium**
EE	49	$32.68	$19,216	$35.62	$20,945
EE & SP	8	$68.75	$6,600	$74.94	$7,194
EE & CH	14	$89.42	$15,023	$97.47	$16,375
FAMILY	58	$125.48	$87,334	$136.77	$95,192
TOTAL	**129**		**$128,172**		**$139,706**

Current Dental Plan Information

CONTRACT TYPE: DENTAL GUARD 2000

This plan is currently offered for Insurance Class 1

PLAN BENEFITS SUMMARY

	In-Network	Out-of-Network
Network	DentalGuard Preferred	None
Coinsurance		
Preventive	100%	100%
Basic	80%	80%
Major	50%	50%
Deductible	$0	$50
Waived for preventive?	Yes	Yes
Claim Payment Basis	Fee Schedule	Fee Schedule
Maximum	$1,500	$1,500
Orthodontia	Included	
Lifetime Maximum	$1,000	
Coinsurance	50%	
Maximum Rollover		
Threshold	$700	
Rollover Amount	$350	
In-network only rollover	$500	
Max Rollover Limit	$1,250	
Dependent Age Limit	26/26	

Plan information is for illustrative purposes only. Please consult plan contract for specific benefit levels.

GUARDIAN®

Thank you for choosing Guardian for your dental benefit needs.

As a dental market leader, we are committed to helping your employees save through our strong and continuously growing PPO network. As part of our ongoing growth, we are introducing a new tier of dentists offering discounted care called DentalGuard Preferred Plus.

Dentists that participate in DentalGuard Preferred Plus agree to a percent off their submitted charges. When a member visits a DentalGuard Preferred Plus dentist, benefits are based on the plan's out-of-network coverage (including coinsurance, deductibles and maximums). However, since these dentists have agreed to a discounted rate, members may save more than if they visit a dentist who is not contracted with Guardian.

Benefit certificates and policies have been updated with a disclaimer regarding the out-of-network reimbursement for DentalGuard Preferred Plus. These materials can be obtained on GuardianAnytime.com.

Enclosed is a notice you can share with your employees with Guardian dental coverage.

Please contact us at 1-800-541-7846 with any questions.

Sincerely,

The Guardian Life Insurance Company of America

GUARDIAN®

Thank you for choosing Guardian for your dental benefits.

The best way for you to save on dental care is to visit a dentist in our network and Guardian is committed to ensuring you have a vast selection of dentists to choose from. As part of our ongoing growth, you now have additional opportunities to save through DentalGuard Preferred Plus, a new tier of dentists within our network offering discounted care.

Dentists that participate in DentalGuard Preferred Plus agree to a percent off their submitted charges. When you visit a DentalGuard Preferred Plus dentist, benefits are based on the plan's out-of-network coverage (including coinsurance, deductibles and maximums). However, since these dentists have agreed to discounted care, you will save more than if you visit a dentist who is not contracted with Guardian.

The following example demonstrates the cost differences between the cost of a crown with a DentalGuard Preferred dentist, DentalGuard Preferred Plus dentist and an out-of-network dentist.*

	DentalGuard Preferred dentist	DentalGuard Preferred Plus dentist	Out-of-network
Patient responsibility	$ 403	$ 585	$ 650

Your benefit certificates and policies have been updated with a disclaimer regarding DentalGuard Preferred Plus' out-of-network reimbursement. These materials can be obtained through www.GuardianAnytime.com.

You can find a contracted dentist at www.GuardianAnytime.com. Please contact your employer or call us at 1-800-541-7846 with any questions.

Sincerely,

The Guardian Life Insurance Company of America

*Example is for illustrative purposes only. Costs vary by plan design and location.

August 31, 2017

VSP Vision care for life

BROKER COPY

MS. DENA WIGGINS
TRUCKEE MEADOWS FIRE PROTECTION DISTRICT
PO BOX 11130
RENO, NV 89520-0027

DEAR MS. DENA WIGGINS:

Thank you for choosing VSP® Vision Care. We put your employees first and guarantee their satisfaction. As the only national not-for-profit vision company, VSP gives you:

- Lowest employee out-of-pocket costs
- Reduced healthcare costs
- World Class Service

Your VSP plan automatically renews on January 1, 2018. No action is required to continue to receive consumers' #1 choice in vision care.

Group Name/Number:	TRUCKEE MEADOWS FIRE PROTECTION DISTRICT / 30010936
Renewal Period:	January 1, 2018 - December 31, 2019
Current Plan Frequency:	12 / 12 / 24
Current Copay:	$10 Exam / $25 Materials
Current Allowance:	$120.00 Retail Frame / $120.00 Elective Contact Lenses
Current Rates:	$8.38 / 13.41 / 13.68 / 22.06
Renewal Rates:	$8.38 / 13.41 / 13.68 / 22.06

Rates include all applicable taxes and health assessment fees known as of the date of your renewal.

Enhanced Contact Lens Benefit
This benefit design allows members to use their full contact lens allowance toward contact lenses and provides both standard and premium fit contact lens wearers a covered-in-full contact lens exam after a copay that will never exceed $60.

Please let me know if you have any questions about your VSP plan or would like to see additional options to enhance your benefit or lower your premium. Please contact me at the number below and I can assist you.

Cordially,

Melissa Clark (800) 852-7600

cc: LLOYD BARNES
L/P INSURANCE SERVICES, INC.
300 E 2ND ST STE 1300
RENO, NV 89501

Western Team

TotalCare EAP
Public Safety EAP
Educators' EAP
Higher Ed EAP
HealthCare EAP
Union AP
TotalCare Wellness

Employee Assistance Program – RENEWAL AGREEMENT

REVISED

Truckee Meadows Fire Protection Services agrees to contract with **ESI Employee Assistance Group** for the period of **January 1, 2018 through December 31, 2018.**

I. Fees and Payment:

A. The annual fee for the employee assistance program is **$28.00** per employee.
B. The total number of employees covered under this Agreement is **168. (126 fulltime employees and 84 volunteers on a 2:1 ratio).**
C. Employer agrees to pay ESI the sum of **$4,704.00** per agreement year.
D. The annual fee also includes all immediate family members residing in the same household and dependent children up to age 26.
E. Payment of the **Annual** premium is due upon receipt of the invoice.
F. If the number of covered employees increases or decreases more than 5%, the total agreement value will be revised to reflect the changes.

II. The EAP will provide:

Employee Benefits

- Unlimited telephonic counseling, 24/7
- Up to **3** face-to-face counseling sessions per issue
- Work/life benefits-including debt, legal, financial, elder & child care counseling
- Information Resource benefits
- Lifestyle benefits designed to improve members' health, financial security and overall wellbeing
- Peak Performance Training and Development: **No**
- Peak Performance Wellness Coaching: **No**
- GCN Compliance Training: **No**
- Lynch Ryan Worker's Compensation: **No**

Employer Services

- **1** on-site trauma response(s) @ no charge per year, additional Trauma Responses available at **$250.00** per hour
- Unlimited Administrative (Mandatory) Referrals
- Unlimited HR consultations with certified SPHR's
- Unlimited online Supervisor compliance training & Orientation videos
- Statistical Reports, Newsletters and EAP Awareness Materials
- All web services for employee and employer

No other services are expressed or implied under the terms and conditions of this agreement.

ESI Group

Diane Dunbar

Diane Dunbar, President & Chief Operating Officer

10/24/17 Revised

Date

Truckee Meadows Fire Protection Services

Authorized Signature

Date

TRUCKEE MEADOWS FIRE PROTECTION DISTRICT

STAFF REPORT

Board Meeting Date: December 5, 2017

Fire Chief CM
Finance ___.
Legal DW
Risk Mgt DE
HR DW

DATE: November 3, 2017

TO: Truckee Meadows Fire Protection District Board of Fire Commissioners

FROM: Charles A. Moore, Fire Chief
Phone: (775) 328-6123 Email: cmoore@tmfpd.us

SUBJECT: Authorization to freeze one (1) vacant Fire Mechanic/Logistics Assistant position (#70009601) and to create one (1) additional Fire Mechanic position. (All Commission Districts)

SUMMARY

Authorization to freeze one (1) vacant Fire Mechanic/Logistics Assistant position (#70009601) and to create one (1) additional Fire Mechanic position. (All Commission Districts)

Strategic Objective supported by this item: *Safe, Secure and Healthy Communities*

PREVIOUS ACTION

On May 17, 2016, the Board of Fire Commissioners approved the new position Fire Mechanic/Logistics Assistant.

BACKGROUND

After reviewing the workload of the Fire Mechanic/Logistics Assistant over the past 12 months compared to the demand for expeditious maintenance repair of the TMFPD equipment, it became apparent that the workload demand for two experienced Fire Mechanics outweighed the workload demand for the Fire Mechanic/Logistic Assistant position at this time. With the creation of a second Fire Mechanic position, the maintenance workload can be distributed between two mechanics, resulting in timely repairs to the fire equipment.

The position of Fire Mechanic/Logistics Assistant is currently vacant and will be frozen until the District reevaluates the workload demand for a Fire Mechanic/Logistics Assistant and determines the future needs and purpose of the position

FISCAL IMPACT

The annual salary range of a Fire Mechanic/Logistics Assistant position is $ 45,260.80 to $57,345.60 and the annual salary rage of a Fire Mechanic is $ 57,678.40 to $75,732.80. The total fiscal year 2018 impact with the position freeze and creation of a second Fire Mechanic position will be approximately $15,000 which is offset in the budget by the seven month vacancy in the current Fire Mechanic position.

RECOMMENDATION

It is recommended that the Board give authorization to freeze one (1) vacant Fire Mechanic/Logistics Assistant position (#70009601) and to create one (1) additional Fire Mechanic position.

POSSIBLE MOTION

Should the Board agree with staff' recommendation, a possible motion could be:

"I move to authorize the freezing of one (1) vacant Fire Mechanic/Logistics Assistant position (#70009601) and to create one (1) additional Fire Mechanic position."

TRUCKEE MEADOWS FIRE PROTECTION DISTRICT

Fire Chief CM
Finance CV
Legal DW
Risk Mgt DE
HR N/A

STAFF REPORT
Board Meeting Date: December 5, 2017

DATE: November 8, 2017

TO: Truckee Meadows Fire Protection District Board of Fire Commissioners

FROM: Charles A. Moore, Fire Chief
Phone: (775) 328-6123 Email: cmoore@tmfpd.us

SUBJECT: Discussion, acceptance and possible direction to staff regarding an "Informational Summary/Finding and Recommendations" report on Lakeview Incident #TM160005937 presented by Mike Brown of R&R Partners. (All Commission Districts)

SUMMARY

Discussion, acceptance and possible direction to staff regarding an "Informational Summary/Finding and Recommendations" report on Lakeview Incident #TM160005937 presented by Mike Brown of R&R Partners.

Strategic Objective supported by this item: *Safe, Secure and Healthy Communities*

PREVIOUS ACTION

September 19, 2017 The Board of Fire Commissioners reviewed a draft Report on this incident from ESCI and heard a presentation from Mike Brown of R&R Partners.

BACKGROUND

On August 2, 2016 the District responded to a report of a structure fire at 345 Lakeview Drive in Verdi Nevada. The initial 911 caller reported significant fire conditions and explosions.
Engine 35 (Mogul Fire Station) observed and reported a black column of smoke as they left the station. Engine 35 arrived to find the three car garage fully involved in fire from the side facing the street, consistent with the 911 caller's description. A 360 degree assessment was made by the engine Captain who found a significant portion of the rear of the home also involved in fire with exposures to adjacent structures and wildlands. The Captain's estimate was approximately 40% fire involvement of the entire structure.

The District received assistance from the City of Sparks Fire Marshal, who investigated the cause and origin of the fire. He determined the fire started proximate to the rear of the structure from oily rags that spontaneously ignited.

Over the course of many meetings, the Board has heard input from some citizens who have been critical of the District's response and fire-ground actions. District staff attended three meetings with citizens to review facts and service levels. With differences of opinions and facts unresolved, the District arranged

for a third party review of the incident to include the District's response and strategy and tactics used by responders.

Chief Mike Brown of R&R Consulting was retained to review facts regarding the District's response and determine if the response was consistent with industry practices – and to determine if the District's fire ground actions were proximate in any way to the severity of the fire.
Additionally, the District requested a review of any protocol changes to the existing dispatch scheme and any recommendations for water supply, *(Most of the areas in Verdi are not served by municipal water; consequently there are no fire hydrants. When this is the case, the District uses water tender shuttles for its water supply. For the reason the fire was well established, water tender shuttles proved insufficient and the District established a water supply to the TMWA canal some ½ mile away.)* The incident occurred on a red-flag warning day.

Attached for your review is the Informational Summary/Finding and Recommendations report prepared and to be presented by Mike Brown from R&R Partners.

FISCAL IMPACT

There is no fiscal impact directly related to the presentation of the report. Costs may result depending on direction from the Board.

RECOMMENDATION

It is recommended that the Board of Fire Commissioners accept an "Informational Summary/Finding and Recommendations" report on Lakeview Incident #TM160005937 presented by Mike Brown of R&R Partners.

POSSIBLE MOTION

Should the Board agree with staff's recommendation a possible motion would be:

"I move to accept an "Informational Summary/Finding and Recommendations" report on Lakeview Incident #TM160005937 presented by Mike Brown of R&R Partners."

Truckee Meadows Fire Protection District
(TMFPD)
Informational Summary/Findings and Recommendations

Lakeview Incident (Lakeview Command)

August 2, 2016

Location: 345 Lakeview

Truckee Meadows Incident #: TM160005937

Truckee Meadows Fire Protection District
(TMFPD)
Informational Summary/Findings and Recommendations

SUMMARY

This informational Summary/Findings and Recommendations Report references Tuesday, August 2, 2016, at approximately 1908 hours, the residence located at 345 Lakeview Drive as reported by 911 caller to be fully engulfed by fire (Structure Fire), as received by 911 call takers at the Regional Communications Center.

CONDITIONS

Weather
Reno Fire Weather Center

- Temperature: 83.0 F
- Relative Humidity: 18%
- Wind: 15.0 mph, with gusts 24.0 mph

Structure
Single Family dwelling, two story wood frame, three-car garage and unknown fuel loading

Fuel Type
Sage Brush, loose vegetation litter, cured grass, scattered trees- pinyon, white fir and similar vegetation contiguous to the area.

Road Conditions
Pavement with ability for cars to pass without difficulty. Structure involved is directly at the intersection of Lakeview and Hansen Drives.

Topography
Relatively flat ground

Fire Behavior
Smoke visible from responding station TMFPD Station, 35 as reported by Engine 35 Captain. Upon arrival of Engine 35, Captain reports "Large structure, three car garage, fully involved".

Actions Taken
Defensive operations

Truckee Meadows Fire Protection District
(TMFPD)
Informational Summary/Findings and Recommendations

Sequence of events

On Tuesday August 2, 2016 at approximately 1908 hours, Regional Communications Center received a 911 call via cell phone that a neighbor's residence was on fire. Reporting Party states unknown if anyone is home can see smoke and flames-Fully Engulfed.
Dispatch initiated the call at 19:08:36.
Dispatch toned out at 19:09:00 the following equipment and personnel: TMFPD Battalion 3, TMFPD Engine 35, TMFPD Engine 15, TMFPD Engine 37, TMFPD Engine 13 and Verdi Volunteers
Dispatch advises at 19:09:10 the Reporting party reports unknown if anyone is home, can see smoke and flames, fully engulfed.
Dispatch advises at 19:09:31 reporting party stating something is blowing up.
Dispatch advises at 19:10:11 that Reporting party can see one vehicle in driveway, unknown if anyone is home.
TMFPD Battalion 3 en route 19:10:35
TMFPD Engine 15 en route 19:10:31
TMFPD Engine 35 en route 19:10:52
TMFPD Engine 13 en route 19:10:53
TMFPD Engine 37 cancelled 19:12:02 and cleared at same time
TMFPD Engine 35 on scene 19:17:33 (time of dispatch to arrival 8 min 33 sec) Captain provides arrival up-date, "Large structure, three car garage, fully involved in defensive operations".
Battalion 3 at 19:18:55 requests of dispatch to re-tone Verdi Volunteers
Battalion 3 at 19:19:23 asks of Engine 35 if any additional structures are threatened at this time
Engine 35 at 19:19:28 tells Battalion 3 to stand by
Battalion 3 at 19:20:36 request of dispatch to tone out Lemmon Valley Volunteers for their Water Tenders (Note this is a delayed entry and may have occurred earlier in the request by Battalion 3 to dispatch).
Battalion 3 at 19:21:03 requests of dispatch to make "Working Fire Notifications"
TMFPD Engine 35 at 13:23:07 requests to Battalion 3, need water and two lines, house ¾ involved
TMFPD Engine 18 and TMFPD Water Tender 18 en route 19:23:42 to Lakeview incident
TMFPD Engine 35 at 19:24:14 Advises TMFPD Engine 15 best access Old HWY 40
TMFPD Battalion 3 at 19:28:01 on scene (time of dispatch to arrival 19 min 1 sec)
TMFPD Battalion 3 assuming command at 19:29:21
TMFPD Engine 15 at 19:29:26 on scene (time of dispatch to arrival 20 min 26sec)
TMFPD Engine 15 at 19:29:48 requested to take their engine to Engine 35
TMFPD Water Tender 351 en route 19:29:15 (BC Hicks responding Water Tender 351)
Battalion 3 at 19:30:15 advises, "Ammo inside residence is cooking off"
Battalion 3 request water be supplied to TMFPD Engine 15 (possibly Tender 351)
TMFPD Engine 13 at 19:33.02 on scene (time of dispatch to arrival 24 min 2 sec)
TMFPD Engine 351 at 19:35.02 on scene (time of dispatch to arrival 26 min 2 sec)

Truckee Meadows Fire Protection District
(TMFPD)
Informational Summary/Findings and Recommendations

TMFPD Engine 36 at 19:36:13 on scene (time of dispatch to arrival 27 min 13 sec)
TMFPD Water Tender 13 at 19:37:30 on scene (time of dispatch to arrival 28min 3 sec)
TMFPD Water Tender 351 at19:37:55 on scene. (time of dispatch to arrival 28 min 55 sec)
TMFPD Battalion 3 requests two more Water Tenders at 19:42:35(time of dispatch to request 36 min 43 sec)
Battalion 3 acknowledged Sparks Water Tender and NV National Guard Water Tender at 14:45:43
TMFPD Water Tender 223 at 19:43:56 on scene (time of dispatch to arrival 34: min 56 sec)
TMFPD Water Tender 36 at 19:44:28 on scene (time of dispatch to arrival 35 min 28 sec)
Request to close road at Bridge/40 for supply line placement at 19:44:51
Contact Minden for Brush Response at 19:50:52 (time of dispatch to request 50 min 52 sec)
TMFPD Battalion 3 request 1 Type I engine from Reno Fire at 19:54:34 (time of dispatch to request 45 min 34 sec)
Reno Fire Engine 11 dispatched overhead at station at 19:58:28
Reno Engine 11 on scene 20:07:00 (time of dispatch to arrival 9 minutes)
Engine 351 water flowing 20:19:02 (water supply from Canal)
BLM on Scene 20:29:16 (time of initial alarm dispatch 1 hour 10 min and 16 sec)
Battalion 3 Knockdown all sides at 20:43:24

Truckee Meadows Fire Protection District
(TMFPD)
Informational Summary/Findings and Recommendations

Finding and Recommendations Dispatch

The call from the reporting party via 911 occurred at 19:08.36. Washoe County Communications Dispatch Center, the contract dispatch center for Truckee Meadows Fire Protection District, answered and dispatched the call in less than one minute: the contract time frame.

Following a review of all dispatch logs and voice communications, it has been determined that all records on this incident are exact. The dispatch center and assigned dispatchers provided information and received information from fire personnel on this incident and also dispatched and logged other incidents for within the TMFPD responsibility area.

It is recommended that staff of TMFPD share information following any incident in the form of After Action Review (AAR) with dispatch personnel associated with incident to better educate and make improvements to the dispatch system.

Finding and Recommendations District 35 Engine 35 response

Engine 35 and personnel received overhead dispatch at 19:09. Engine 35 responded from Station 35 Located at 10201 W 4th St, Reno, (Mogul) NV 89523 with an in-service time of 19:10.52. Engine 35 arrived at scene of incident 345 Lakeview Drive at 19:17.33. Time from dispatch of incident to arrival: 8 minutes and 33 seconds. Travel distance of 5.1 miles.

With a system of cover recommended response time of not to exceed 10 minutes from time of dispatch to equipment on scene, no further recommendation required.

Finding and Recommendation Actions of Engine 35 Personnel

Engine 35 Captain, on arrival of incident at 345 Lakeside Drive, reported "Large structure, three car garage, fully involved in defensive operations".

Following an interview with the crew from engine 35, it was made very clear that once they deployed a 2.5" attack line and started attempting to take the heat out of the fire from the "A" side of the structure, they would not have enough water on Engine 35 to make an effective extinguishment of this structure fire and that an additional water source would need to be established. Engine 35 captain chose to provide protection to neighboring exposures for potential fire movement from involved structure to the vegetation (wildland) and possibly nearby structures.

Following questions over the radio from incoming Battalion Chief 3 concerning additional Structure Threat, Engine 35 captain at 19:23:07 to Battalion 3, "need water and 2 lines, House ¾ involved.

No recommendations for decisions of engine 35 crew on tactics and strategy, actions were dictated by insufficient water demands and captain and crew acted efficiently.

Truckee Meadows Fire Protection District
(TMFPD)
Informational Summary/Findings and Recommendations

Finding and Recommendation Water Source

Engine 35 is a type one structure engine that caries 750 gallons of water. The fire flow demands for this incident required an availability of between 2,000 – 3,000 gallons of available water for the estimated size of the structure and involved square feet estimated at 50% on arrival. The structure at 345 Lakeview Drive and neighboring structures do not have hydrants and homeowners rely on private wells to provide water to the homes in the area.

Early on in this incident, water was of concern for not only Engine 35 crew, but also the thought process of responding Battalion Chief 3 as evidenced by the prompt requests, prior to Battalion Chief 3's arrival, to have Lemmon Valley respond tender, Tender 351, Tender 18, and eventually Sparks Fire Tender, Nevada National Guard Tender and Tender 223. All were requested through dispatch.

Eventually, with support of Verdi Volunteers, other on scene Engines and Reno Engine 11, a water supply was established with over 3000' of 5" supply line. A drafting evolution provided by E-351, E-36 relay to engines on scene at 345 Lakeshore Drive was established at 20:30.33. 1 hour and 22 minutes from time of dispatch to water supply. As Engines arrived and tender 351 arrived, water was utilized to suppress this structure fire. 20:43:24 Battalion 3 advises, KNOCK DOWN of Fire all sides Alpha – Delta. 1 hour 35 minutes from call initiation with Washoe County Dispatch.

City of Reno Fire Department Station 11 Located at 7105 Mae Anne Ave, Reno NV 89523, is the next closest fire station to this incident. Reno Fire Department was requested by Battalion Chief 3 to respond a Type 1 Engine at 19:54:34. This request is 45 minutes and 34 seconds following initial dispatch of all Truckee Meadows Engines for this incident.

Reno Fire Engine 11went en route at 19:58:28 and arrived at incident 20:07:00 9 minute response time.

Immediate Recommendations:

- ***Closest forces concept be initiated and utilize neighboring agencies that have closer proximity stations on initial run cards not only for this incident and area, but all locations served by the Truckee Meadows Fire Protection District.***
- ***It is recommended that a water tender be placed at station 35 and respond to all working fire notifications***

Future Recommendations:

- ***Mobile/Portable water storage services strategically located for quick fill of tenders for fire events.***
- ***Evaluation of businesses in the area that have water storage systems for sharing of water in event of major fires of any kind.***
- ***Pre-plan of all districts but using Verdi as a template to establish pre-incident survey of available water sources that may be utilized in the event***

of an incident. Many private water sources are available such as swimming pools, cisterns and possibly other mobile and fixed sources. It will be recommended that fire service personnel explore communities for these water source opportunities by walking the communities and establishing relationships and knowledge of access and egress for such opportunities.

- ***Verdi Volunteers played a significant role in this incident and ability to provide water support through the drafting evolution utilized. Verdi Volunteers are an on- call pool of personnel and, if trained appropriately, can assist with Tender response and support from the Volunteer station located at the old Verdi Elementary school.***
- ***Work with developers of future construction sites to establish water supply in the form of hydrants to be utilized within the Verdi area.***

Finding and Recommendations Agreements

Truckee Meadows Fire Protection District has numerous agreements that allow for Mutual Aid and Automatic Aid from collaborating agencies.

It is recommended that Truckee Meadows Fire Protection District and surrounding agencies work together to establish boundary drops that would allow for all agencies' equipment and personnel to cross jurisdictions for service of the closest station or apparatus and personnel to better serve the Truckee Meadows communities in Washoe County.

Automatic Vehicle Locators (AVL) are the Gold standard in the industry of public safety. It would be advantageous for all public service agencies to explore and incorporate AVL for their responding apparatus and stations so Computer Automated Dispatch (CAD) programs can direct closest forces to incidents of any kind that require immediate incident responses for a variety of critical time sensitive emergency incidents.

Community Wildfire Protection Plans (CWPP). Research revealed that the last evaluation completed for all Truckee Meadows Fire Protection Districts was accomplished in 2006. It is recommended that the CWPP be updated for all districts within the responsibility of TMFPD.

Nevada Network of Fire Adaptive Communities: In association with Nevada Division of Forestry, University of Nevada Reno, Cooperative Extension and members of the Board of Fire Adaptive Communities, establish a chapter with the Verdi Community so as to assist with Community Fire Threat analysis, community and residential fire fuels reduction.

It is recommended that a Fire Service representative be assigned as a community liaison and establish a relationship with the communities for assisting with

Truckee Meadows Fire Protection District
(TMFPD)
Informational Summary/Findings and Recommendations

education, commitment and understanding of the needs of the community and ability to provide direction and insight within the community.

Volunteers: It is very apparent that housing of equipment and personnel for the Volunteer Ranks needs to be modified in several areas. The current Station located at the Verdi Elementary school has several issues that render it incapable of providing the housing and services required for the safety and convenience of the Volunteers. The location is ideal, but the ability to provide for sanitary restrooms and water as well as needed up-grades to the building remain a challenge for the volunteer ranks.

Volunteer recruitment: Truckee Meadows Fire Protection District should run a recruiting program locally for volunteers within any of their districts that have volunteer recruiting stations and needs. This would combine and show support across the entire district. Volunteer positions should have Job Descriptions for identified needs that can vary from full suppression requirements to identified special positions. For example, Water Tender support, Logistic support and programs that are modeled after Community Emergency Response Teams (CERT) shared with the Washoe County Sheriff's Department.

Emergency Preparedness Guide: In coordination with Washoe County Emergency Management, Washoe County Sheriff and City of Reno Public safety agencies, a guide for preparedness for disasters that may occur. The need for our customers to know how to be notified in the event of a disaster in their area, evacuation routes and shelter in place locations is important. Such Emergency Preparedness Guides should be developed and provided with training to all communities throughout Washoe County.

It would advantageous for the TMFPD to explore future station locations with collaborating public service agencies such as, Reno Fire Department, United States Forest Service and responsible Law Enforcement agencies that provide service to the Verdi Area.

Grants can be applied for that meet the funding criteria and so often are found favorable when shared with other agencies that have similar needs for housing and staffing of equipment and personnel.

Truckee Meadows Fire Protection District
(TMFPD)
Informational Summary/Findings and Recommendations

The loss of structure and contents associated with this incident is tragic. The owners, their family, friends and neighbors that assisted during and following this incident are to be commended for taking the steps to ensure they have a stronger and safer community.

From the onset and throughout this incident, safety was mentioned time and time again by all fire suppression personnel as it should be for our public safety first responders and our members of our community.

With the growth, annexation and expansion of industry that is taking place within and around the Verdi area, no one public safety agency is currently able to meet every need without help and assistance from their neighbors.

It would be an advantage to all agencies and our customers to ensure that transition from one agencies' responsibility to another is combined to involve a seamless conversion with no customer or agency experiencing a decrease in service. As it stands, and with the example that is currently playing out in California with the fires occurring, the color of the Fire Apparatus, Law Enforcement Vehicle or Ambulance is not a factor while ensuring mitigation of any incident or assistances that can be provided to a person, a community, a visitor or an agency reaching out.

Executive Summary

The Healthy Forests Initiative was announced by the White House in 2002 to implement the core components of the National Fire Plan *Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy.* The Plan calls for more active forest and rangeland management to reduce the threat of wildland fire in the wildland-urban interface, the area where homes and wildland meet.

This report was prepared specifically for the communities within Washoe County, Nevada that were identified in the 2001 Federal Register list of communities at risk within the vicinity of federal lands that are most vulnerable to the threat of wildfire. Washoe County communities located in the Lake Tahoe Basin were addressed in a separate report. The communities assessed in Washoe County are listed in Table 1-1.

The Nevada Fire Safe Council contracted with Resource Concepts, Inc. (RCI) to assemble a project team of experts in the fields of fire behavior and suppression, forest and rangeland ecology, forest health, and geographic information systems (GIS) to complete the assessment for each Washoe County community listed in the Federal Register. The RCI Project Team spent approximately three weeks in September 2004 inventorying conditions in Washoe County and completing the primary data collection and verification portions of the risk assessment.

The general risk/hazard assessment results for each community are summarized in Table 1-1. Five primary factors that affect the potential fire hazard were assessed to arrive at the community hazard assessment score: community design, construction materials, defensible space, availability of fire suppression resources, and physical conditions such as the vegetative fuel load and topography. Information on fire suppression capabilities and responsibilities for Washoe County communities was obtained from local Fire Chiefs and agency Fire Management Officers. The RCI Project Team Fire Specialists assigned an ignition risk rating for each community of low, moderate, or high. The rating was based upon historical ignition patterns, the opinions of local, state, and federal fire agency personnel, field visits to each community, and the professional judgment of the Fire Specialists on the RCI Team based on their experience with wildland fire ignitions in Nevada.

Existing Situation

A total of 41 communities were included in the risk/hazard assessment for Washoe County. Nearly half of these areas have high and extreme fuel hazard conditions within one mile of the community boundary. In some cases, hazardous fuel conditions occur within the community boundary. Many of the areas that were classified as moderate fuel hazards have a large component of cheatgrass. During years with above normal precipitation and abundant growth of cheatgrass, perennial grass, and annual forbs, these areas can escalate into high fuel hazard conditions.

Table 1-1. Community Risk and Hazard Assessment Results

Community	Interface Condition	Interface Fuel Hazard Condition	Ignition Risk Rating	Community Hazard Rating
High and Extreme Hazard Communities				
Antelope Valley	Intermix	Low to High	High	High
Mount Rose Corridor	Intermix	Moderate to Extreme	High	High
Rancho Haven	Intermix	Moderate to Extreme	High	High
Red Rock	Intermix	Low to High	High	High
Warm Springs Valley	Intermix	Low to High	High	High
Washoe Valley - West	Intermix	Low to Extreme	High	High
Moderate Hazard Communities				
Anderson Acres	Intermix	Moderate	High	Moderate
Cold Springs	Classic	Moderate	High	Moderate
Galena	Intermix	High to Extreme	High	Moderate
Gerlach	Intermix	Low to Moderate	Moderate	Moderate
Golden Valley	Intermix	Moderate	High	Moderate
Lemmon Valley	Intermix	Moderate	High	Moderate
Mogul (I-80 Corridor West)	Classic	Moderate	High	Moderate
Nixon	Intermix	Low to High	High	Moderate
Palomino Valley	Intermix	Low to High	High	Moderate
Pleasant Valley	Classic	Moderate to High	High	Moderate
Reno-Northwest	Classic	Moderate to High	High	Moderate
Reno-Southeast	Intermix	Moderate to High	High	Moderate
Silver Knolls	Intermix	Moderate	High	Moderate
Spanish Springs	Intermix	Moderate to High	Moderate	Moderate
Steamboat	Intermix	Low to High	High	Moderate
Sun Valley	Intermix	Low to Extreme	Moderate	Moderate
Sutcliffe	Classic	High	High	Moderate (High)
Verdi	Intermix	Moderate to Extreme	High	Moderate
Washoe City	Classic and Intermix	High	High	Moderate
Washoe Valley -	Intermix	Moderate to High	High	Moderate

East				
Low Hazard Communities				
Empire	Intermix	Low to Moderate	Moderate	Low
Reno-Southwest	Classic	Low to High	High	Low
Sparks	Classic	Low to Moderate	Low	Low
Stead	Classic	Moderate	Moderate	Low
Wadsworth	Classic	Low to Moderate	Moderate	Low

Many Washoe County communities occur in and are further expanding into a fire-prone environment. More than half of the communities evaluated in this report have a high ignition risk. The fire history in Washoe County (Figure 3-2) shows a high occurrence of ignitions and large wildland fires around the majority of the communities. The tendency for dry lightning associated with summer thunderstorm activity and widespread outdoor recreational use across the public forests and rangelands increase the risk of wildfire ignitions.

Several Washoe County communities are rapidly expanding and community boundaries shown in this report will need to be updated on a regular basis. In some cases (particularly Reno Northwest, Reno Southwest, Reno Southeast, and Reno Northeast), the community boundaries encompass geographically diverse conditions, varied fuel conditions, and a wide range of urban development styles. The results reported for these communities represent a general overview of the entire urban-interface condition. More detailed analyses of smaller neighborhoods within these communities would better reflect community risk and hazard conditions at the local level. It is therefore recommended that this follow-up analysis be conducted and that this plan be reviewed and updated at least annually.

Multiple fire suppression agencies in Washoe County including the Reno/Truckee Meadows Fire Department, the Sparks Fire Department, the Nevada Division of Forestry, the Bureau of Land Management, and the US Forest Service have developed mutual aid agreements for initial attack of wildland fires. However in many cases the first responders are volunteer firefighters. Volunteer Fire Departments in Washoe County, supervised by the Nevada Division of Forestry and Reno/Truckee Meadows Fire Department, are equipped with wildland fire suppression apparatus and firefighters receive recommended wildland fire training. Still, volunteer response may not be sufficient during normal work hours, and ignitions on high hazard days may quickly escape initial attack efforts.

Recommendations

The cooperative approach to wildland fire suppression in Washoe County, formally known as the Sierra Front Wildfire Cooperators, has been successful in Washoe County and serves as a model for the rest of the nation. However, many communities in Washoe County

are rapidly expanding into the wildland urban interface and the jurisdictional area for existing fire districts is rapidly expanding. The following recommendations are made to promote effective and efficient wildland fire suppression in the interface communities and protect lives, property and natural resources.

Community Development and Defensible Space Requirements

It is imperative that Washoe County, the City of Reno, and the City of Sparks continue to require all future development to meet the National Fire Codes with regard to community design, construction materials, housing density, road design and access routes, and water supplies for fire suppression.

Appropriate regulations and ordinances must be developed and enforced to require property owners in existing and future developments to maintain adequate defensible space around their residences in order to reduce hazardous conditions for firefighters and to save lives, property, and natural resources. Enforcement of fuel reduction treatments must also apply to owners of vacant lots and absentee homeowners.

On an individual basis, the most widespread recommendation for Washoe County residents is to create and maintain defensible space. Defensible space is the homeowner's responsibility, and it is an essential first line of defense for improving firefighter safety and saving lives and property during a catastrophic wildland fire.

Landscape Level Fuel Reduction Treatments

Fuelbreaks, greenstrips, and fuel reduction treatments that include tree and brush thinning have been proposed for several Washoe County communities with moderate to extreme fuel hazard conditions adjacent to the communities. These treatments are most effective when constructed across large continuous blocks of land to break up fuel continuity. In some cases these treatments necessarily cross property lines and require cooperation between private property owners and public land management agencies to successfully meet fuel reduction objectives. A summary of the fuel reduction treatments proposed for Washoe County is summarized in Table 1-2.

When implementing proposed fuel reduction treatments and fuelbreaks, the tree density in Jeffrey pine forests is recommended to be reduced to a spacing of 18 to 31 feet between trees when trees are 12 to 18 inches in diameter. A tree thinning guideline for various size trees is given in Appendix E. Pinyon and juniper trees are recommended to be thinned to a spacing equal to twice their height. Tree thinning is not only necessary to reduce hazardous fuel conditions but also to maintain healthy forests and woodlands.

Shrubs are recommended to be removed when they are adjacent to roadways, utility lines, railroads, and other ignition sources or when they are growing beneath large trees creating ladder fuel conditions that could lead to a dangerous and catastrophic crown fire.

Community Coordination and Public Education

To be most effective, fire safe practices need to be implemented on a community-wide basis. There is no guarantee that a wildfire will not occur in any of these communities, even if all of the recommendations in this report are implemented. Nonetheless, public awareness, neighbors helping neighbors, and concerned, proactive individuals setting examples for others to follow are among the most important initiatives involved in reducing the risk of wildfire ignition and managing the hazards inherent in wildland interface areas.

There is no way to completely eliminate the threat of wildfire in the wildland-urban interface. Acknowledging the need for ongoing fuels management on public and private lands is vital for fire safe living in a wildfire-prone environment. The best possible assurance for long-term community safety from wildfire requires a permanent commitment to the enforcement of fire safe ordinances at the local level. Mandatory fuels management includes regular monitoring and evaluation of fuel conditions and maintenance or implementation of additional fuel reduction treatments as development continues to encroach at the wildland-urban interface.

Any of the following agencies or organizations can be contacted for further information and assistance.	
Nevada Fire Safe Council	firesafe@renonevada.net www.nvfsc.org
Nevada Division of Forestry	Fire Program Coordinator **(775) 684-2500**
Nevada Association of Counties	nvnaco@nvnaco.org
Bureau of Land Management Nevada State Office	Nevada BLM State Fire Management Officer khull@nv.blm.gov
Humboldt-Toiyabe National Forest Supervisors Office	H-T Supervisors Office Fire Staff Officer mdondero@fs.fed.us

Table 1-2. Summary of Hazard Reduction Recommendations for Communities in Washoe County

Community	Description	Estimated Treatment Area[1]	Cooperating Partners						
High and Extreme Hazard Communities									
Mount Rose Corridor	Shaded fuelbreaks, 300' x 0.9 mi	34 acres	X				X		
Washoe	Tree thinning								

Valley - West	along west side of community	1,101 acres	X			X	X		
Moderate Hazard Communities									
Cold Springs	Fuelbreak, 200' x 3.8 mi	92 acres	X		X				
Galena	Fuelbreak, 300' x 3.6 mi	133 acres	X			X	X		
	Fuelbreak, 200' x 2.3 mi	56 acres	X						
	Fuelbreak along State Route 431, 500' x 2.6 mi	157 acres	X	X		X	X	X	
	Tree thinning on private parcels	1,050 acres	X				X		
	Tree thinning within Galena Creek Regional Park	341 acres		X			X		
	Brush thinning	171 acres				X			
Mogul	Brush thinning	41 acres				X			
Palomino Valley	Greenstrip along roads, 100' x 4.8 mi	58 acres	X	X					
	Fuelbreak south along Bacon Rind Road, 150' x 4.9 mi	89 acres	X						
Reno - Northwest	Brush thinning in open space areas	730 acres	X						
	Fuelbreak around Horizon Hills area, 150' x 2.9	54 acres	X			X			

	mi								
	Fuelbreak on west side of community, 100' x 4.0 mi	48 acres	X						
Reno - Southeast	Fuelbreak south of Steamboat Estates Trailer Park, 100' x 2.0 mi	25 acres	X		X				
Sutcliff	Fuelbreak along west side of community, 150' x 1.0 mi	18 acres							BIA/Tribe
	Fuelbreak along south side of community, 150' x 0.6 mi	11 acres							BIA/Tribe
Verdi	Greenstrip on north and southeast side of community, 200' x 5.9 mi	144 acres	X			X			
	Tree thinning on private parcels	406 acres	X						
Washoe City	Shaded fuelbreak from Joy Lake Road to Davis Creek Park, 200' x 3.1 mi	76 acres	X			X	X		
	Tree thinning southwest of community including Davis Creek Park	256 acres	X			X	X		

Washoe Valley - East	Fuelbreak along outside of the community, 200' x 12.7 mi	309 acres	X		X				NVST[2]
Low Hazard Communities									
Reno - Southwest	Brush thinning in open space areas	470 acres	X						
	Fuelbreak on west side of community, 200' x 7.3 mi	177 acres	X			X			

[1] *Roadside fuelbreak areas are measured from the edge of pavement. Treatment area estimates include both sides of the road.*

[2] *NVST - Nevada State Lands*

^ Table of Contents ^ 1.0 Introduction -->

28.0 Verdi

28.1 Risk and Hazard Assessment

Verdi is located adjacent to the California state line west of Reno-Northwest along Interstate 80. The community is situated in the canyon between Peavine Peak and the northern extent of the Carson Range. The community boundary is shown in Figure 28-1. The community hazard assessment resulted in classifying Verdi in the **Moderate Hazard Category** (54 points). A summary of factors that contributed to the hazard rating is included in Table 28-3. Primary factors that determined the hazard rating in Verdi included the potential fire behavior based on fuel hazards and topographic conditions in the community.

28.1.1 Community Design

The wildland-urban interface area in Verdi is described as an intermix condition. There is no clear line of demarcation between wildland fuels and the residential structures in the community. Approximately sixty percent of residences are located on lots less than one acre in size and forty percent are located on lots between one and ten acres in size.

- **Access**: Bridge Street, South Verdi Road, and Quilici Ranch Road are the primary transportation routes providing access to and from the community. The roads are greater than 24 feet wide and provide adequate space for two-way vehicular travel and for fire suppression equipment to maneuver. Secondary roads in the majority of the community have road grades less than five percent with adequate turn around space for fire suppression apparatus.
- **Signage**: Almost all of the street signs in the community are easily visible. Ninety-six percent of the residential addresses are easily visible from the road. Clear and visible street signs and residential addresses are important in locating homes during low visibility conditions that occur during a wildfire.
- **Utilities:**All utilities are above ground. Power lines have not been properly maintained in all areas of the community. Proper maintenance minimizes the possibility that arcing may start fires in nearby vegetation. In some areas of the community, the recommended ten feet of vegetation clearance does not exist around propane tanks.

28.1.2 Construction Materials

Almost all of the homes in the interface are built with non-combustible or ignition resistant siding such as medium density fiberboard, stucco, or brick. Ninety-five percent of the residences have roofs of non-combustible material such as tile, metal, or composition. Approximately seventeen percent of the homes observed have unenclosed balconies, porches, decks, or other architectural features that can create drafty areas where sparks and embers can be trapped, smolder, ignite, and rapidly spread fire to the house.

28.1.3 Defensible Space

Approximately 93 percent of the homes surveyed in Verdi have landscaping that meets defensible space guidelines to protect the home from damage or loss during a wildfire.

28.1.4 Suppression Capabilities

Wildfire Protection Resources

The Verdi community is included in the Nevada Division of Forestry Sierra Forest Fire Protection District that includes Verdi Station 5, staffed by three career personnel daily with three additional seasonal firefighters during the fire season, and the Verdi Volunteer Fire Department Station 51. The Verdi VFD reported having 22 volunteer members at the time interviews were conducted for this project. Resources within the community for response to a reported wildland fire are summarized in Table 28-1. Reno Fire Department responds with additional resources from the closest available career staffed station according to their standard wildland fire dispatch. Other local, state, and federal resources are available upon request through mutual agreements as described in Section 4.1.1.

Table 28-1. Verdi Initial Attack Wildfire Suppression Resources

Type of Resource	Amount of Equipment	Cooperating Partner (Resource Location)
Engine Type 3 Water Tender Type 1	2 1	Nevada Division of Forestry (Station 5 -Verdi)
Engine Type 3 Engine Type 4 Water Tender Type 1	2 1 1	Verdi Volunteer Fire Department (NDF Station 51 - Verdi)
Source: Brent Harper, Chief Verdi VFD, Joe Reinhardt ,BC, Nevada Division of Forestry; Marty Scheuerman DC, Reno Fire Department; Roy Slate Volunteer Coordinator Reno Fire Department.		

Water Sources and Infrastructure

Water available for fire suppression in Verdi includes fire hydrants with a minimum flow capacity of 1,000 gallons per minute within 1,000 feet of structures in parts of the community. The water system

includes several storage tanks and operates by gravity and eclectic pumps. There are emergency back-up generators to refill water storage tanks in the case of a power outage. The Quilici Ranch Road area does not have hydrants.

Detection and Communication

Fires are reported in Washoe County through the 911 system, which connects the call with the Washoe County 911 Center. Washoe County 911 notifies the Sierra Front Interagency Dispatch Center of wildland fires. The Sierra Front Interagency Dispatch Center notifies the Volunteer Fire Departments, the Nevada Division of Forestry, the Bureau of Land Management, and the US Forest Service of fires through the use of pagers and radios.

Communication frequencies are currently compatible between agencies. When the federal agencies go to narrow band digital radios, the volunteers will no longer be able to communicate with the Bureau of Land Management and US Forest Service.

Fire Protection Personnel Qualifications

All volunteer firefighters are trained to the State Fire Marshal Entry Level Firefighter and Firefighter I standards. Nevada Division of Forestry provides all volunteer, career, and seasonal firefighters with Basic Wildland Firefighting training that meets NWCG 310-1 standards. Nevada Division of Forestry career firefighters also receive State Fire Marshal's Firefighter I and II training

Work Load

The Verdi VFD responded to 114 calls in 2003 that included twenty wildland/brush calls.

Financial Support

Financial support for the Verdi VFD is provided through a pay-per-call program of the Nevada Division of Forestry Sierra Fire Protection District (NRS 473) and a contract with Sierra County, CA. Western Region Nevada Division of Forestry receives funding form the Sierra Fire District (NRS 473) and sales tax revenue.

28.1.5 Factors Affecting Fire Behavior

The community of Verdi is situated in the Truckee River canyon. The terrain varies from flat near the Truckee River to slopes between eight and twenty percent with all aspects. The prevailing wind direction is from the west and southwest. Strong down-canyon winds through the Truckee River canyon are common during summer afternoons.

Areas around Quilici Ranch Road, Hill Lane, and Garson Road are characterized by Jeffrey pine forest associated with mountain mahogany, bitterbrush, big sagebrush, and rabbitbrush. Cheatgrass, perennial grasses, pine needles, and pinecones are the primary ground fuels. The fuel loads in the forested areas within and around the community were estimated to range between six and eighteen tons per acre depending upon the slope and the tree and shrub density. The fuel hazard was considered moderate to extreme. The heaviest fuel loadings occur on interior lots.

28.1.6 Fire Behavior Worst-Case Scenario

The worst-case scenario for this area would be a dry lightning storm late on a summer afternoon, during a year with above normal precipitation and abundant cheatgrass production. Multiple fire ignitions combined with strong erratic winds, greater than twenty miles per hour, could push fires into the community from the southwest and north. Prevailing west winds in the Truckee River canyon would slow fire spread from the east. Hazardous fuels in the interior of the community characterized by dense brush, overstocked stands of timber, and thick stands of mountain mahogany are be vulnerable to long range fire brand ignitions and increase the potential for spot fires within the community. These interior areas of the community are at risk for structure loss from spot fires.

The distribution of two state-listed noxious weeds, tall whitetop and yellow star thistle, are already present in the community and could expand into burned areas.

28.1.7 Ignition Risk Assessment

The ignition risk in Verdi is high due to the tendency for summer afternoon thunderstorms and the high public use of the area. The area has a history of multiple ignitions and large fires.

28.2 Risk and Hazard Reduction Recommendations

The responsibility to keep a community fire safe falls not only on the local fire protection district but also on the residents of the community and local governments. The recommendations for the Verdi area focus on fuel reduction treatments aimed at thinning trees, and reducing brushy ladder fuels, and the implementation of other defensible space treatments around private residences.

28.2.1 Defensible Space Treatments

Defensible space treatments are an essential first line of defense for residential structures. The goal of the treatments is to significantly reduce or remove flammable vegetation within a prescribed distance from structures. (Refer to Appendix E for the recommended

defensible space area). Defensible space reduces the fire intensity and improves firefighter and homeowner chances for successfully defending a structure against oncoming wildfire.

Property Owner Recommendations

- Remove, reduce, and replace vegetation to create defensible space around homes according to the guidelines in Appendix E. This area should be kept:
  - **Lean**: There are only small amount of flammable vegetation.
  - **Clean**: There is no accumulation of dead vegetation or other flammable debris.
  - **Green**: Existing plants are healthy and green during the fire season.
- Store firewood a minimum distance of thirty feet from structures.
- Clear all dead plant material and combustible materials a minimum of five feet from the exterior of all structures.
- Mow or remove brush growing against fences in the community. The minimum distance for clearance should be ten feet in grass and 25 feet in brush.
- Enclose areas under wood decks and porches when possible or maintain these areas to be free of weeds and other flammable debris. Box in eves and cover ventilation openings with very fine metal wire mesh to prevent embers from entering the attic and crawl spaces.
- Clear all vegetation and combustible materials around propane tanks for a minimum of ten feet.
- Clear weeds and brush to a width of ten feet along both sides of the driveways.
- Maintain a minimum clearance of thirty feet from the crown of trees that remain within the defensible space zone. Keep this area free of smaller trees, shrubs, and other ladder fuels.
- Trim and remove tree branches a minimum of fifteen feet from the ground, but not more than one-third the height of the tree, to reduce ladder fuels on all deciduous and coniferous trees within the defensible space zone. Prune all dead and diseased branches.
- Prune all tree branches to a minimum distance of fifteen feet from buildings, paying special attention around chimneys.
- Install spark arrestors on chimneys.
- Replace wood shake roofs with fire resistant roofing materials.
- Mow grass within the defensible space zone to maintain a maximum height of four inches.
- Thin sagebrush and other shrubs to a spacing between shrubs that is equal to twice the shrub height.
- Replace ornamental junipers in landscaped areas with fire resistant species.
- Immediately dispose of cleared vegetation when implementing

defensible space treatments. This material dries quickly and poses a fire hazard if left on site.

- Where possible, irrigate all trees and large shrubs that remain in close proximity to structures to increase their fire resiliency. This is especially important during drought conditions.
- Where cheatgrass has become dominant within the defensible space zone, areas should be mowed prior to seed maturity or treated with an application of a pre-emergent herbicide.[17] Treatments may need to be repeated for several years to ensure that the seed bank of unwanted annual grass seeds has been depleted. Refer to Appendix E for a recommended seed mixture and planting guidelines that can be used in conjunction with cheatgrass removal.
- Maintain the defensible space as needed.

28.2.2 Fuel Reduction Treatments

Fuel reduction treatments are applied on a larger scale than defensible space treatments. Permanently changing the fuel characteristics over large blocks of land to one of a lower volume and altered distribution reduces the risk of a catastrophic wildfire in the treated area. Reducing vegetation along roadways and driveways could reduce the likelihood of blocking access and escape routes, help contain the fire perimeter, and improve firefighter access and safety for protecting homes.

Utility Company Recommendation

- Reduce and remove vegetation to maintain clearance around power lines. Clear vegetation within fifteen feet of utility poles near the community. Remove all trees from under power lines. Reduce and remove vegetation to maintain a minimum clearance of thirty feet from fences around power substations.

Washoe County Roads Department and Nevada Department of Transportation Recommendation

- Reduce vegetation and maintain roads by mowing all vegetation to a height of no more than four inches for a distance of twenty feet from the edge of the pavement on both sides of the road. Remove biomass and dispose at an appropriate site. Reseed treated areas with fire resistant species such as recommended in Appendix E to minimize cheatgrass and noxious weed invasion.

Union Pacific Railroad Recommendation

- Mow or reduce vegetation within a minimum distance of twenty feet on both sides of the railroad tracks. Reseed according to the recommendations in Appendix E, if necessary to prevent

cheatgrass or other noxious weed invasion. Maintain low growing, low-density fuel volumes within the railroad corridors to reduce the wildfire ignition risk and hazard.

US Forest Service and Property Owner Recommendation

- Construct a greenstrip 100 to 200 feet wide seeded with crested wheatgrass adjacent to structures in burned areas around the community as shown in Figure 28-1.
- Thin Jeffrey pine trees to a basal area of 80 to 100 square feet per acre. Remove ladder fuels in the understory along both sides of the Truckee River. Refer to Appendix E for basal area thinning guidelines.

28.2.3 Fire Suppression Resources and Training

Verdi Volunteer Fire Department and Nevada Division of Forestry Recommendation

- Meet annually with the US Forest Service to review pre-attack plans and to coordinate firefighting resources and response procedures including testing radio compatibility and coverage. Upgrade radios to new narrowband/digital technologies as needed to maintain communications with the federal agencies.

28.2.4 Community Coordination

Property Owners

- Form a local chapter of the Nevada Fire Safe Council. The Nevada Fire Safe Council facilitates solutions to reduce the loss of lives and property from wildfire in Nevada's communities. Through the establishment of a local Chapter, local communities will become part of a large network for sharing information including notification of programs and funding opportunities for fire mitigation projects such as those listed in this report. The Nevada Fire Safe Council will accept and manage grants and contracts on the Chapter's behalf through its non-profit status. The Nevada Fire Safe Council will provide assistance and support to communities to complete fire safe plans, set priorities, educate and train community members, and promote success stories of its members. To form a local Chapter or for more information contact the:

Nevada Fire Safe Council
1187 Charles Drive
Reno, Nevada 89509
www.nvfsc.org

- Assure that address signs are visible from the road. Address

characters should be at least four inches high, reflective, and composed of non-flammable material. Improving visibility of addresses will make it easier for those unfamiliar with the area to navigate under smoky conditions during a wildland fire.

Washoe County Recommendations

- Continue to require all future development in the County to meet the National Fire Codes with regard to community design, building construction and spacing, road construction and design, water supply, and emergency access. Refer to Appendix F for an example of fire safe recommendations for planning new developments.
- Develop and enforce ordinances regarding fuel reduction and defensible space requirements for wildland-urban interface areas. Require defensible space implementation and maintenance on all developed lots and fuel reduction on all vacant lots within the interface area. Require approval by the appropriate fire agency of completed fuel reduction treatments prior to issuance of building permits for new wildland-urban interface developments.
- Facilitate coordinated and collaborative efforts at the County and State levels for consistency in fire safe community planning and enforcement of fire safe ordinances in a unified manner.

Nevada Division of Forestry and Verdi Volunteer Fire Department

- Prepare an evacuation plan and post or otherwise distribute this plan to residents. This plan should include information regarding evacuation routes, evacuation procedures, designated fire safe zones, and procedures for sheltering in place in case evacuation becomes infeasible during a fast moving firestorm.

28.2.5 Public Education

A public education program that explains fire safe measures in clear and emphatic terms will have an impact on residents of the wildland-urban interface. Informed community members will be more inclined to make efforts to effectively reduce wildfire hazards around their homes and neighborhoods.

Nevada Division of Forestry and Verdi Volunteer Fire Department

- Distribute copies of the publication "*Living with Fire*" to all property owners. This publication is free of charge. Copies can be requested from the University of Nevada Cooperative Extension.

Property Owner Recommendation

- As an evacuation plan becomes available, citizens should read and become fully knowledgeable of evacuation procedures, fire safety zones, and safety procedures for sheltering in place in the event that evacuation is not possible.

28.3 Summary of Recommendations

Table 28-2. Verdi Priority Recommendations to Reduce Wildfire Risks and Hazards

Involved Party	Recommended Treatment	Recommendation Description
Property Owners	Defensible Space	Remove, reduce, and replace vegetation around homes according to the defensible space guidelines in Appendix E.
	Community Coordination	Form a local chapter of the Nevada Fire Safe Council. Improve address visibility from the road. Participate in public education opportunities and become knowledgeable of emergency evacuation procedures.
	Fuels Reduction	Coordinate with US Forest Service to create a crested wheatgrass greenstrip in burned areas adjacent to structures. Thin trees to a basal area of 80-100 square feet per acre and remove ladder fuels on both sides of the Truckee River.
Washoe County **Nevada Department of Transportation**	Fuels Reduction	Reduce and remove vegetation in road right-of-ways to maintain an average four-inch vegetation height. Reseed treated areas to minimize cheatgrass and noxious weed invasion.
Union Pacific Railroad	Fuels Reduction	Reduce and remove vegetation within twenty feet on both sides of railroad tracks.
Utility Company	Fuels Reduction	Remove trees and thin shrubs beneath power lines and utility poles. Maintain fifteen feet of clearance around utility poles.
Washoe County	Community Coordination	Continue to require all future development in the County to meet the national fire codes with regard to community design, building construction, road construction, water supply, and emergency access. Develop and/or enforce laws and regulations for defensible space and fuels reduction that include absentee homeowners, vacant lots, and new subdivisions. Facilitate coordinated and collaborative efforts at the County and State levels for consistency in fire safe community planning and enforcement of fire safe ordinances in a unified manner.
Nevada Division of Forestry **Verdi Volunteer Fire Department**	Resources and Training	Meet annually with the US Forest Service to discuss pre-attack plans for the community and test radio compatibility.
	Community Coordination	Develop an emergency evacuation plan for Verdi area.
	Public Education	Distribute copies of the publication "*Living with Fire*" to all property owners.
US Forest Service	Fuels Reduction	Coordinate with property owners to construct a crested wheatgrass greenstrip in burned areas adjacent to structures. Thin trees to a basal area of 80-100 square feet per acre and remove

		ladder fuels on both sides of the Truckee River.

Table 28-3

Verdi Wildfire Hazard Rating Summary

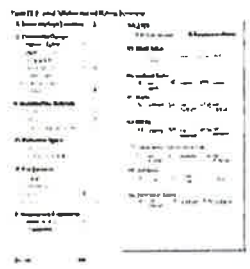


Figure 28-1

Verdi Fire History, Suppression Resources, Critical Features, and Proposed Mitigation Projects

small | large | x-large

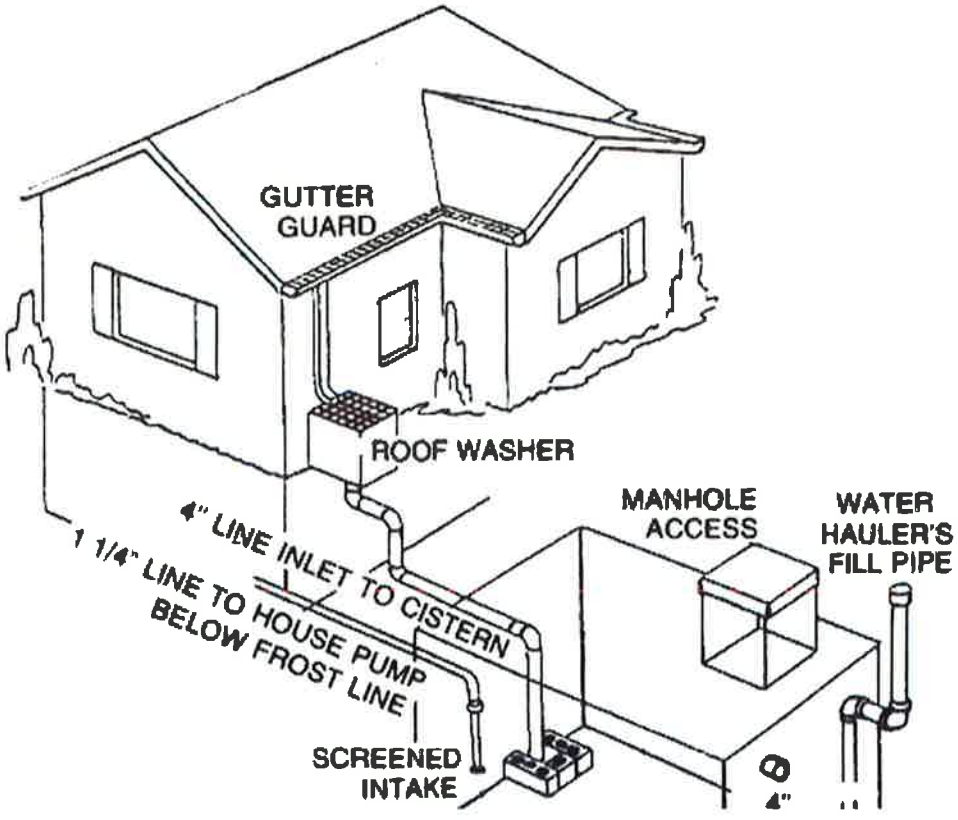
<-- 27.0 Sutcliffe ^ Table of Contents ^ 29.0 Washoe City -->

Rainwater Cisterns: Design, Construction, and Treatment

Roof-catchment cisterns are systems used to collect and store rainwater for household and other uses.

ARTICLES | UPDATED: AUGUST 24, 2017

A system of gutters and downspouts directs the rainwater collected by the roof to the storage cistern. The cistern, typically located underground, may be constructed of various materials including cinderblock, reinforced concrete, or precast concrete, fiberglass, or steel. The cistern supplies water to the household through a standard pressurized plumbing system. A typical arrangement for a roof-catchment cistern system is shown in Figure 1.



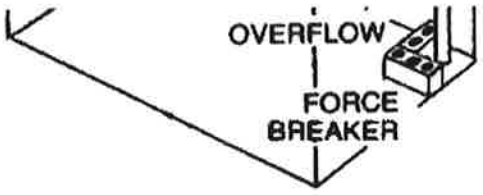


Figure 1. Typical roof-catchment cistern system. (Source: Water Filtration Co. customer information brochure. Water Filtration Co., 1088 Industry Rd., Marietta, Ohio 45750.)

The use of rainwater cisterns is by no means new. They were utilized by both Greek and Roman civilizations, as well as by Pacific island inhabitants prior to any contact with western civilization. Nevertheless, the same basic principles of modern-day systems were used in the roof-catchment cisterns of these earlier times.

Current use of rainwater cisterns may be increasing. Those who live in areas where groundwater and surface water are unobtainable or unsuitable for use have been compelled to resort to other sources of water. Rainwater collection on a household scale is quite practical in areas where there is adequate rainfall, and other acceptable sources of water are lacking. The coal strip-mining region of western Pennsylvania is one such area. Mining has rendered much of the ground and surface water unfit for drinking or other uses in large portions of these areas. Rural residents have been forced to find other sources of water and they have invariably turned to roof-catchment cisterns.

Roof-catchment cisterns may also be used to supply water to farms. Watering troughs and rain barrels can be filled by water collected from barn and other out-building roofs. A storage cistern built alongside a barn or other building could serve as an emergency source of water for firefighting in the event that a pond were not nearby. However, the use of rainwater for supplying domestic water needs is not without its problems.

Water *quality* is of concern especially when the rainwater is to be used for drinking purposes in addition to other domestic uses. Rainwater and atmospheric dust that are collected by roof catchments contain certain contaminants which may pose a health threat to those consuming the water. Lead and other pollutants may accumulate in cistern bottom sediments; and untreated rainwater is quite corrosive to plumbing systems. Measures must be taken to minimize these and other water-quality problems in cistern systems. Recommendations for doing this will be presented, as well as guidelines for designing and building roof-catchment cistern systems.

Rainwater cisterns can provide water of adequate quantity and quality if proper steps are taken in the planning and construction stages, and periodic maintenance is performed throughout the life of the cistern.

Cistern design

The storage capacity of a rainwater cistern depends on several factors:

- the amount of rainfall available for use
- the roof-catchment area available for collecting that rainfall
- the daily water requirements of the household
- and economics

All but the first of these factors can be controlled to some extent by the cistern owner.

Available rainfall

Across most of Pennsylvania, annual rainfall averages around 40 inches (Figure 2). During drought years there may be as little as 30 inches, while excessively wet years may produce 50 or more inches of rainfall. For most planning purposes, the average figure should be used. However, designing a cistern based on the lowest figure would guarantee enough storage to get you through even the driest years.

Due to evaporative, snow and ice, and roof-washer losses (to be discussed later), only about two-thirds of the annual total rainfall is actually available for cistern storage.

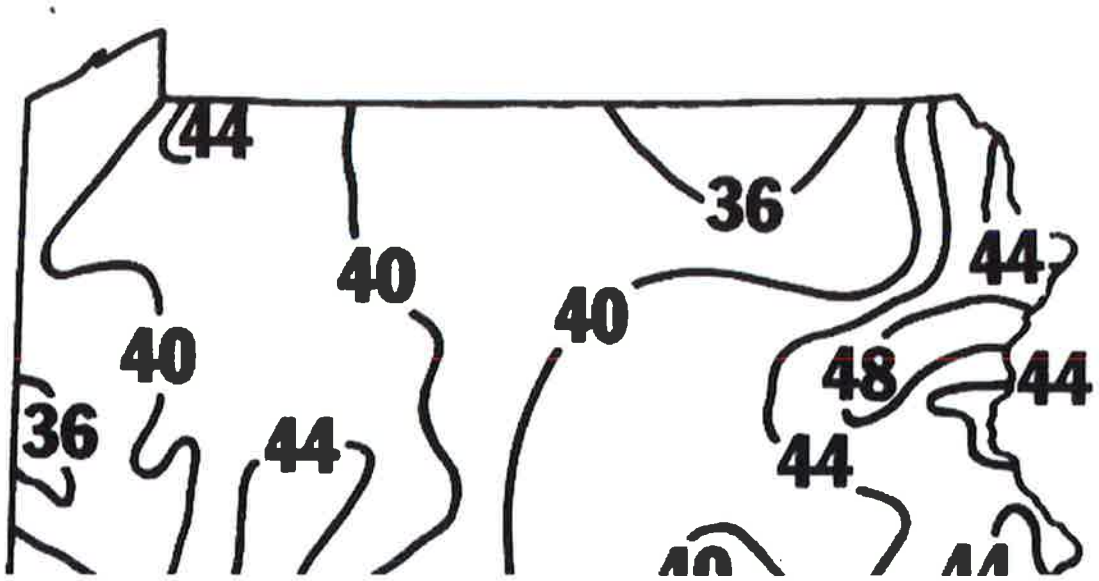


Figure 2. Average annual precipitation for Pennsylvania (inches)

Daily water needs

The amount of water you design your roof-catchment cistern to collect and store depends upon your daily water needs. If you have a small catchment area and low-volume cistern then your water use will be limited accordingly. So it is important when designing a roof-catchment cistern system to have some idea how much water you will require from it every day.

Various estimates of household water use have been published. The average base use determined by water utilities is 7500 gallons per month, which is equivalent to an average yearly minimum need of 90,000 gallons per household. Common household planning provides for 50 to 75 gallons a day per person, or 73,000 to 110,000 gallons a year for a family of four. One-third to one-half of this amount is used for flushing toilets. However, those who must rely solely on rainwater-fed supplies will undoubtedly use less water.

Studies of water use in the U.S. Virgin Islands and Hawaii, where rainwater cisterns are used extensively, indicate that this is generally the case. Water use from rainwater cisterns in the U.S. Virgin Islands averaged only 24 gallons a day per person for owner-residents. However, in Hawaii, where rainfall is much more plentiful (up to 160 inches annually) cisterns tended to be much larger and water use was considerably greater-over 100 gallons a day per person in many cases. Nevertheless, in both situations steps to conserve water were voluntarily implemented when cistern levels fell to low levels. As one cistern owner in the Virgin Islands commented, "We can make the last quarter of our cistern supply last about as long as the first three quarters."

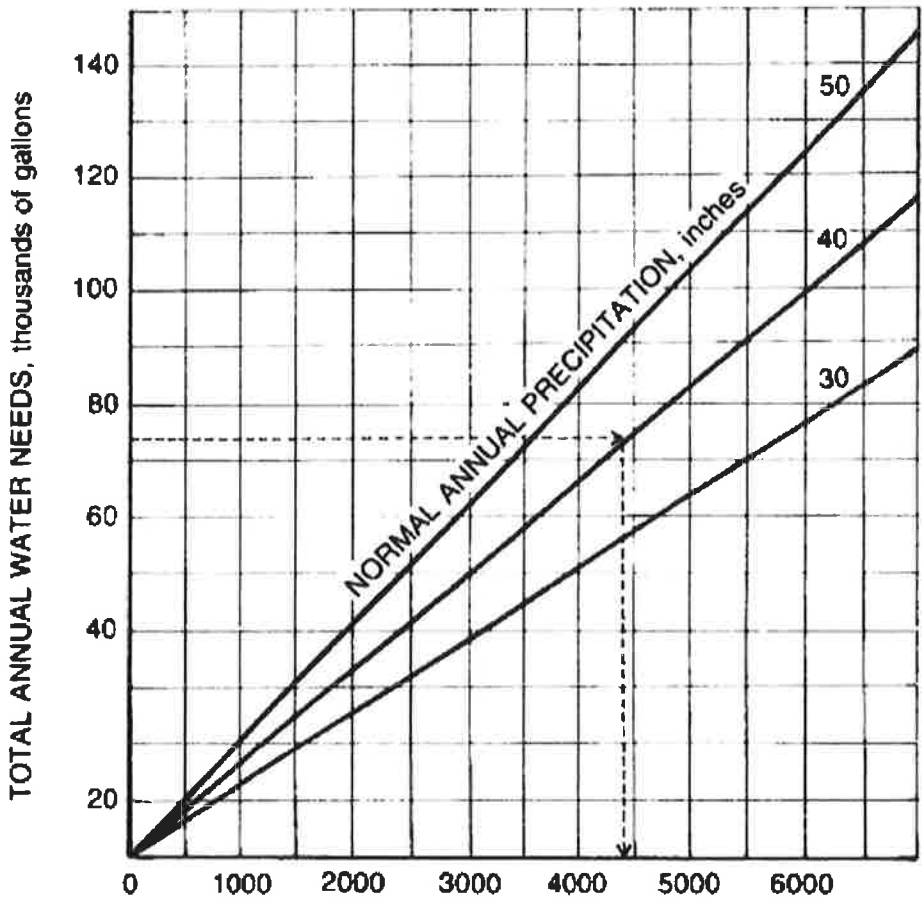
It should be clear from this brief discussion of water use that there is considerable variation, depending on the circumstances. For purposes of general cistern design, the figure of 50 gallons a day per person is probably the best one to use. This figure would be applicable to a family living in a home with hot and cold running water and all the modem conveniences (including automatic washer and dishwasher), and no special water conservation measures.

The installation of water-saving devices could considerably reduce household water use with no conscious effort on the part of family members.

Catchment area

The roof area to be used as the collection surface is usually predetermined by the size of the existing house or other outbuilding roofs. However, when planning a rainwater collection system from the ground up, where the size of the catchment is to be designed to suit domestic water needs, the following guidelines will be useful.

Figure 3 allows the catchment area required to be determined based on annual water needs and annual precipitation. As an example, suppose the average annual precipitation or your area is 40 inches. You have determined that your family of four requires 200 gallons a day or 73,000 gallons annually. From Figure 3 the needed catchment area is determined to be 4400 square feet. Note: Roof area can be determined by measuring the outside of the building or buildings to be used to collect rainfall. Do not measure the actual roof surface unless it is horizontal.



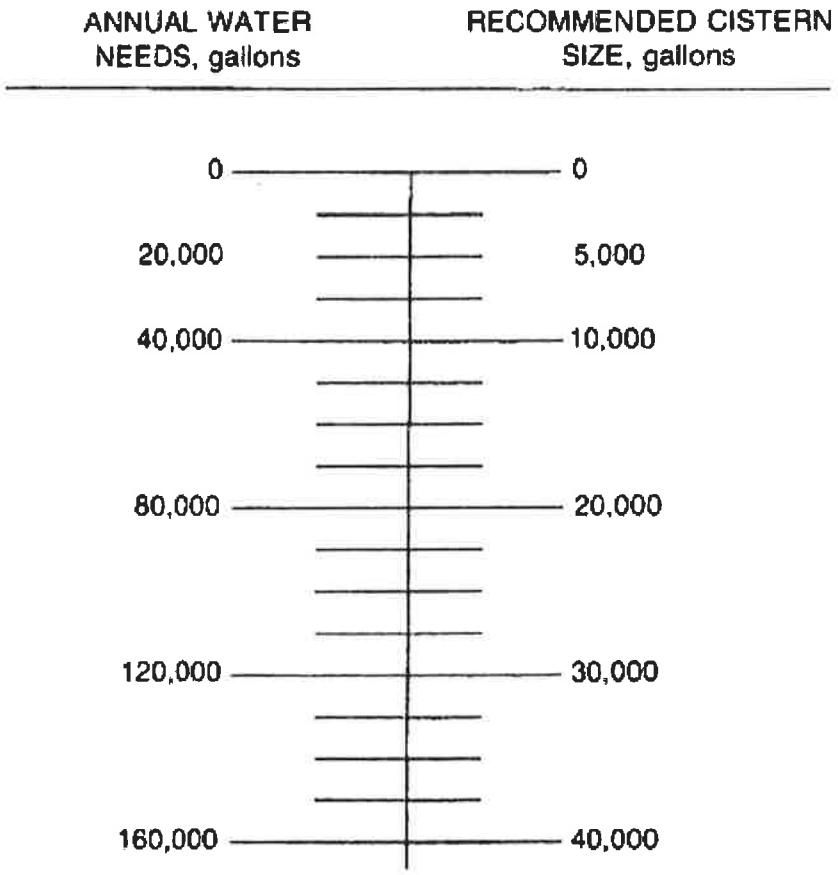
CATCHMENT AREA, square feet

Figure 3. Graph used to determine catchment area needed. (Source: Midwest Plan Service, Iowa State Univ. 1968. Private Water Systems. p. 13.)

Cistern size

A cistern should have sufficient storage capacity to carry the household through extended periods of low rainfall. A three-month supply of water, or one-fourth of the annual yield of the catchment area, is generally adequate in areas such as Pennsylvania where the rainfall is distributed fairly evenly over the course of the year.

Figure 4 illustrates this idea. For example, if you have determined your annual domestic water needs to be 40,000 gallons (and, most importantly, you have enough catchment area and annual precipitation to supply this amount of water), then you should design and build a cistern with a 10,000-gallon storage capacity.



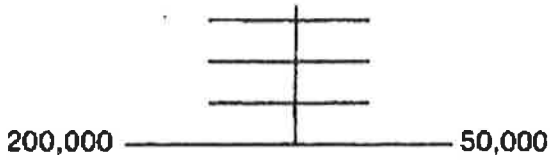


Figure 4. Cistern size based on a storage capacity equal to ¼ of the annual water needs or a three-month supply of stored water. (Source: Midwest Plan Service, Iowa State Univ., 1968. Private Water Systems. p. 15.)

A minimum storage capacity of 5000 gallons is recommended for domestic cisterns. This capacity should eliminate having to buy or haul water, a practice that is not only inconvenient but can become somewhat costly. Remember these words of wisdom when designing your roof-catchment cistern: "You pay for a large cistern once and a small one forever..."

Cistern construction

Location

Cisterns should be located as close as possible to the house or wherever the water is to be used. They may be built above or below ground, but below-ground cisterns are recommended in this part of the country to avoid freezing during the winter months. Underground cisterns also have the advantage of providing relatively cool water even during the warmest months of the year. Cisterns may be incorporated into building structures, such as in basements or under porches. This way you can use foundation walls for structural support as well as for containment of stored rainwater.

A cistern should be located where the surrounding area can be graded to provide good drainage of surface water *away* from the cistern. Avoid placing cisterns in low areas subject to flooding. Both of the above steps will reduce the chance of storm runoff contaminating the stored cistern water.

Cisterns should always be located upslope from any sewage disposal facilities; at least 10 feet away from watertight sewer lines and drains, at least 50 feet away from non-watertight sewer lines and drains, septic tanks, sewage absorption fields, vault privies and animal stables, and at least 100 feet away from sewage cesspools and leaching privies.

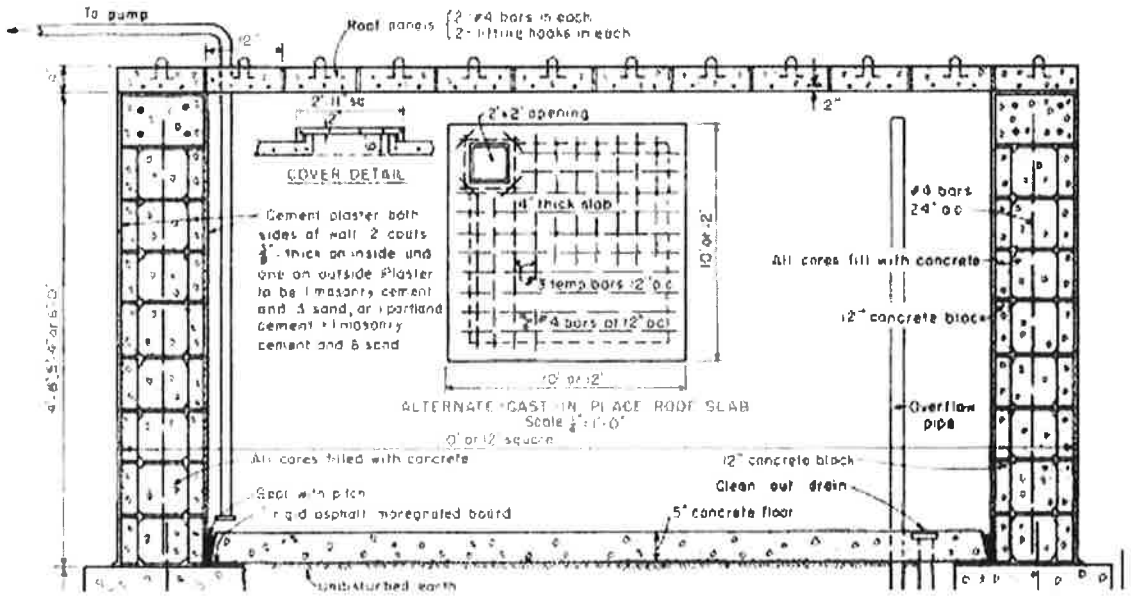
It pays to check these things out carefully *before* turning the first shovelful of earth for the cistern excavation. A contaminated cistern is not worth very much.

In certain situations, such as a barn or other outbuilding roof that supplies collected rainwater to a house downslope, cisterns may be located so as to provide gravity flow to the place of use. This setup is definitely preferable if it can be worked into your particular system. However, in most cases the level of water stored in underground cisterns is lower than the points of use within the distribution system so a pump and pressurized system are usually required.

Construction

Cisterns can be constructed from a variety of materials including cast-in-place reinforced concrete, cinderblock and concrete, brick or stone set with mortar and plastered with cement on the inside, ready-made steel tanks, precast concrete tanks, redwood tanks, and fiberglass. Cast-in-place reinforced concrete is considered best, especially for underground cisterns. However, cinderblock-walled cisterns with concrete floors are common and are quite satisfactory for below-ground construction; these will usually be somewhat less expensive than the all-concrete version. Concrete walls and floors should be at least 6 inches thick and reinforced with steel rods.

Two plans for below-ground concrete cisterns are shown in Figures 5 and 6. Figure 5 shows a concrete block-walled version and Figure 6 shows an all-concrete version with a sand and gravel filter on top of the cistern.



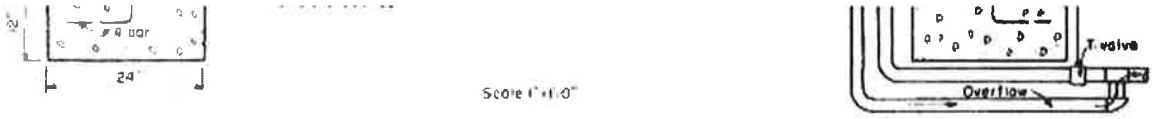


Figure 5. Cross section of a concrete block-walled below ground cistern, showing important features. (Source: Penn State Ag. Ext. Service, Order #800-86 Concrete Masonry Cisterns)

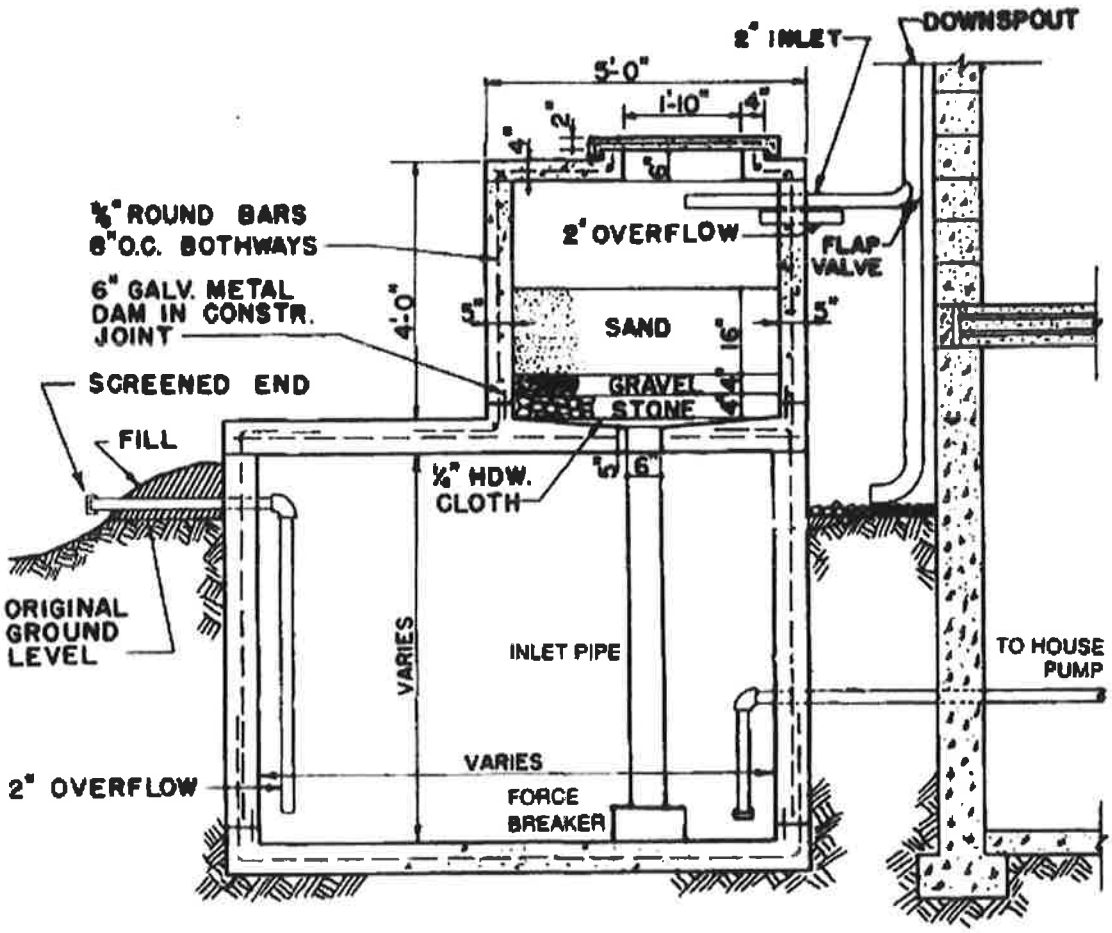


Figure 6. Cross section of concrete cistern with filter (Source: Penn State Ag Ext. Service, Order #800-87 Concrete Cisterns)

If cinderblock or concrete block is used for the walls of the cistern, all hollow cores should be filled with concrete and reinforcing rods should be placed vertically to add strength to the structure. Footers may be necessary for larger cisterns, as shown in Figure 5.

The top of the cistern should be of reinforced concrete and should fit tightly onto the rest of the structure. The top may consist of individual panels as shown in Figure 5, or it may be a one-piece slab, like that shown in Figure 6. In any event, a manhole through the top of the cistern to allow access to the storage tank should be included. Such an opening should be at least 2 feet across. A heavy concrete or iron lid like that shown in Figures 5 and 7 should be fitted tightly over the opening to prevent the entrance of light, dust, surface water, insects and animals.

Manhole openings should have a watertight curb with edges projecting several inches above the level of the surrounding surface. The edges of the manhole cover should overlap the curb and project downward a minimum of 2 inches. Manhole covers should be provided with locks to further reduce the danger of contamination and accidents.

Place the manhole opening near a corner or an edge of the structure so that a ladder can be lowered into the cistern and braced securely against a wall. This access is necessary for the periodic maintenance tasks, to be discussed later. An alternative is to build concrete steps and handholds into the cistern wall beneath the opening.

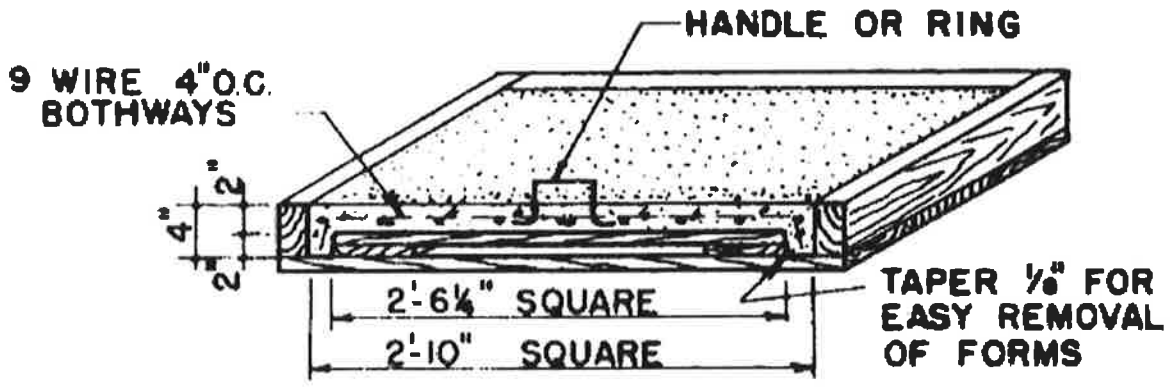


Figure 7. Section thru form for manhole cover.

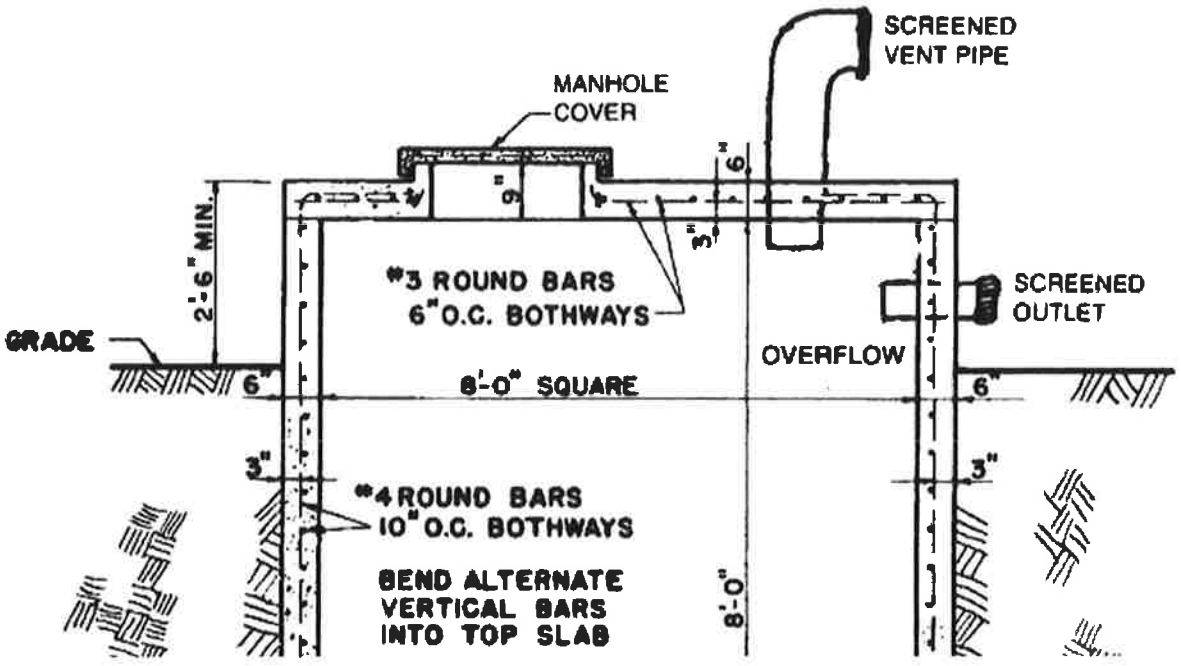
The interior walls and floor of the cistern should be smooth to make cleaning easier. A cement plaster can be spread over the interior, depending on how rough the basic construction is. Cement-base sealants, such as Thoroseal and Sure-Wall, can be applied to the interior as well, to provide a smoother finish and further protection against leakage. A cistern that leaks is not only useless but it is dangerous as well; if stored water can leak out, contaminated surface or

ground water can leak in. It is worth the time when building a cistern to do it right--get a good builder who will guarantee his work against leakage.

Vinyl liners may be used to prevent leakage in some cisterns, but they are usually troublesome. They are expensive, prone to puncture, and they prevent the use of cleanout drains and other accessories inside the cistern. Try a vinyl liner only as a last resort when all other efforts to prevent leakage have failed.

Another important feature of a well-designed cistern is an overflow pipe or pipes. Two different possibilities are shown in Figures 5 and 6. In Figure 5 the overflow is in the form of a standpipe that leads through the floor of the cistern to a drain. Such an overflow pipe, or any other cistern outlet for that matter, should never be connected to a sewer line, either directly or indirectly. The drain line shown in Figure 5 should lead to a free outlet downslope from the cistern. The diameter of the overflow pipe should be at least as large as the diameter of the inflow pipe from the roof catchment. Figure 6 shows an overflow pipe leading through a wall of the cistern directly to the outside.

The outside end of an overflow pipe should be *effectively* screened to prevent the entrance of animals and insects. A fine-mesh rust-proof screening should be used. The screening can be cut to a size large enough to be wrapped over the end of the overflow pipe and should be secured with a hose clamp or similar fastening device. A simple overflow design is pictured in Figure 8.



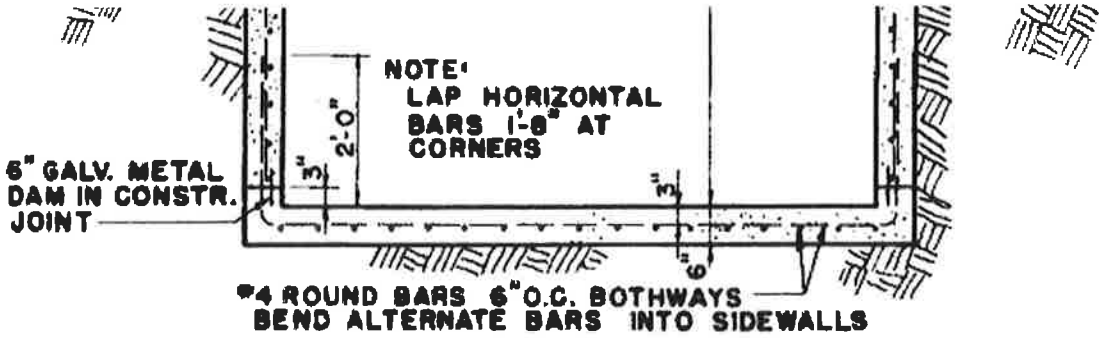
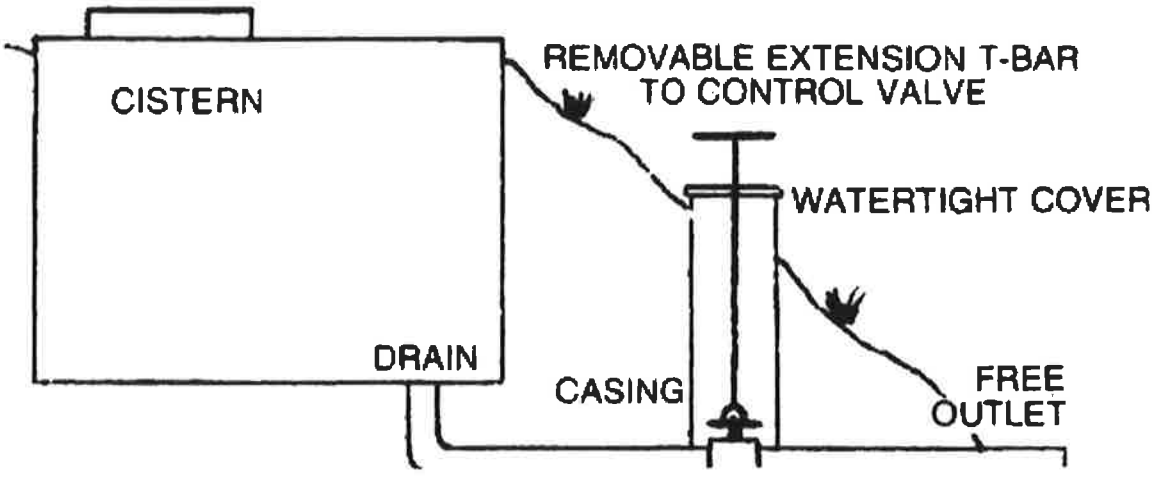


Figure 8. Cross section of 8' x 8' cistern showing overflow pipe, manhole, and vent pipe.

Large-diameter plastic pipe should be used for the overflow pipe in any case. Good drainage away from the cistern and house should be provided, when designing overflow outlets like those shown in Figures 6 and 8.

A cleanout drain should lead to a free outlet and never a sewer line. The floor of the cistern should be sloped slightly toward the drain to facilitate cleaning. A valve to open and close the drain could be controlled from above ground level as shown in Figure 9, or an underground pit could be built around the valve to provide direct access. See Figure 10. In either case, the valve and drain line should be insulated by a sufficient depth of earth to prevent freezing during even the most severe winter weather.

A cleanout drain line should be at least 3 or 4 inches in diameter to avoid clogging--a large amount of sediment may have to move through the line during cleaning operations. The outlet should be located where draining water will not cause any problems or complaints from neighbors.



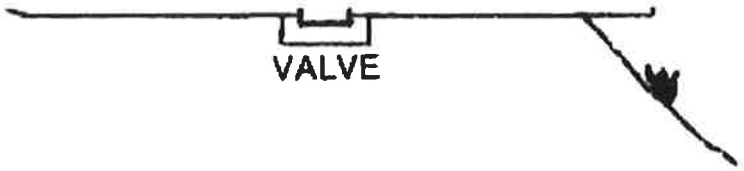


Figure 9. Plan for cleanout drain and control valve.

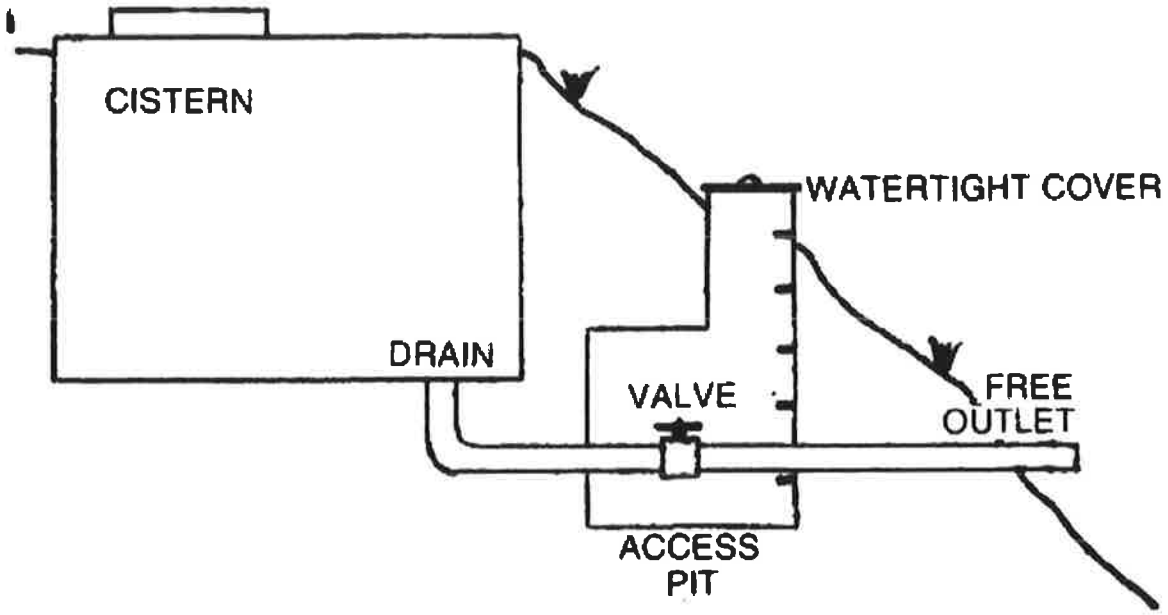


Figure 10. Plan for cleanout drain and control valve.

Cisterns should be *vented* to allow fresh air to circulate into the storage compartment. One or more large-diameter pipes through the top of the cistern will serve this purpose, as shown in Figure 8. The outside opening of each pipe should be screened in the same manner as that described above for overflow pipes. The openings, located several feet above ground level, should face the direction of the prevailing winds, west in most cases, to maximize ventilation. Four- or six-inch diameter plastic pipe is good for vents. Make sure there is a watertight seal where each vent pipe goes through the top of the cistern.

The water line from the cistern to the house or other place of use should be buried below the frost line and should be 1 or 1¼ inches in diameter. The intake head should be effectively screened and elevated a minimum of one foot above the floor of the cistern to prevent sediment from being drawn into the distribution system. The portion of the intake pipe within

the cistern should be plastic. The best position for the intake is on the opposite side of the cistern from the roof-water input pipe.

A separate input pipe for adding hauled water is another important feature of the well-designed cistern. The system pictured in Figure 1 shows such a pipe. Where possible, it is best to locate the above-ground portion of the fill pipe near the driveway or other road surface, so that the water truck will not have to drive over your lawn to reach it. Four-inch plastic pipe makes a good fill pipe. A tight-fitting cap should be placed over the above-ground end of the pipe. You may want to padlock the cap to further reduce the possibility of contamination.

Water entering a cistern with any kind of force behind it, as during a summer thundershower, or from a water truck, tends to agitate the stored water and possibly stir up sediment unless steps are taken to lower the force of the incoming water. One way of doing this is through the use of "force breakers," as pictured in Figure 11.

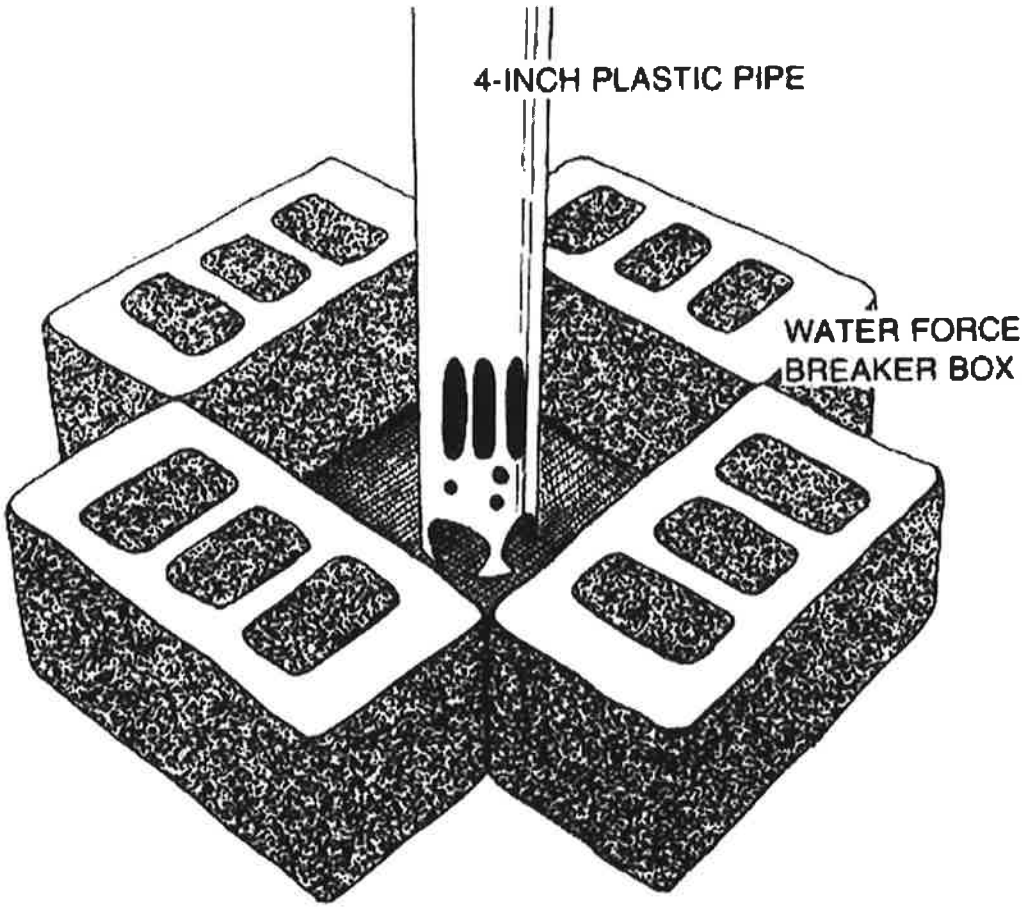


Figure 11. Water force breaker. Should be placed at all inlets to the cistern. (Source: Water Filtration Co. customer information brochure. Water Filtration Co., 1088 Industry Rd., Marietta, Ohio 45750.)

Water entering the cistern from either the roof or a water truck should travel down a 4-inch plastic pipe into a force breaker box made from concrete blocks. The blocks should be set in mortar on the floor of the cistern with the cavities facing up. Slots or openings with an area of at least 13 square inches need to be cut into the lower end of the pipe to allow the incoming water to move from the pipe to the cistern. Force breakers should be installed under both roof-water and water-hauler inlets.

Roof washers

There are several other very important construction features that will help insure good quality cistern water. Roof washers and roof-water filters were mentioned earlier, and their importance and construction details will be discussed here.

A lot of dirt and dust collects on the roof-catchment surface between rainstorms. This debris can include particles of lead and other atmospheric pollutants as well as bird droppings. These contaminants will enter the cistern along with the roof water unless steps are taken to prevent contamination. The use of roof washers and roof-water filters can reduce the amount of these contaminants entering the system.

The first water to come off the roof at the beginning of a rainstorm is the most contaminated. The degree of contamination will depend on several things including the length of time since the last rainfall, proximity of the catchment to a highway or other local source of airborne pollution, and the local bird population. Also, certain types of materials are preferable for the catchment surface, as will be detailed later.

A roof washer is a mechanism that diverts this initial, highly contaminated roof water away from the cistern. Once the catchment surface has been washed off by an adequate amount of rainfall, the roof water is once again routed to the cistern for storage. Usually the first 0.01 inch of rainfall is considered to be adequate to remove most of the dust and dirt from the surface of the catchment. In this way, only the cleanest roof water is collected in the cistern, whereas the contaminated roof wash is discharged to waste.

There are several ways of accomplishing this. The roof water can be diverted manually through a series of valves within the spouting system, or automatic roof washers may be fabricated by the cistern owner or purchased from commercial distributors.

A simple roof-wash diverter is shown in Figure 12. This particular design requires manual operation of a flap valve to control the flow path of the roof water within the spouting system. Such a valve would be necessary on each downspout unless they all converged into a single pipe just before emptying into the cistern. This single-valve arrangement is definitely preferred since the operation of this type of diverter requires someone to go out and close the valve shortly after the rain begins, allowing the roof water to flow into the cistern. The valve should be located so that it can be reached or controlled from a covered porch or other roofed area adjacent to the house or cistern.

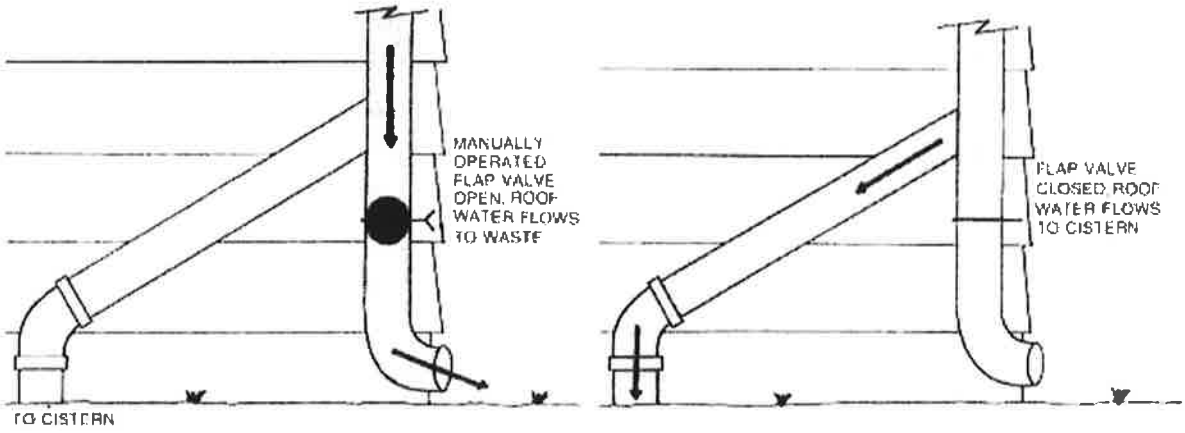


Figure 12. A simple roof-wash diverter.

During periods when rains are separated by only brief periods of time (less than a day), it would not be necessary to divert the initial roof wash every time it began to rain. However, it is important to divert the initial roof water produced by the first rainfall following an extended dry period.

As far as determining how much roof water to allow to run to waste before routing it to the cistern, this will vary for each storm. You can use the visual appearance of the roof water as an indicator--if it runs clear to your eye when collected in a clear glass jar, then you can direct the water to the cistern for storage and subsequent use. Or, you can place a large 10- to 20-gallon container under the down-spout draining to waste. The container should be sized to suit your

particular roof area--10 gallons per 1000 square feet of roof area. So, at the beginning of a rainstorm the dirty roof water is directed into the container; when it is full, you know that the catchment has been sufficiently rinsed and the roof water can thereafter be routed to the cistern. For this type of arrangement, a single roof-water collection vessel for the entire catchment would be best. Adequate drainage, such as into a gravel-filled hole, should be provided for the roof water that is to be wasted, whether or not it passes through a collection vessel first.

Figure 13 is an illustration of an automatic roof-wash diverter that does not require someone's presence to operate at the start of a rainstorm, as was the case for the previous design. The basic principle is the same. A certain quantity of contaminated roof water at the beginning of a rainstorm is collected in a vessel so that it cannot enter the cistern. Once the catchment has been rinsed off by a sufficient quantity of water, the roof water is again routed to the cistern. For the design pictured in Figure 13, the volume of the collection vessel should be 10 gallons per 1000 square feet of roof area. If more than one collection vessel is necessary, as in the case of a very large catchment, then the size of the vessels should be adjusted accordingly to provide for the entire catchment area.

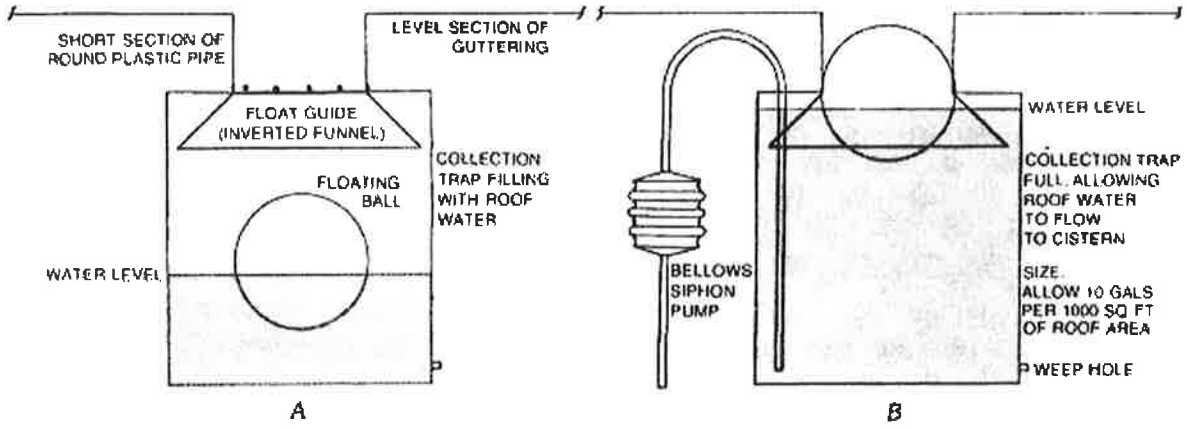


Figure 13. Automatic roof-wash diverter. (Adapted from Jenkins, D. and F. Pearson. 1978. Feasibility of Rainwater Collection Systems in California. Calif. Water Resources Center, Univ. of Calif., Contrib. No. 173, p. 51.)

The design shown in Figure 13 is a fairly generalized one, in that few specifics are given for the components of the homemade roof washer. The collection vessel could be a large plastic or glass bottle, or a rain barrel or other similar container. Regardless of the type of container that

is used, several important features should be included in such an automatic roof washer. These include a float to seal off the vessel or collection trap when full, tapered guides to insure that the float will not become lodged off to one side of the opening as the vessel fills, and provision for draining the collection vessel between storms.

A buoyant plastic ball several inches in diameter will serve as the float in an automatic roof-wash diverter fashioned after that shown in Figure 13. Of course the ball must be slightly larger in diameter than the section of pipe leading into the top of the collection trap. This will keep the dirty roof water collected in the trap from escaping and flowing to the cistern once the trap is full. A soft rubber strip may be fastened around the lip of the pipe at the top of the collection trap where the ball will come to rest, to improve the seal.

As the collection trap fills and the float rises to the top, the float should be guided to the input pipe opening by means of an inverted funnel or similar device. Otherwise, the float may become lodged off to the side and thus will not block off the inflow pipe. The funnel or float guide should extend far enough toward the sides of the collection trap so that the float cannot possibly be caught up between the edge of the guide and the side of the collection trap. The float guide can be flared and attached to the input pipe by means of rustproof bolts, as pictured in Figure 13A. A plastic float guide is preferable; however, other materials such as galvanized steel, sheet aluminum, or tin are also acceptable for use in this portion of the roof-catchment system.

Some provision must be made for draining the automatic roof-wash diverter between rainstorms. This can be accomplished in a number of ways. Two are shown in Figure 138. Either a simple bellows siphon pump or a small-diameter weep hole can be used to drain the water out of the collection trap. Although both of these mechanisms are shown in Figure 138, only one of the two would be required in an actual system. If a siphon-pump were used, someone would be required to operate it following each rainstorm. The end of the siphon tubing inside the collection trap should be positioned at least ¼ to ½ inch above the bottom of the collection trap, to avoid the layer of sediment that will accumulate there. If you decide to use a weep hole to drain your roof-water collection trap, it should be drilled through the side of the collection trap about ½ inch above the bottom and 1/16 inch in diameter. This will allow the water to slowly drain out of the collection trap during non-rain periods, yet the water will drain out slowly enough that very little will be lost during a rainstorm. A third method of draining the collection trap would simply be to install a faucet with valve on the side or bottom of the collection trap. The valve would be closed during rainfall events and opened

during non-rain periods. This arrangement would also require someone to be there to operate the valve, although it could be done at one's leisure during non-rain periods.

Regardless of the type of waste outlet used on the collection trap, it should lead into a gravel-filled hole or to air, never into a sewer line. Also, a layer of sediment will accumulate on the bottom of any roof-water collection trap, necessitating periodic cleaning. These factors should be considered when planning the location and fitting of these units in your particular system.

If you do not want to construct your own roof-wash diverter, commercial units are available from a variety of suppliers. The one pictured in Figure 14 is made by Water Filtration Co., 1088 Industry Rd., Marietta, Ohio 45750.

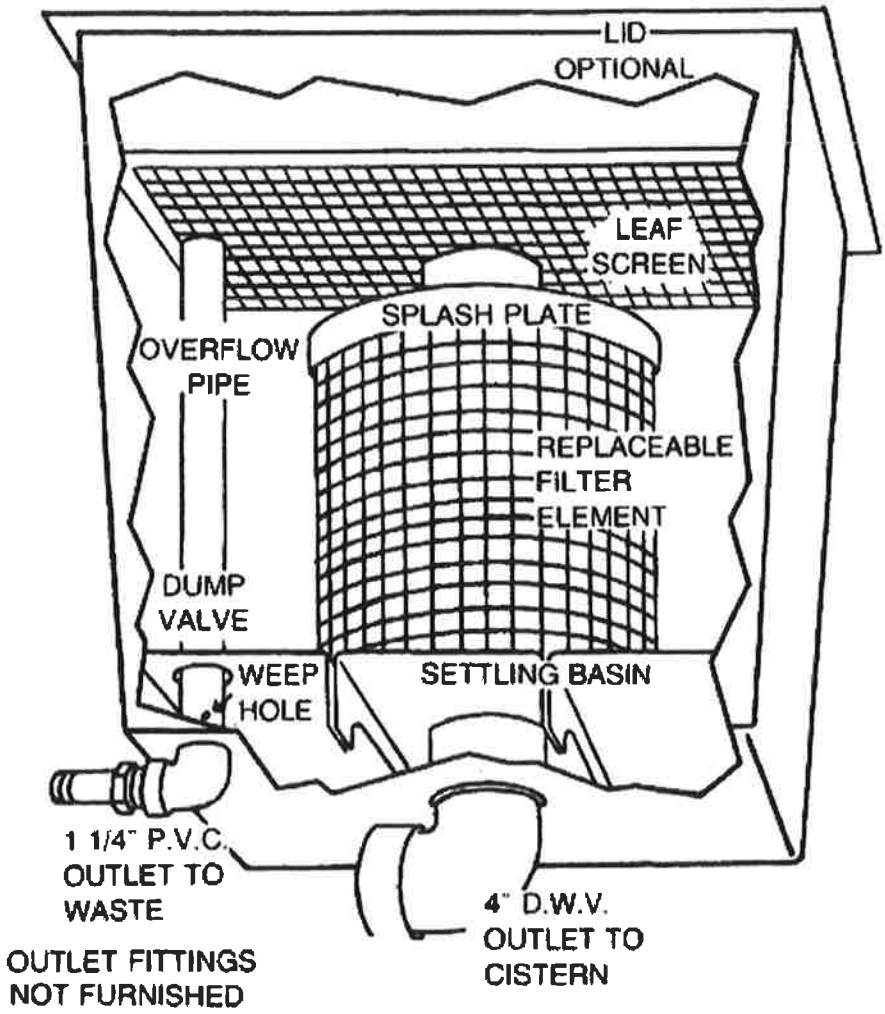


Figure 14. Commercially available filter-type roof washer. (Source: Water Filtration Co.

customer information brochure. Water Filtration Co., 1088 Industry Rd., Marietta, Ohio 45750.)

Roof-water filters

In addition to roof washers, your roof-catchment system should also include a roof-water filter located between the catchment and cistern. Such a filter will primarily serve to remove gross particulates and associated contaminants from the water before it enters the cistern. It can also serve to neutralize the acidic rainwater to some extent if limestone is used for the gravel and stone portions of the filter.

One possible design for a roof-water filter was pictured in Figure 6. The filter box could be totally or partially buried underground to lessen the chances of freezing during the winter months. The filter box shown in Figure 6 is of reinforced concrete with walls and top a minimum of 4 inches thick. A short section of precast concrete culvert pipe could also function as a filter box; a lid or top would be required, however. A manhole and cover similar to that described previously for the cistern itself should also be built into the top of the filter box to provide access for periodic inspection and maintenance. If the filter box is positioned directly on top of the cistern, as shown in Figure 6, be certain that there is a watertight seal where the two join.

Several layers of gravel and sand will make up the filtering medium. The total thickness of the filtering material should be a minimum of 12 inches and a practical maximum of around 3 feet, depending upon the area of the catchment and size of the filter box. A filter the size of that shown in Figure 6 would be adequate for a roof area of up to 2000 square feet for all but perhaps the most intense rainfalls. For this reason, an overflow should also be built into the filter box, as shown in Figure 6. Mesh hardware cloth (¼- to ½-inch) or aluminum screening is placed on the bottom of the filter box (on the inside) before the gravel and sand are placed. This will keep the filtering material in place.

A cross-section of a typical roof-water filter is shown in Figure 15. Sizes and depths of the sand and gravel layers are shown in detail. Limestone should be used for the gravel and stone portions of the filter. Clean filter sand and gravel must be used, and the entire filter box should be cleaned and disinfected before the sand and gravel are placed. The completed system should also be disinfected with chlorine. Before placing the filter sand and gravel, wash down the interior of the filter box with a disinfecting solution of ¼ cup of 5 percent chlorine bleach

mixed with 10 gallons of water. Use a brush to thoroughly wash all interior surfaces. After the sand and gravel are in place, a gallon of 5 percent chlorine bleach should be added to the filter, the filter filled with clean water and allowed to stand for 24 hours. After this period of time, the chlorine solution should be drained from the filter and clean water should be run through the filter until the chlorine smell dissipates and the water is clear.

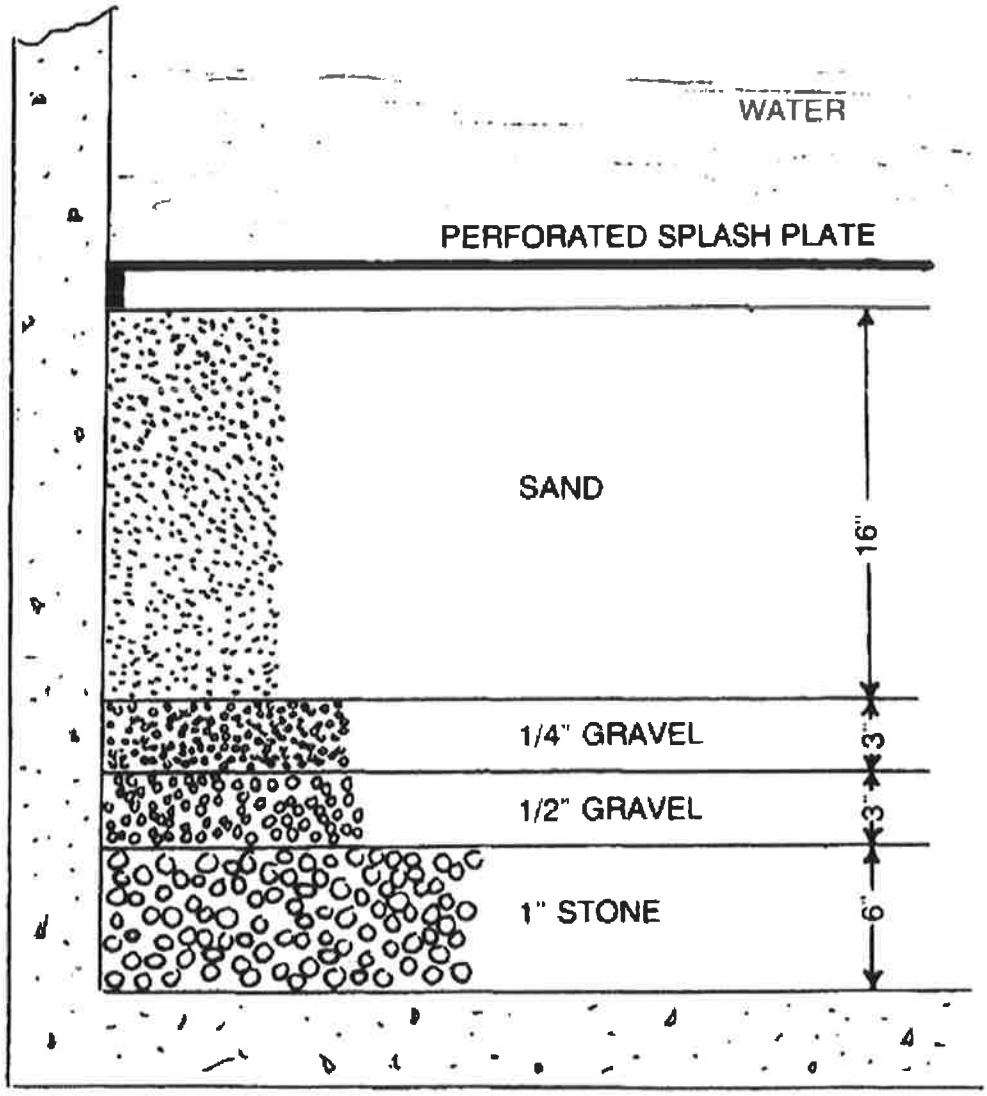


Figure 15. Sand and gravel sizes and depths for a roofwater filter. (Adapted from Midwest Plan Service, Iowa State Univ. 1968. Private Water Systems., p. 53.)

A perforated splash plate is also pictured in Figure 15. It is located approximately 2 inches above the top of the sand and serves to break the force of the incoming water, spreading it

evenly over the top of the filter sand. In this way the sand will be disturbed as little as possible. A non-metallic material such as wood or plastic should be used as a splash plate. Half-inch holes should be drilled through the splash plate on 2-inch centers. Supports for the splash plate should be built into the walls of the filter box, thus allowing for easy removal and refitting of the plate for inspection and maintenance of the filter.

Any filter will tend to clog over time and will require periodic maintenance. This may entail the removal of portions of the filter medium and replacement with new sand or gravel. Whenever such replacement is necessary, the entire filter box should be cleaned and disinfected following the procedure described earlier. Periodic inspection of the roof-water filter in your system should provide visual evidence of a malfunction or clogged condition requiring remedial action.

Roof catchments

As mentioned previously, certain types of roofing materials are more suitable than others for use as collection surfaces for rainwater cisterns. Those most suitable for catchments are asphalt shingle, slate, and sheet metal (tin or aluminum). The following factors should be considered when planning a roof-catchment cistern system:

- Rough-surfaced roofing materials will collect dirt and debris which will affect the quality of the runoff.
- Some painted surfaces, some wood shingles, and some asphalt shingles may impart objectionable taste or color.
- All gutters and downspouts should be easy to clean and inspect.
- The roof area should be large enough to supply the amount of water needed.
- The atmosphere in your area may contain undesirable or harmful pollutants that might affect the quality of the collected rainwater.
- Before using a roof coating, consult local health authorities concerning possible toxicity of the material.

Gutter guards should also be installed along any roof catchment. Aluminum screening or ¼-inch or ½-inch mesh hardware cloth can be cut into strips and secured over the top of open gutters, as shown in Figure 16. Gutter guards will keep leaves, twigs, and animals out but let water in. Also remove any tree limbs overhanging the catchment. You may also want to

remove nearby trees that contribute leaves and twigs to the catchment; or, if you're planning a new home and cistern system, don't plant trees right next to the house.

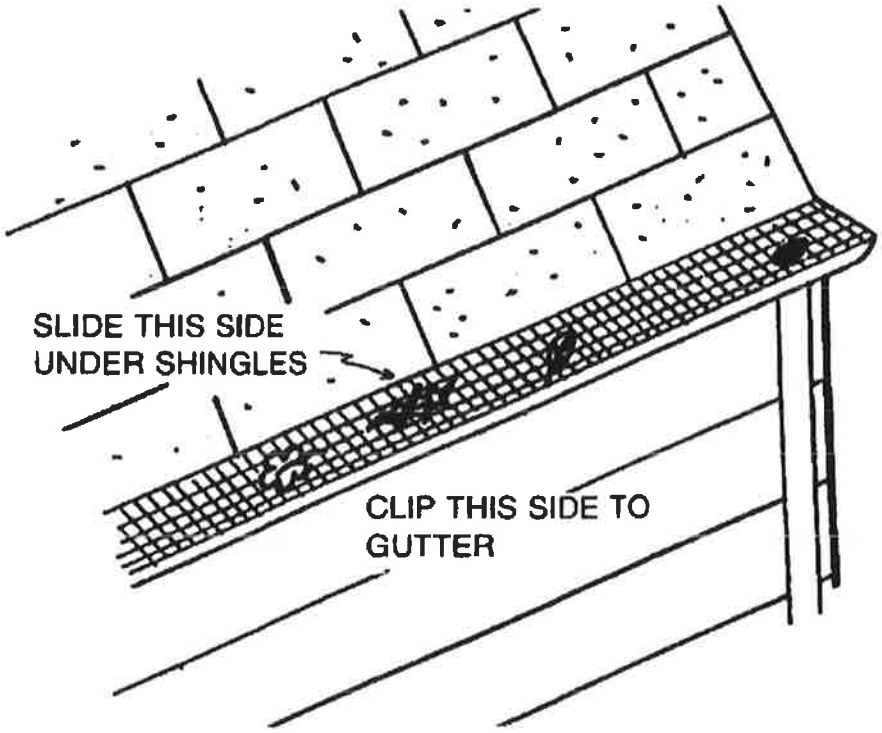


Figure 16. Gutter guard. (Source: Midwest Plan Service, Iowa State Univ. 1968. Private Water Systems p. 14)

Cistern water treatment

Several of the design features described previously will help insure good-quality cistern water. These would include roof washers, roof-water filters, gutter guards, water force breakers; and effectively screened cistern inlets and outlets. In addition to these measures, however, specific water treatment will be necessary to insure safe, potable cistern water. Recommendations for disinfection of cistern water and minimization of corrosion and sediment transport within distribution systems will be covered in the following pages.

Disinfection of cistern water

The interior of a new cistern should be scrubbed down with a disinfecting solution of chlorine and water, as described for roof-water filter boxes. **Caution:** make sure there is adequate ventilation while working inside the cistern because of the dangers of chlorine gas and lack of oxygen. Following the disinfecting operation, and before filling with water, the interior of the cistern should be rinsed down with clean water until the strong odor of chlorine is no longer present. A cistern should also be disinfected following cleaning or other maintenance that requires emptying the cistern.

To disinfect stored cistern water the simplest procedure is to add standard, unscented bleach once each week, at the rate of one ounce per 200 gallons of stored water during dry periods, or one ounce for each 400 gallons of stored water during wet spells. If a chlorine taste develops in the water it may be reasonably safe to dose weekly with one ounce for each 400 gallons of stored water. If, due to the absence of occupants, water is not chlorinated for a week or longer, one ounce of chlorine bleach for each 200 gallons of stored water should be added to the cistern upon returning.

You can devise a simple way of measuring the volume of water stored in your cistern. A wooden pole, long enough to reach the bottom of the cistern through the manhole opening, should be obtained. The pole can then be calibrated such that when it rests on the bottom it will indicate the approximate volume of stored water from the depth of the water. This can be done in the following way. First, find the capacity of your cistern from one of the two tables at the back of this booklet. If your cistern is rectangular in shape, rather than square or circular, you can determine its capacity by the following procedure. Multiply the length by the width by the depth (all in feet) to get the number of cubic feet of storage. Then multiply this figure by 7.5 to get the number of gallons of storage capacity. For example, a cistern measuring 10 feet by 8 feet, with a depth of 6 feet, would have a storage capacity equal to (10 X 8 X 6) X 7.5, or 3600 gallons.

Once you have determined the capacity of your cistern, the pole can be calibrated according to the following example. To calibrate a measuring pole for a cistern that measures 10 feet by 8 feet, with a depth of 6 feet, first divide the capacity by the depth in inches to obtain the number of gallons per each 1-inch-thick layer of stored water (3600/72 or 50 gallons in this example). Then simply mark the pole at 1-inch intervals, starting at one end and going toward the other until the total depth of the stored water is reached (6ft. or 72 inches in this example).

At each l-inch interval mark the corresponding volume, starting (at the bottom) with 50, 100, 150, 200,... etc., adding 50 (for this example) to each successive interval.

Once calibrated, such a measuring stick would give you a quick way of estimating the volume of water remaining in the cistern at any given time. Depths and corresponding volumes also could be listed side by side in a simple table, and the stick would then only be used to measure the depth of water in the cistern. Chlorine dosages required could also be listed alongside the various volumes for quick reference.

If the water has disagreeable taste and odor, the following procedure may be used. Add 2 ounces of crystallized sodium thiosulfate to 1 gallon of clean water. Then add 1 quart of this solution to each 1000 gallons of water in the cistern, mixing it with the cistern water but being careful not to stir up bottom sediment. After a few hours the water should be free of the disagreeable taste and odor.

Any water supply should be tested for bacterial contamination at least once a year. If a water analysis shows that the water is contaminated, a careful examination of the entire water supply system and of the area surrounding the cistern has to be made in order to find and eliminate the source of contamination.

As an alternative to adding disinfectant directly to the cistern, commercially distributed in-line automatic chlorinators are available from most distributors of water conditioning equipment.

Minimizing corrosion within cistern water systems

As pointed out previously, rainwater is acidic and therefore corrosive. Unless steps are taken to neutralize this water, it will corrode household distribution systems adding toxic metals such as lead and cadmium to the tapwater. Corrosion processes are very complex chemical reactions that involve many different factors. Employing the recommendations presented here will not completely eliminate corrosion within your cistern system, but should reduce it to tolerable levels. Minimizing the amount of corroded metals in the finished tapwater is the goal.

Perhaps the surest way of minimizing tapwater metals is to use plastic pipe to service at least one cold-water tap within the system. This would effectively replace the source of metallic lead and copper with a nontoxic, noncorrodible conduit of PVC or PEX plastic. Be sure to use plastic pipe that meets specifications for conveying drinking water, if that is what you intend

to use it for. If just one cold-water tap within your household were to be serviced by an all-plastic water line, then you should draw all of your drinking water from that tap and from no other. It would probably be best to plumb the kitchen cold-water tap and perhaps a bathroom lavatory with plastic. If you are planning a new system from scratch, then you may want to consider using plastic plumbing throughout the entire distribution system.

If your existing distribution system is older (pre-1990), it is likely composed of lead-soldered copper plumbing throughout. If you do not want to replace a portion of it with plastic, an alternative would be to install an in-line acid neutralizer to reduce the corrosivity of the water. Such units are available commercially from water treatment equipment distributors located throughout Pennsylvania. The acid-neutralizing units are approximately $1,500 and are available in either manual or automatic models.

In lieu of an in-line acid neutralizer, a neutralizing agent could be added directly to the cistern. Following is a table of common alkali reagents along with approximate treatment rates. They are listed in order from lowest to highest cost per pound.

Reagent	Chemical formula	Amount required to neutralize 1000 gallons of rainwater
Limestone	$CaCO_3$	2 oz.
Quick lime	CaO	1 oz.
Hydrated lime	$Ca(OH)_3$	1 oz.
Soda ash	$NaCO_3$	1 oz.
Caustic soda	NaOH	1.5 oz.

It would be necessary to add the appropriate amount of neutralizing agent at periodic intervals, depending on the amount and frequency of rainwater input to the cistern. Perhaps the most convenient treatment procedure would be to add the neutralizing agent when you add disinfectant to the cistern (once a week), at least during weeks when additional rainfall is collected. During weeks when little or no fresh rainwater is collected it would not be necessary to add more neutralizer to the cistern.

Some cistern owners have placed blocks of natural limestone in their cisterns to serve as continuous neutralizing agents. We have no guidelines to offer you as to the size or other characteristics of such blocks.

Regardless of whether or not you install an acid neutralizer or plastic pipe, or add a neutralizing agent directly to the cistern, there is one simple thing that you should do before using the tapwater for drinking or cooking purposes. You should always allow the cold water to run for about a minute before using it for drinking or cooking. This will flush the "stale" water (laden with toxic metals if from lead-soldered copper or other metallic pipe) from the supply line, leaving you with tapwater of acceptable quality. This practice is especially important after a tap has gone unused for several hours, or overnight. Rather than just letting the water run down the drain during this procedure, you may use it for purposes other than drinking or cooking.

Minimizing sediment transport through cistern systems

Use of roof washers and roof-water filters, described in detail earlier, will minimize the input of particulate matter to the cistern. However, these devices will not completely eliminate input of fine particulates or the formation of a sediment layer on the bottom of a cistern. Therefore, certain steps need to be taken to prevent this sediment from being transported through the distribution system and possibly reaching the tap.

Periodic cleaning of the cistern to remove the sediment accumulation is recommended. This would involve draining the cistern, scooping out the sediment, and washing down the interior with a brush and disinfectant. Thorough rinsing with clean water should precede refilling of the cistern. Such cleaning should be done at regular intervals every three to five years. Applying a new coat of interior sealant may also be necessary at the time of cleaning.

An in-line sediment filtering unit, like those distributed commercially by either of the two companies listed previously for acid neutralizers, should be installed between the cistern and tap to remove any sediment that might otherwise be transported to the tap. Such units are in the same price range as acid neutralizers, and some units are available as a combination acid neutralizer/sediment filter.

Summary statement

This publication is intended to serve as a guide to homeowners who are planning to build a roof-catchment cistern system. It will also provide useful information to those who already own a rainwater cistern and want to improve the quality of the water used. The material presented here has been consolidated from scientific research, public agencies, and private firms specializing in domestic water systems. The cistern study that formed the basis for this publication was conducted in rural Clarion and Indiana counties, Pennsylvania during 1979 and 1980, under the direction of the School of Forest Resources, the Environmental Resources Research Institute, and Penn State Extension. Funding was provided through Title V of The Rural Development Act.

References

Information in this circular has been adapted from the following publications:

- Contribution No. 173, "Feasibility of Rainwater Collection Systems in California," by David Jenkins and Frank Pearson. Available from California Water Resources Center, University of California, 475 Kerr Hall, Davis, California 95616.
- Customer information brochure. Water Filtration Co., 1088 Industry Rd., Marietta, Ohio 45750.
- *Private Water Systems*. Midwest Plan Service, Iowa State University, Ames, Iowa 50010, attn. Extension Agricultural Engineer.
- *Cisterns for Rural Water Supply in Ohio* by Norman G. Bailey. Water Resources Center, The Ohio State University, 1791 Neil Avenue, Columbia, Ohio 43210

Capacity (gallons) of Square Cisterns

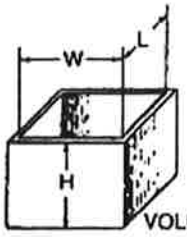
Area in Feet	4 ft	5 ft	6 ft	7 ft	8 ft	9 ft	10 ft	11 ft	12 ft	13 ft	14 ft
16	480	600	720	840	960	1080	1200	1320	1440	1560	1680
25	750	937	1125	1312	1500	1687	1875	2062	2250	2437	2625

Area in Feet	4 ft	5 ft	6 ft	7 ft	8 ft	9 ft	10 ft	11 ft	12 ft	13 ft	14 ft	15
36	1080	1350	1620	1890	2150	2430	2700	2970	3240	3510	3780	40
49	1470	1837	2205	2572	2940	3307	3675	4042	4410	4777	5145	55
64	1920	2400	2880	3360	3840	4320	4800	5280	5760	6240	6720	72
81	2430	3037	3645	4252	4860	5467	6075	6682	7290	7897	8505	91
100	3000	3750	4500	5250	6000	6750	7500	8250	9000	9750	10500	11
121	3630	4537	5445	6352	7260	8167	9075	9982	10890	11797	12705	13
144	4320	5400	6480	7560	8640	9720	10800	11880	12960	14040	15120	16
169	5070	6337	7605	8872	10140	11407	12675	13942	15210	16477	17745	19
196	5880	7350	8820	10290	11760	13230	14700	16170	17640	19110	20580	22
225	6750	8437	10125	11812	13500	15187	16875	18562	20250	21937	23625	25
256	7680	9600	11520	13440	15350	17280	19200	21120	23040	24960	26880	28
289	8670	10837	13005	15172	17340	19507	21675	23842	26010	28177	30345	35
324	9720	12150	14580	17010	19440	21870	24300	26730	29160	31590	34020	36
361	10830	13537	16245	18952	21660	24367	27075	29782	32490	35197	37905	40
400	12000	15000	18000	21000	24000	27000	30000	33000	36000	39000	42000	45

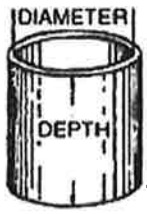
Capacity (gallons) of Circular Cisterns

Diameter in Feet	4 ft	5 ft	6 ft	7 ft	8 ft	9 ft	10 ft	11 ft	12 ft	13 ft	14 ft
4	378	472	566	661	755	850	944	1038	1133	1227	1322

Diameter in Feet	4 ft	5 ft	6 ft	7 ft	8 ft	9 ft	10 ft	11 ft	12 ft	13 ft	14 ft
5	590	737	885	1032	1180	1327	1475	1622	1770	1917	2065
6	850	1062	1274	1487	1699	1912	2124	2336	2549	2761	2974
7	1156	1445	1735	2024	2313	2602	2891	3180	3469	3758	4047
8	1510	1888	2266	2643	3021	3398	3776	4154	4531	4909	5286
9	1908	2385	2863	3340	3817	4294	4771	5248	5725	6202	6679
10	2360	2950	3540	4130	4720	5310	5900	6490	7080	7670	8260
11	2856	3569	4283	4997	5711	6425	7139	7853	8567	9281	9995
12	3398	4248	5098	5947	6797	7646	8496	9346	10195	11045	11894
13	3988	4985	5983	6980	7977	8974	9971	10968	11965	12962	13959
14	4626	5782	6983	8095	9251	10408	11564	12720	13877	13033	16190
15	5310	6637	7965	9292	10620	11947	13275	14602	15930	17258	18585
16	6006	7516	9026	10537	12047	13558	15068	16578	18089	19599	21110
17	6820	8526	10230	11936	13641	15346	17051	18756	20461	22166	23871
18	7646	9558	11470	13381	15293	17204	19116	21028	22939	24851	26762
19	8520	10650	12779	14909	17039	19169	21299	23429	25559	27689	29819
20	9440	11800	14160	16520	18880	21240	23600	25960	28320	30680	33040



VOLUME (GALS) = (L X W X H)7.5



VOLUME (GALS) = 0.785(DIA)²(DEPTH)7.5

Prepared by Edward S. Young, Jr., and William E. Sharpe, former research assistant in the Environmental Resources Research Institute and former associate professor of forest hydrology

BAIT SHOP

AUTOMATIC AID AGREEMENT FOR FIRE PROTECTION AND RESCUE SERVICES

THIS AGREEMENT, made and entered into on the 15th day of February 1977, by and between the COUNTY OF CLARK, a political subdivision of the State of Nevada and THE CITY OF LAS VEGAS, a municipal corporation of the State of Nevada and THE CITY OF NORTH LAS VEGAS, a municipal corporation of the State of Nevada.

W I T N E S S E T H:

WHEREAS, the parties to this agreement provide fire protection and rescue services within their respective territorial limits.

WHEREAS, it is to the mutual advantage and benefit of the parties to this agreement to render supplemental fire protection and rescue services to each other in the event of a fire or other local emergency which is or is likely to be, beyond the control of the services, personnel, equipment, and facilities of the agency having jurisdiction over the area in which the emergency occurs and which requires the services of the other party to control.

WHEREAS, the exchange of services under such conditions is authorized by law.

NOW, THEREFORE, IT IS HEREBY AGREED BY AND BETWEEN EACH AND ALL OF THE PARTIES HERETO, AS FOLLOWS:

1. There is hereby created an automatic aid between the County and City Fire Departments that will allow the nearest fire suppression and rescue units and manpower to be utilized at the scene of an emergency occurring within the established running areas of those units. During the tenure of this Agreement, emergency units shall automatically be provided and dispatched to fires and emergencies closest to their respective stations.

Further, City and County units shall be provided and dispatched simultaneously into areas of mutual interest and protection both in City and County areas on a first alarm basis.

2. Officers of each of the parties designated as officer-in-charge by their respective Departments shall have the authority to request additional assistance hereunder and each of the parties hereto shall notify the others of such officers.

That details as to methods of requesting assistance, and such other planning as may be necessary to effectuate the purpose of this agreement, may be covered by supplementary agreements between the Chiefs of the respective fire departments.

3. That the personnel furnished will work insofar as possible under their own supervisors, and the equipment furnished will insofar as possible be operated by the personnel of the agency furnishing the equipment. The overall command of the forces engaged in controlling a particular emergency situation shall be retained by the appropriate officers of the agency requesting the assistance.

4. That no party furnishing aid pursuant to this agreement shall be entitled to compensation for services rendered to the requesting agency, it being understood that the respective covenants contained in this agreement shall constitute the sole consideration for such services.

5. It is mutually understood and agreed that this agreement does not relieve any party hereto from the necessity and obligation of furnishing adequate fire and rescue protection within their own areas.

6. It is mutually understood and agreed that the party requesting assistance is not required to indemnify the party furnishing assistance as to any liability or damage imposed by law upon the assisting party by reason of an act or omission of its employee occurring in the performance of the service. The requesting party shall be responsible only for the acts of the employees of the responding party performed at the scene of the emergency and performed at the specific direction of an employee

of the requesting party.

7. This agreement shall not be construed as, or deemed to be an agreement for the benefit of any third party or parties, and no third party or parties shall have a right of action hereunder for any cause whatsoever.

8. Any services performed or expenditures made in connection with the furnishing of assistance shall conclusively be presumed to be for the direct protection of the inhabitants and property of the party furnishing the assistance and for the direct benefit of all the inhabitants and citizens of the County and the municipalities.

9. This agreement shall become effective when approved or executed by the County of Clark, City of Las Vegas and City of North Las Vegas, and shall remain operative and effective until participation in this agreement is terminated by either party. This agreement may be terminated at any time upon the giving of written notice to the other party at least thirty (30) days prior to the date of withdrawal.

10. Termination of this Agreement by any one party shall not void this Agreement between the remaining parties.

11. A map shall be created and agreed upon by all involved parties designating areas of responsibilities covered by this Agreement.

IN WITNESS WHEREOF, this agreement has been executed and approved and is effective and operative as to each of the parties as herein provided the day and year first above written.

CITY OF LAS VEGAS, NEVADA

By _____
RON LURIE, MAYOR PRO TEM

ATTEST:

_____
DORIS M. KARSNOK
ASSISTANT TO THE CITY CLERK

COUNTY OF CLARK AND ALL UNINCORPORATED TOWNS AND FIRE PROTECTION DISTRICTS OF CLARK COUNTY

By _____
THALIA DONDERO, Chairman
Board of Clark County Commissioners

ATTEST:

_____
LORETTA BOWMAN, County Clerk

CITY OF NORTH LAS VEGAS, NEVADA

By _____
RAY H. DAINES, Mayor

ATTEST:

_____
ESTHER V. BORDEN, City Clerk

COOPERATIVE AGREEMENT BETWEEN
THE TRUCKEE MEADOWS FIRE PROTECTION DISTRICT
and the
CITY OF RENO

In accordance with NRS 277.045, this Cooperative Agreement ("Agreement") is made and entered into between the Truckee Meadows Fire Protection District, a Fire District formed under NRS Chapter 474 ("Truckee Meadows"), and the City of Reno, a municipal corporation ("Reno"), on behalf of the Reno Fire Department. (The parties may also be referred to in the singular as an "agency" or in the plural as "agencies.") This Agreement becomes effective when all governing bodies have approved the Agreement by an adopted resolution.

RECITALS

WHEREAS, each of the above-named agencies maintains and operates fire/rescue organizations within their respective jurisdictions; and

WHEREAS, the parties desire to serve the best interests of the public and citizens of their respective jurisdictions; and

WHEREAS, on occasion each agency experiences fires or other emergencies of such a magnitude that assistance of other fire response agencies would be beneficial in addressing such emergencies; and

WHEREAS, the parties desire to enter into a cooperative agreement pursuant to the Nevada Revised Statutes in order to provide for the circumstances and procedures under which the agencies will provide assistance to one another in responding to fire and other emergencies, including both mutual and automatic aid; and

WHEREAS, the parties agree that, pursuant to SB 185 (2015), each entity is responsible for establishing and defining the geographic areas for automatic aid so as to cause the fire-fighting vehicle located closest to a structure fire or brush fire to respond, regardless of jurisdiction; and

WHEREAS, the parties desire to supersede all previous Mutual and Auto Aid Agreements between Reno and the District, including, but not limited to, the Cooperative Agreement executed on September 21, 2015;

NOW, THEREFORE, based upon the foregoing recitals which are incorporated by this reference, the parties mutually agree to provide fire suppression equipment, facilities and personnel to each other under the following terms and conditions:

1. Definitions. The following terms shall have the meanings ascribed to them:

a. Agency Representative. A Chief Officer who has been delegated the authority to make decisions regarding the agency's participation at the incident.

b. AOP. An annual operating plan jointly prepared and agreed to by the parties at a meeting to be scheduled as close to annually as conveniently possible amongst the parties, which plan shall include current rates for use of each agency's equipment and personnel, a list of principal personnel of each agency, descriptions of the areas negotiated by the parties where automatic or mutual aid is required according to law and any other items identified in this Agreement. If an AOP has not been executed for the current fiscal year, the most recently executed AOP shall remain effective.

c. Assistance by Hire. The provision of fire suppression or support resources to another agency on a reimbursement basis in connection with situations other than Mutual Aid or Automatic Aid situations. All reimbursement shall be based upon rates established in the 2016 AOP attached hereto as Exhibit A.

d. Automatic Aid. An arrangement pursuant SB 185 (2015) in which the Agency that is responsible for the emergency fire-fighting vehicle located closest to a structure or brush fire is required to respond to and take all measures necessary to suppress the fire regardless of whether the fire occurs within the territory served by the Agency.

e. Mutual Aid. An arrangement in which a Requesting Agency has the ability to specifically request the assistance of a Responding Agency in connection with an incident requiring fire suppression services, to which the Responding Agency is obligated to respond, subject to the parameters set forth herein.

f. Requesting Agency. An agency in whose jurisdiction an incident requiring Mutual Aid or Automatic Aid occurs.

g. Responding Agency. The agency providing Mutual or Automatic Aid to the Requesting Agency.

2. Request for Mutual Aid. When a Requesting Agency determines that Mutual Aid is necessary to provide the best fire suppression services to an incident occurring in its jurisdiction, an Agency Representative may make a request to an Agency Representative of the Responding Agency in the most expedient manner possible. The preferred contact information for such circumstances shall be set forth in the AOP. Nothing in this provision shall prevent an agency from using other known telephone numbers to obtain assistance as expediently as possible, provided, however, that neither agency may submit a request for mutual aid on the radio frequency of the other agency.

3. Mutual Aid Resource Determination. When a request for Mutual Aid occurs, an Agency Representative of the Responding Agency shall determine, in his sole and absolute discretion, whether it has sufficient resources available to provide Mutual Aid and respond to the request. If an Agency Representative determines that the Responding Agency has the resources available to respond to the request for assistance, the Responding Agency shall furnish to the Requesting Agency whatever requested firefighting equipment, career personnel, and facilities that are available in the jurisdiction of the Responding Agency. Nothing in this provision shall be construed to require a Responding Agency to reduce the level of resources available in its jurisdiction below the level deemed reasonably necessary by the Responding Agency, in its sole and absolute discretion, to provide the residents of the Responding Agency's jurisdiction with fire suppression services.

4. Automatic Aid. When a Responding Agency receives an Automatic Aid dispatch call to an area negotiated by the parties as an automatic-aid area as described in the AOP attached as Exhibit A, the appropriate apparatuses shall be automatically dispatched to the incident by the Responding Agency in accordance with the terms of the AOP.

5. Communications. In both Mutual Aid and Automatic Aid situations, the operating frequency shall be designated by the Requesting Agency's dispatch center, concurrently with the request for assistance (in a Mutual Aid situation) or the automatic dispatching of Responding Agency assistance (in an Automatic Aid situation). All subsequent communications regarding the incident shall be to the Requesting Agency's dispatch center on the designated frequency.

6. Incident Management. In any incident triggering Mutual Aid under this Agreement, the personnel of the Requesting Agency shall remain in command of the incident, unless the command of the incident has been transferred to another agency or to an incident management team. In any incident triggering Automatic Aid, the agency arriving first shall assume incident command. In Automatic aid incidents, command will be passed to the Requesting Agency as soon practicable upon the arrival of a career officer of the Requesting Agency. In either Mutual Aid or Automatic Aid situations, the agency or incident management team in command may direct and supervise the equipment, facilities and personnel provided by the Responding Agency through the operation of this Agreement. The incident commander shall be a qualified career fire officer. In situations in which the Requesting Agency initially establishes command in the absence of a qualified career fire officer, command shall be transferred to a qualified career fire officer upon arrival of the Responding Agency, until such time as a qualified career fire officer from the Requesting Agency arrives at the incident.

7. Reimbursement. Unless otherwise provided in the Agreement, the following reimbursement terms shall apply in connection with requests for Mutual Aid and Automatic Aid:

a. Duration of response shall be calculated from the time of the request to the Responding Agency (in a Mutual Aid situation) or automatic dispatching of Responding Agency resources (in an Automatic Aid situation).

b. Non-reimbursable durations of response:

i. Mutual Aid for all fire based services shall be provided without expectation of reimbursement for the first twelve (12) hours of response. In the event that the Responding Agency remains on an incident in excess of twelve (12) hours, reimbursement shall be calculated from the time of the request to the Responding Agency.

ii. Automatic Aid for all fire based services shall be provided without expectation of reimbursement for the first twelve (12) hours of response. The requesting agency shall make all diligent and reasonable efforts to release the Responding Agency from an incident as soon as practical and possible. In the event that the Responding Agency remains on an incident in excess of twelve (12) hours, reimbursement shall be calculated from the time of automatic dispatching of the Responding Agency resources.

The above time frames for Mutual Aid or Automatic Aid may be re-evaluated and modified

pursuant to Paragraphs 16 and 22 of this Agreement.

c. In the event that a Mutual Aid incident lasts longer than twelve (12) hours, or an Automatic Aid situation lasts longer than twelve (12) hours, reimbursement to the Responding Agency shall be invoiced and paid in accordance with the reimbursement rates established in the AOP. On multi-jurisdictional incidents and/or incidents that threaten both jurisdictions, the Agencies agree to jointly develop a cost- share agreement which details a fair distribution of the financial responsibilities of the incident.

d. Reimbursement rates shall be calculated as follows:

i. Equipment. The parties' equipment rate schedules are attached to the AOP as an Exhibit, are incorporated herein by this reference, and may only be changed as allowed in Paragraphs 16 and 22 of this Agreement.

ii. Personnel. The parties' personnel rates are attached to the AOP as an exhibit, are incorporated herein by this reference, and may only be changed as allowed in Paragraphs 16 and 22 of this Agreement. The Responding Agency will bill and provide supporting documentation to the Requesting Agency for actual costs incurred for assistance provided and identified as reimbursable. Reimbursable costs include all costs associated with the direct fire operations and incident support ordered by or for the incident by the requesting agency. Rates are documented in the AOP. Reimbursement will not be provided for both "backfill" and resources mobilized to an incident.

iii. Calculation. All equipment and personnel rates shall be rounded up to the nearest 1/4 hour.

iv. Documentation. Billing shall include documentation of times and rates.

e. In connection with incidents in which reimbursement is triggered pursuant to the terms of this Agreement, the Responding Agency shall submit an invoice or estimate for reimbursement as soon as reasonably possible, but no later than ninety (90) days after the incident. If the total cost is not known at the time of initial billing, or if additional costs are identified thereafter, additional invoices may be submitted to the Requesting Agency. Payment on the invoice shall be made within sixty (60) days after receipt. The parties understand and acknowledge that if this Agreement is in effect, FEMA will not reimburse the Responding Agency for the aid services provided pursuant to this Agreement.

f. Billing deadlines set forth herein are intended to encourage prompt billing. Failure to meet these timeframes shall not be construed as a release or waiver of claims for reimbursement against the other agency; however, in no circumstance may an invoice for reimbursement pursuant to this Agreement be submitted more than 180 days after an incident.

g. A separate invoice shall be submitted for each incident. Invoices shall be identified by incident name, location, jurisdictional unit, and appropriate order number, and will be supported by adequate documentation and broken down by categories including apparatus type, engine number, and personnel responded. Invoices for fire based emergencies shall not include administrative overhead or other costs not requested by the authority having jurisdiction.

Documentation in support of the billing shall include:

i. Invoice with total amount requested
ii. Narrative cover letter
iii. Incident cost summaries
iv. CAD Report and other supporting documentation
v. Copies of applicable cost share agreements

In no circumstances shall either agency agree to or pay incident charges on behalf of the other agency without first obtaining express written permission of the other agency.

h. If reimbursement is allowable under Mutual Aid or Automatic Aid, as a result of a declaration of disaster, grant, and/or cost recovery, reimbursement for personnel, apparatus and support equipment shall cover the entire time of commitment, beginning from the time of initial dispatch from the Responding Agency's home base, to the time of return to the home base. Events that are cost recoverable and/or payable through State or Federal Funding, or from third parties determined responsible shall be reimbursable.

8. Assistance by Hire. Except for instances of Mutual Aid and Automatic Aid, all requests for fire suppression assistance shall be assistance by hire. Any resources provided by a Responding Agency, and not specifically ordered by the Requesting Agency, shall be considered a voluntary contribution and shall not be reimbursed. Agencies to this agreement will provide current Assistance by Hire rate schedules and updates when rates change. The rates will be posted and updated in the AOP following the agencies' joint written agreement to change those rates as allowed in Paragraphs 16 and 22 of this Agreement.

9. Hazmat Team. All hazardous materials responses will be in accordance with the current Regional Hazardous Materials Response Agreement.

10. Equipment. The Responding Agency is responsible for the operation, service and maintenance of their equipment during incident operations on the jurisdiction of the Requesting Agency. The Requesting Agency shall be responsible to pay or reimburse for damages in excess of normal wear and tear, and shall replace or reimburse items lost, damaged or destroyed, except for damage that occurred as a result of negligence or willful acts or omissions by the Responding Agency. Replacement or reimbursement to the Responding Agency by the Requesting Agency will occur within 90 days of receipt of an invoice documenting such equipment.

11. Incident Report. For services rendered pursuant to this Agreement, the Responding Agency to a mutual aid incident shall, upon request, provide the Requesting Agency with an incident report within (20) twenty working days following completion of the incident.

12. Worker's Compensation. For the limited purpose of the exclusive remedy set forth in NRS 616A.020, during circumstances where one party to this Agreement is providing Mutual or Automatic Aid to the other party, both parties shall be deemed to employ jointly a person who is an employee of either party and sustains an injury by accident or occupational disease while participating in the matter for which assistance was requested. However, for the purpose of providing insurance benefits pursuant to NRS 616A through NRS 616D and NRS Chapter 617

each party shall provide such benefits to its own employees at its own expense.

The parties waive any indemnification provision with respect to such industrial injuries or occupational diseases.

13. Independent Agencies. The parties are associated with each other only for the purposes and to the extent set forth in this Agreement, and in respect to performance of services pursuant to this Agreement, each party is and shall be a public agency separate and distinct from the other party and, subject only to the terms of this Agreement, shall have the sole right to supervise, manage, operate, control, and direct performance of the incident under this Agreement. Nothing contained in this Agreement shall be deemed or construed to create a partnership or joint venture, to create relationships of an employer-employee or principal-agent, or to otherwise create any liability for one agency whatsoever with respect to the indebtedness, liabilities, and obligations of the other agency or any other party.

14. Hold Harmless. The parties will not waive and intend to assert available remedies and liability limitations set forth in Chapter 41 of the Nevada Revised Statutes and case law. Contractual liability of both parties shall not be subject to punitive damages. To the fullest extent of Chapter 41 of the Nevada Revised Statutes, each party shall indemnify, hold harmless and defend, not excluding the other's right to participate, the other party from and against all liability, claims, actions, damages, losses, and expenses, including, but not limited to, reasonable attorney's fees and costs arising out of any alleged negligent or willful acts or omissions of the indemnifying party, its officers, employees and agents. The indemnifying party shall not be liable to hold harmless any attorney's fees and costs for the indemnified party's chosen right to participate with legal counsel.

15. Third Party Beneficiaries. This Agreement is not intended to create, or to be construed to create, any right or action on the part of any person or entity not signatory to this Agreement, nor create the status of third party beneficiaries for any person or entity.

16. Integration and Modification. This Agreement and the attached AOP constitute the entire agreement of the parties and are intended as a complete and exclusive statement of the promises, representations, negotiations, discussions, and other agreements that may have been made in connection with the subject matter hereof. Unless otherwise expressly authorized by the terms of this Agreement, no modification or amendment to this Agreement shall be binding upon the parties unless the same is in writing and signed by the respective parties hereto.

17. Severability. If any provision of this agreement is held to be illegal, invalid or unenforceable by a court of competent jurisdiction, the parties shall, if possible, agree on a legal, valid and enforceable substitute provision that is as similar in effect to the deleted provision as possible. The remaining portion of the Agreement not declared illegal, invalid or unenforceable shall, in any event, remain valid and effective for the term remaining unless the provision found illegal, invalid or unenforceable goes to the essence of this Agreement.

18. Assignment. Neither party shall assign, transfer or delegate any rights, obligations or duties under this Agreement without the proper written consent of the other party.

19. Proper Authority. The parties hereto represent and warrant that the person executing this

Agreement on behalf of each party has full power and authority to enter into this Agreement and that the parties are authorized by law to engage in the cooperative action set forth in this Agreement.

20. Governing law; Jurisdiction. This Agreement and the rights and obligations of the parties hereto shall be governed by, and construed according to, the laws of the State of Nevada.

21. Ratification. This Agreement shall become effective when all governing bodies have approved this Agreement by an adopted resolution pursuant to NRS 277.045. This Agreement shall remain in full force and effect unless terminated or amended as provided below.

22. Amendment. The parties may amend this Agreement or the AOP at any time by an endorsement made in writing and approved by the Truckee Meadows Fire Protection District and the Reno City Council.

23. Termination. The Agencies understand that SB 185 (2015 Session), which requires the Agencies to provide automatic aid to one another will expire on June 30, 2017, unless such provisions are extended by the legislature. Notwithstanding the expiration date contained in SB 185, the Agencies wish to extend the term of this Agreement to June 30, 2019. Any Agency may terminate this agreement upon 30 days' written notice to the other Agencies. The Agencies shall strive to review the Agreement and the AOP annually to determine if any modifications are necessary. If the Agencies do not have the opportunity to review the Agreement or the AOP prior to the beginning of the next fiscal year, this Agreement and the AOP shall remain in force and effect until amended or terminated pursuant to this paragraph.

24. Notices. All notices regarding this Agreement shall be in writing and shall be deemed to have been duly given when delivered personally by hand, or by telephonic facsimile with simultaneous delivery by regular mail, or mailed certified mail, return receipt requested, postage repaid on the date posted, and addressed to the other party at the following addresses:

Truckee Meadows Fire Protection
Fire Chief Charles A. Moore
P.O. Box 11130
Reno, NV 89520

Reno Fire Department
ATTN: Fire Chief
P.O. Box 1900
Reno, NV 89505

and

Reno City Attorney's Office
P.O. Box 1900
Reno, NV 89505

Any party may designate a different address or representative to receive notices provided that such designation is sent in writing to the other party in accordance with this paragraph.

25. Execution in Counterparts and Signatures. This Agreement may be executed in more than one counterpart, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. An electronic or facsimile signature shall be valid for all purposes.

IN WITNESS WHEREOF, The parties hereto have caused this Cooperative Agreement between Truckee Meadows Fire Protection District and the City of Reno to be executed as of the last date written below.

Kitty Jung, Chair
Truckee Meadows Fire Protection District
Board of Fire Commissioners

10-18-16
Date

Attest by:

Washoe County Clerk

Hillary Schieve, Mayor
City of Reno, Nevada

11-02-2016
Date

CITY OF RENO CORPORATE SEAL WASHOE COUNTY, NEVADA

Attest by:

City Clerk, City of Reno Chief Deputy

Approved as to Form:

David Watts Vial
Washoe County Deputy District Attorney

Approved as to Form

Karl S. Hall
Reno City Attorney