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September 18, 2012

Alpensee Water District  
Director Mr. Don Skotty  
PO Box 2204  
Frisco, CO 80443

Dear Don,

Based on our earlier discussions at Alpensee Water District (AWD) meetings for technical support I accepted your design basis and drawings for AWD on September 17, 2012. These records consist of one 8" stack of files (not collated) and one 50 gallon garbage bag full of drawings, with no master list.

I have done a casual survey of the information. I now find that there is enough confusion to require my formalizing our communications and working relationship. I am making AWD the same offer for my skills that I provide for the US Government, US Military, and US Intelligence agencies. My services are free subject to the following requirements: The AWD shall pay for all out of pocket expenses. All out of pocket expenses will be defined and approved before expenditure by AWD board of Directors. The AWD will indemnify and hold harmless myself (David Flanigan) and my Company, David Flanigan, Ltd. The agreement must be confirmed in writing and is subject to approval by my Boss, who is a Director of AWD, C.J. Winkle. A conclusions and findings are subject to review.

The AWD and its directors are covered by insurance and other elements that protect the Directors from litigations based on the decisions they must make. I require the same protection because the Developer and Former Board member Laurence (Larry) A. Smith was the approver of most of the Development work. I am still working full time and the work completion is subject to my free time available. My free time and ability to earn an income could be severely limited by litigation, be it nuisance or not.

All analysis and information that I provide will be subject to secondary review; which should be done by the AWD Board of Directors or whom the Board deems qualified. Most of the problems and issues AWD faces are the result of lack of adequate review during the process of developing the AWD. The documentation you provided has uncovered several problem issues so far. But, the documentation provided is far from complete. My **first recommendation** is that you ask the previous AWD board members, the previous AWD Operator, and AWD Developer; including General Contractor, Engineering firm and County or State Officials involved for records which may clarify changes made to the AWD from approved design basis to the system you have now.



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The **second recommendation** I have is that you institute a change track and control system as soon as possible for AWD. Many of the issues you now face are the result change to the AWD operating system from the original design basis with hazard mitigation or economic cost review.

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## QUALIFICATIONS

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David Flanigan received a BS (81), MS (83), and PhD (86) from the Colorado School of Mines in Chemical Engineering. The work experience will be condensed to items concerning the tasks required by AWD. 1978-1981 US Geological Survey, Ground Water Hydrologist. 1984-1994 Conoco/DuPont R&D+Technical Service. 1986-1990 Senior Research Engineer, developed process systems for offshore/onshore drilling and production of Oil and Gas. This includes fire mitigation, hazard analysis, and systems analysis for North Sea, Alaska, and US domestic Operations. 1990-1994 Senior Research Supervisor built and operated initial plants for Freon replacements HFC-134a and HFC-32. Process design, hazard reviews and fire mitigation analysis for these 20million USD facilities. 1994-2004 Consultant for the DuPont Company: More than 100 process designs and hazards reviews from pilot to commercial plant which included fire mitigation and risk assessment. 1994-Current Principal Engineer for David Flanigan, Ltd.: Provided process design and hazard assessment mitigation design for Clariant, DuPont and Nuclear Fuels Services. 2003-2006 Co-chairman of the Board for Fuxin HengTong Fluorine Chemicals Ltd. (FHT): Process Design, Hazard Analysis. Project Engineer for construction. 2006-Current Technical Director for Tianhe Group: FHT merged with Tianhe: Design, Build, and construct Tianhe Company plants which manufacture chemicals using processes with conditions that are immediately dangerous to life and health producing Fluoro-chemicals and polymers. Designs also include fire mitigation, fire suppression, domestic or potable water systems.

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## CONFLICTS OF INTEREST

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I have certain conflicts of interest that should be understood before reading any report I might make to the AWD. I am customer of the AWD, and as such I live in the district where fire mitigation is dependent on the AWD. My wife, C.J. Winkle is member of the Board of Directors of the AWD.

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## INITIAL REPORT FINDINGS

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Please remember my findings here are subject to change based on complete review of all the information provided. I find it necessary to make this report so that the AWD Board of Directors can begin to assess the needs for the AWD and the current risks for the AWD and its customers.

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## 50 GALLON GARBAGE BAG OF DRAWINGS

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## WORK DONE TO DATE

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1. Sort the drawings into two piles:
  - A. AWD system drawings. So far I have found no Process and Instrument (P&ID) drawing certified or signed to indicate an as built state. Out-lot A is lot in Highland Meadows which is given easement from lots 22 and 23 for the purpose of water storage and distribution for the AWD. But this lot is not owned or maintained by the AWD. In the most recent AWD meeting, September 17, 2012, the public was told that Lot A belongs to the former Developer and AWD Board member Larry Smith and other Smith family members. But lot A was not on the list of customers of AWD, though Lot A receives fire mitigation from AWD. Lot A was surveyed and photographed. Elevations were also taken. This work was done to provide data to see if Lot A could be used in Lot A's original intent or some other support capacity. Please find **Figure 1; As built for 2 of 2 sewer HM draw**, the only "As Built" PUD distribution drawing found so far.
  - B. All others; which are mostly the project drawings for homes in the Highland Meadows PUD. Early project plans are minimal. The plans become more detailed and substantial as they become more current. The AWD was informed by phone via director Skotty of the PUD house project drawings. Director Skotty and the AWD Board will determine what to do with the drawings.
2. Looked for drawing to determine what is in Highland Meadows PUD. **Figure 2, HM PUD 1 of 2 for 14 lots W of HS** shows 14 more lots in the original Highland Meadows PUD submission for AWD.
3. Found a drawing to locate Lot A accurately and did a survey for initial determination of use. Please tell me if I should proceed with any options using Lot A, since AWD or the HM PUD do not control its use currently.

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## WORK NEEDED

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1. Determine a method to scan or photograph the drawings that can provide the detail required for review.
2. Catalog all drawings in a worksheet or data base. The AWD board will advise me on which are to be electronically stored.
3. At this time I assume all E4 drawings related to the AWD treatment and distribution system will be scanned as soon as the method is finalized.
4. The AWD board will inform me where to deliver the drawings once they are available electronically.

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## 8" STACK OF FILES

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The files are in used file folders with no descriptions or collation. I needed somewhere to start so briefly scanned through all the files visually. There are some things I think the AWD Board needs to know at this time.

1. November 26, 2001 hydrant flow test report from Martin/Martin Consulting Engineers (MM). I pulled this report and randomly checked it for accuracy. See **Figure 3, 20011126 MM flow hydrant flow test.**
  - A. I found a hydrant listed as Lot 23 which was tested. But there is no hydrant on lot 23. There is a hydrant across the road on lot 19 or 20. I am not sure which lot it is on because the hydrants are not marked on as built or other drawing reviewed. The drawing key shows the symbols, but the locations are not marked. I could not easily find a survey marker. I need to get a Segment Length (SL) from a plat drawing as pace it out to find the lot location for the hydrant. So if there was an error in hydrant location in randomly picked test, then how much confidence should I have in the rest of the data?
  - B. The test flows on the hydrant show low flow at the highest hydrant, lot 27, 1250GPM, elevation 9310ft. The highest flow is at "Lot 1,2" hydrant, 1790GPM, elevation 9120ft.
  - C. The elevations are from the MM test report. There are no values on the drawings from Range West that have been reviewed.
  - D. If the Lot 27 hydrant passed, then the flow was determined to be enough. Since the test required 2 @655GPM and 2@165GPM pumps the low figure must be somewhere near the required flow. Total name plate flow is 1640GPM. How do we explain the test flow of 1790GPM at Lot 1, 2 hydrant; 10% higher than name plate? I know gravity could be possibly lower at this altitude depending on the density of the earth in this local area. If the measurement is biased 10% at the low elevation, then the flow at hydrant lot 17 may only be 1125GPM. So is 1125GPM enough for the system criteria? This report is signed by a Professional Engineer with no basic system check?
  - E. A secluded single home fire with an adequate fire hydrant out front is considered to be a 3 hour event. So  $3 \times 60 \times 1250 = 225,000$  gallons are required to fight the fire. The storage vault is reported as 275,000 gallons. The tank must be kept 82% full to have enough water to fight a potential fire. The well production rate should be checked.
2. The Farmer's Korner Water District Design basis is in **Figure 4, Farmers Korner Water Use Assumptions**. This is not for designing a water distribution system. This is for water rights assignment. No dynamic or peak rate is estimated.
3. Well #1 and Well #2, also known as wells 52910-F and 52911-F respectively. Court Case numbers 93CW241 (A) and 98CW296. Both wells have the same court case references. The wells are limited to 100gpm and 20.66 annual acre-ft for production of water. The permits are not in the name of AWD. The permits are assigned to Farmers Korner Inc. C/O Bishop-Brogden Assoc. Inc. So it appears that AWD may not even have a permit to get water from the wells. However, the water is assigned to "Domestic use in Highland Meadows Subdivision & Alpanse 3 Subdivision". Permit dates are 5/31/2001. So total raw water production is limited to 200GPM, provided the wells produce this much. You cannot therefore, mitigate a fire using the production from the wells. Typically a pond is made to hold water for fire fighting. But, a pond freezes in the winter. So the 275,000gallon vault is the under-ground fire water pond or supply. Again the level cannot drop below that



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required for a fire mitigation incident. Therefore, the operation where the level in the tank was taken down put the AWD at risk. The operator of the distribution system needs to be given a minimum reserve level for fire mitigation. The level in the vault cannot drop below the minimum without fire watch or special precautions.

4. Well test reports are for MH-25403 in April 15, 1995 by the Office of State Engineer. 6.5" casing 38ft deep. Test rate was 50GPM. MH-35971 was tested by the Samuelson Pump Co. on July 14, 1999. The casing was 10". The depth was 50'. Standing water depth 8'9" draw down to 24' 9" in 20 minutes at >200GPM test flow. Apparently they do not know the production test is done at steady level to see the well production limit. How these wells are related to the ones AWD uses is not known. So I have no sense of the ability for AWD to produce water. But, we know AWD is limited to 200GPM production per day. **Figure 5 is *Well drill and reports, 7/14/1999.***
5. The system summary for insurance was generated on July 12, 2001. The equipment is valued at 700,000USD as is indicated in



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- 6.
7. Figure 6, ***Equipment value/system stats letter, 6/12/2001.***
8. Water right applications started in June 1992. Refer to **Figure 7, 19920621 water rights start.**
9. The hydrant count for the AWD is in **Figure 8, Hydrant count 8/4/2004.** This is a hand written memo to Matt. Matt's name, address, and function are not known. All of the AWD hydrants were not tested. Only those in the above test report from MM are confirmed as functional. The district has been operating for some time now. So a flow test is not necessarily required, but the hydrants should have been tested for operation at some time during the past 11 years. I recommend the AWD board put this as an action item for future work. If water is needed in the district, then you might want to take it from different hydrants to make sure all the hydrants function. Please also note there 18 hydrants in the district. One hydrant services the Mobile Home Park and High School. So the AWD has been providing mitigation for the High School and Mobile Home Park at no cost? I did not see these properties on the AWD customer list at the AWD meeting.
10. A copy of the New Water System Capacity Planning Manual is in the file. This document is more than 60 pages. The cover page, County Health Contact, and Approval Flow chart are in **Figure 9, Cover of Capacity Plan Manual no date.** The manual says you can get a copy of the Design Criteria for a potable water system by calling 303-692-3500. The manual has no revision date. However, forms in the manual are dated 12/97. A copy of the design Criteria for Potable Water Systems is in the file, dated March 1997. The Design Criteria costs \$5 USD and has more than 100 pages. I recommend someone from AWD call and see if the Design Criteria has changed and get copy of the updated Design Criteria if available. There are regulations as to what labs can be used and they are found in Article 1.2.3(8). I assume this the Colorado Code. These documents will get scanned when time is available.

## LOT A SURVEY

I did a survey of Lot A by finding the segment lengths of Lot 23 and Lot A. I walked a known section where Lot 23 markers were still up. The calibrate step on un-even ground was 2.27ft/step. This led me to the survey markers put up a long time ago at the southern edge of Lot A. Picture of the Lot A lot lines were taken and sent to the AWD Board. The building envelope of Lot 23 appears to have been moved or changed from plot drawings. The survey notes are in **Figure 10, 20120918 Lot A survey notes.** Elevations where measured using the I-Phone App Trekkers Altimeter.

Point Description	Map Based Elev ft	GPS Based Elev ft	Reference based Elev ft.	Reference
Lot 22 House Main Floor	9307	9321	9301	Range West Survey Lot 22
Lots 22/23 west corner	9331	9331		
Lot A NW corner	9344	9337		
Lot A NE corner	9324	9334		





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Lot A SE corner	9305	9338		
Lot A SW corner	9343	9343		
Lot A center	9342	9342		
Hydrant lot 19/20	9213	9291	9286	MM hydrant test report
Hydrant Lot 17	9288	9286		
Hydrant Lot 27	9295	9330	9310	MM hydrant test report

The GPS values appear to be within 20' or 0.2% error. A storage tank would then set at about 9342ft. The head pressure is given by density x gravity x height.

To service fire mitigation would then require 35 psig at the highest hydrant. This would be Lot 27 at 9330ft. 35 psig is about 76.2 ft of head. We need also to provide for friction losses. So we need about 100ft of head at normal gravity. The force of gravity varies as the distance to the center of the earth, but is also affected by the local density of the earth. This means we may have more height. The height difference at grade is currently  $9342 - 9330 = 12\text{ft}$ . So we would have elevate the tank  $100 - 12\text{ft} = 88\text{ft}$  to the bottom of the tank. The local trees are 60-63 ft tall. If we want to provide fire mitigation, then a 30ft diameter tank would have to be 50ft tall to hold the water plus be elevated from the ground or grade by 88ft. So the water tank would be  $88 + 50 = 138\text{ft}$  tall, surrounded by 60ft trees. Now we know why the design basis was changed to pump pressurized system.

## OTHER OPTIONS

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1. Lot A could have a small pressurized tank that would make sure the water system would not empty from normal use in the event of an electric outage. The tank would need to hold about 3000gallons/day x the average electrical outage. So we can estimate this saying the average electrical outage is no more than 4 hours. Then the tank needs to be >500gallons. However the highest lots will have very little pressure when the power is out; about 5 psig.
2. An underground tank the same size as the vault now under the pump house could be put in the National Forest on the Hill above HM-PUD. We had forest there before, but now all the trees are down. The tank could be buried with earth and trees covering the tank or vault. This is the most green-solution since potential energy would be stored and the AWD would be able to mitigate fire suppression with no harm to the environment. The system would be very reliable. The access to the AWD distribution system could be through Lot-A any other easement that could be negotiated. Can this be done politically?
3. Electrical generators proving emergency power for fire pumps could be installed at the pump house using LP, Diesel, or NG as fuel.
4. The fire pumps could be re-fit with LP, Diesel, of NG engines.
5. The best solution is the one with the least risk, lowest impact, and lowest costs long term. We just need to develop all the possible solutions and determine the impact and cost. To do this we need reliable data about the system that exists now, what will likely happen in the future, and will change in fire mitigation.

This concludes my initial report to the AWD Board. I hope this has been of some value.



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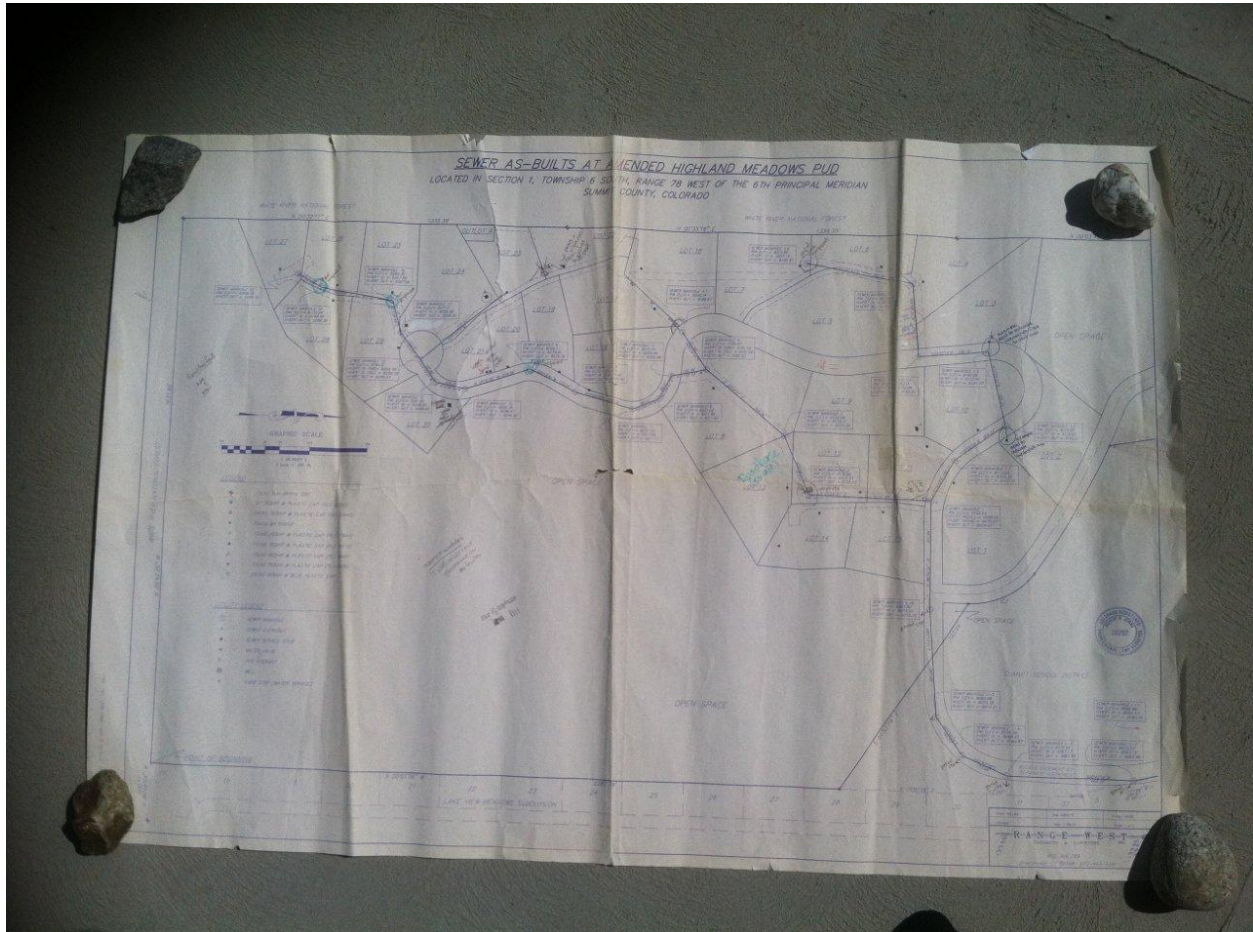


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FIGURE 1

*As built for 2 of 2 sewer HM draw*



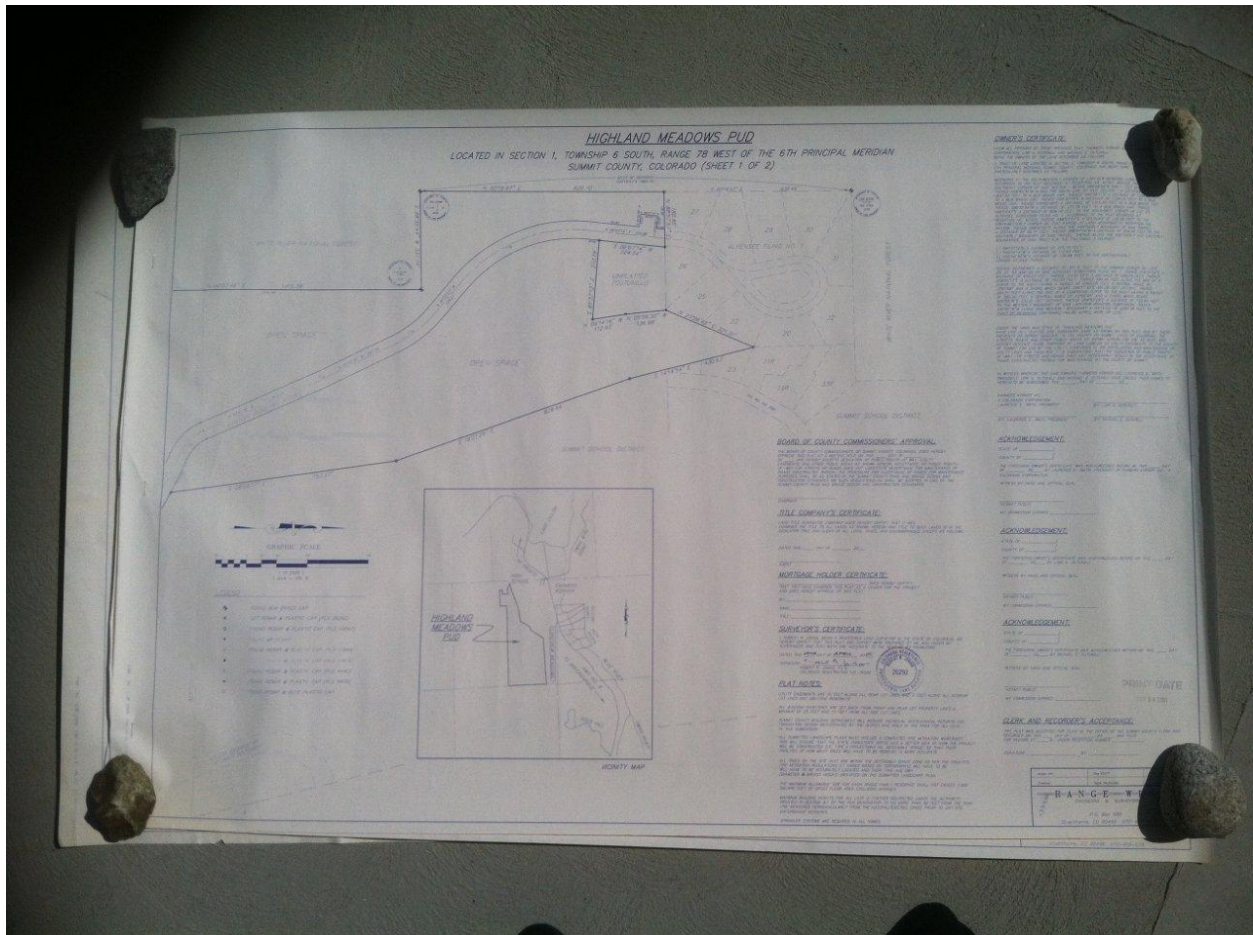


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FIGURE 2

**HM PUD 1 of 2 for 14 lots W of HS.**






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FIGURE 3

**20011126 MM flow hydrant flow test**

 **MARTIN / MARTIN**  
CONSULTING ENGINEERS

November 26, 2001

Farmer's Komer, Inc.  
P.O. Box 1005  
Frisco, Colorado 80443  
Attn: Mr. Larry Smith

Re: Farmer's Komer Water System

Dear Mr. Smith:


The estimated pressure and flow provided by the water pumping system to the fire hydrants is as follows:

<u>Location</u>	<u>Elevation<sup>(1)</sup></u>	<u>Estimated Available Emergency Flow, gpm<sup>(2)(3)</sup></u>
Lots 1,2	9120	1790
Lots 9,10	9164	1700
Lot 16	9278	1420
Lot 23	9286	1400
Lots 24,25	9273	1420
Lot 27	9310	1250

Notes:  
(1) Elevation data provided by Pearson Engineering, Inc.  
(2) Emergency Flow = Total estimated flow - estimated peak day flow.  
(3) Available flow based on pump data submitted by Janssen/Samuelsen for proposed pumps. Two (2) large pumps (655 gpm) and two (2) medium pumps (165 gpm) running.

Pressure and flow vary relative to the elevation of the lot or fire hydrant to be served. In addition, maximum available flow is dependent on the number of fire hydrants in the vicinity of the structure and the maximum flow that can be withdrawn from the hydrant.

Sincerely,

  
Patsy J. Sullivan, P.E.  
Project Engineer

c: Gary Green, Red, White & Blue Fire Protection District

PJS:njt

4251 KIRKLINE • P.O. BOX 4001 • WHEAT RIDGE, COLORADO 80034 • 303.431.5100

*20120918 - DAF  
No hydrant on lot 23.  
should be lot 19, 20*





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FIGURE 4

***Farmers Korner Water Use Assumptions***

FARMERS KORNER DEVELOPMENT WATER USE ASSUMPTIONS			
INSIDE USES			
Indoor Residential Uses:			
Highland Meadows:	3.5 persons per unit		
Alpensee 3:	2 persons per unit		
Henriksen:	3.5 persons		
All:	100 gpcd		
Indoor Commercial Uses:			
	0.175 gal/sq ft/day		
OUTSIDE USES			
Irrigated Acreage:			
Highland Meadows:	3,000 sq ft/unit start-up with 2.07 acre limit incl. common areas		
	1,000 sq ft/unit permanent		
Alpensee 3:	1.14 acres		
Henriksen:	1.6 acres		
Irrigation Requirement:			
Farmers Korner:	5 inches per year		
Henriksen:	1.45 ac-ft/ac/yr		
Stockwatering:			
	12 gal/head/day		
	10 horse limit		
Miscellaneous Outside Uses:			
	200 gals/unit/month (800 gals/yr/unit)		
EVAPORATION RATES (NET)			
Month	Rate (af/ac)	Month	Rate (af/ac)
Jan	0	Jul	0.25
Feb	0	Aug	0.18
Mar	0.04	Sep	0.18
Apr	0.11	Oct	0.11
May	0.2	Nov	0.01
Jun	0.3	Dec	0
		Total	1.38



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Table 1 - Revised  
Farmer's Korner  
Summary of Demands and Consumptive Use - Phase II without Henriksen Property  
(values in acre-feet)

Start-Up Irrigation Scenario

Month	Highland Meadows			Alpensee 3			Phase II Totals		
	Demand	Irrigation	Misc. Out. Uses	Commercial Demand	Residential Demand	Irrigation Demand	Total Demand	Total CU	Phase II Totals Demand CU
Jan	0	0	0	0.416	0.132	0.008	0.556	0.028	0.568
Feb	0	0	0	0.376	0.019	0.007	0.392	0.026	0.513
Mar	0	0	0	0.416	0.152	0.008	0.576	0.028	0.568
Apr	0	0	0	0.403	0.020	0.007	0.430	0.028	0.550
May	0.22	0.22	0.02	0.416	0.152	0.008	0.688	0.148	0.924
Jun	0.22	0.22	0.02	0.403	0.020	0.007	0.670	0.148	0.905
Jul	0.22	0.22	0.02	0.416	0.152	0.008	0.688	0.148	0.924
Aug	0.22	0.22	0.02	0.416	0.152	0.008	0.688	0.148	0.924
Sep	0	0	0	0.403	0.020	0.007	0.430	0.028	0.550
Oct	0	0	0	0.416	0.152	0.008	0.576	0.028	0.568
Nov	0	0	0	0.403	0.020	0.007	0.430	0.028	0.550
Dec	0	0	0	0.416	0.152	0.008	0.576	0.028	0.568
Total	0.86	0.86	0.08	4.901	1.792	0.090	7.173	0.815	8.114

Permanent Irrigation Scenario

Month	Highland Meadows			Alpensee 3			Phase II Totals		
	Demand	Irrigation	Misc. Out. Uses	Commercial Demand	Residential Demand	Irrigation Demand	Total Demand	Total CU	Phase II Totals Demand CU
Jan	0	0	0	0.416	0.132	0.008	0.556	0.028	0.568
Feb	0	0	0	0.376	0.019	0.007	0.392	0.026	0.513
Mar	0	0	0	0.416	0.152	0.008	0.576	0.028	0.568
Apr	0	0	0	0.403	0.020	0.007	0.430	0.028	0.550
May	0.07	0.07	0.02	0.416	0.152	0.008	0.688	0.148	0.780
Jun	0.07	0.07	0.02	0.403	0.020	0.007	0.670	0.148	0.762
Jul	0.07	0.07	0.02	0.416	0.152	0.008	0.688	0.148	0.780
Aug	0.07	0.07	0.02	0.416	0.152	0.008	0.688	0.148	0.780
Sep	0	0	0	0.403	0.020	0.007	0.430	0.028	0.550
Oct	0	0	0	0.416	0.152	0.008	0.576	0.028	0.568
Nov	0	0	0	0.403	0.020	0.007	0.430	0.028	0.550
Dec	0	0	0	0.416	0.152	0.008	0.576	0.028	0.568
Total	0.29	0.29	0.08	4.901	1.792	0.090	7.173	0.815	7.540

Notes: Water rights and an augmentation plan for in-house uses at Highland Meadows were decreased in Case No. 93CW241(A). Irrigation demand is based on a total application of five inches over a four-month growing season from May through August and 100 percent consumption.

Miscellaneous outside uses assumes 200 gallons per unit per month. Each of the 30 units in the Highland Meadows Development has approximately 3,000 ft<sup>2</sup> of start-up irrigation planned and 1,000 ft<sup>2</sup> of permanent irrigation planned. Inside commercial demands are based on 0.175 gal/day/ft<sup>2</sup> and 25,000 ft<sup>2</sup> of commercial space in the Alpensee III Development. Demands for residential units in the Alpensee 3 development are based on two people using 100 gallons per day per person, year-round. The Alpensee III Development has 1.14 acres of irrigated landscape associated with it. Inside uses at Alpensee III are five percent consumptive based on a central wastewater treatment system.



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**Farmer's Korner**  
**Summary of Average Pumping Requirements @ Buildout**  
(All Values In Acre-Feet)

Temporary Irrigation Period				
	Farmers Korner Wells			Henriksen
Month	Phase I	Phase II	Total	Water Requirement
Jan	1.045	0.57	1.613	0.045
Feb	1.045	0.51	1.558	0.040
Mar	1.045	0.57	1.613	0.045
Apr	1.045	0.55	1.595	0.043
May	1.045	0.92	1.965	0.772
Jun	1.045	0.91	1.955	0.770
Jul	1.045	0.92	1.965	0.772
Aug	1.045	0.92	1.965	0.772
Sep	1.045	0.55	1.595	0.043
Oct	1.045	0.57	1.613	0.045
Nov	1.045	0.55	1.595	0.043
Dec	1.045	0.57	1.613	0.045
Totals:				
May-Aug	4.18	3.67	7.85	3.09
Sep-Apr	8.36	4.44	12.79	0.35
Annual	12.55	8.11	20.66	3.43

Permanent Conditions				
	Phase II			Henriksen
Month	Phase I	Phase II	Total	Water Requirement
Jan	1.045	0.57	1.615	0.045
Feb	1.045	0.51	1.555	0.040
Mar	1.045	0.57	1.615	0.045
Apr	1.045	0.55	1.595	0.043
May	1.045	0.78	1.825	0.772
Jun	1.045	0.76	1.805	0.770
Jul	1.045	0.78	1.825	0.772
Aug	1.045	0.78	1.825	0.772
Sep	1.045	0.55	1.595	0.043
Oct	1.045	0.57	1.615	0.045
Nov	1.045	0.55	1.595	0.043
Dec	1.045	0.57	1.615	0.045
Totals:				
May-Aug	4.18	3.10	7.28	3.09
Sep-Apr	8.36	4.44	12.80	0.35
Annual	12.55	7.54	20.09	3.43



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Table 2 - Revised  
Farmer's Korner  
Final Demand Tables -Phase II Including Henrickson Property  
(values in acre-feet)

Start-Up Irrigation Scenario

Month	Henrickson Property				Farmer's Korner Phase II		Total (Including Henrickson)	
	Inside Demand	CU	Irrigation Demand	Stock CU	Demand	Depletions	Total Demand	Total Depletions
Jan	0.033	0.003	0	0.011	0.568	0.028	0.613	0.043
Feb	0.030	0.003	0	0.010	0.513	0.026	0.554	0.039
Mar	0.033	0.003	0	0.011	0.568	0.028	0.613	0.043
Apr	0.032	0.003	0	0.011	0.550	0.028	0.593	0.042
May	0.033	0.003	0.727	0.582	0.924	0.384	1.695	0.980
Jun	0.032	0.003	0.727	0.582	0.905	0.383	1.676	0.979
Jul	0.033	0.003	0.727	0.582	0.924	0.384	1.695	0.980
Aug	0.033	0.003	0.727	0.582	0.924	0.384	1.695	0.980
Sep	0.032	0.003	0	0.011	0.550	0.028	0.593	0.042
Oct	0.033	0.003	0	0.011	0.568	0.028	0.613	0.043
Nov	0.032	0.003	0	0.011	0.550	0.028	0.593	0.042
Dec	0.033	0.003	0	0.011	0.568	0.028	0.613	0.043
Total	0.392	0.039	2.908	2.326	8.114	1.756	11.548	4.256

Permanent Irrigation Scenario

Month	Henrickson Property				Farmer's Korner Phase II		Total (Including Henrickson)	
	Inside Demand	CU	Irrigation Demand	Stock CU	Demand	Depletions	Total Demand	Total Depletions
Jan	0.033	0.003	0	0.011	0.568	0.028	0.613	0.043
Feb	0.030	0.003	0	0.010	0.513	0.026	0.554	0.039
Mar	0.033	0.003	0	0.011	0.568	0.028	0.613	0.043
Apr	0.032	0.003	0	0.011	0.550	0.028	0.593	0.042
May	0.033	0.003	0.727	0.582	0.924	0.384	1.552	0.837
Jun	0.032	0.003	0.727	0.582	0.905	0.383	1.532	0.835
Jul	0.033	0.003	0.727	0.582	0.924	0.384	1.552	0.837
Aug	0.033	0.003	0.727	0.582	0.924	0.384	1.552	0.837
Sep	0.032	0.003	0	0.011	0.550	0.028	0.593	0.042
Oct	0.033	0.003	0	0.011	0.568	0.028	0.613	0.043
Nov	0.032	0.003	0	0.011	0.550	0.028	0.593	0.042
Dec	0.033	0.003	0	0.011	0.568	0.028	0.613	0.043
Total	0.392	0.039	2.908	2.326	7.540	1.182	10.974	3.682

Notes:  
In-house demands for Bud's property are based on 3.5 people using 100 gal/Waterperson.  
In-house consumptive use is ten percent based on an individual non-irrigative septic disposal system.  
Irrigation demands are based on 1.6 acres (70,000 sq. ft.) of irrigation, a consumptive use of 1.45 ac/Water spread over  
a four-month irrigation season, and an irrigation efficiency of 80 percent.  
Stock watering demands are based on ten horses using 12 gallons per day per head (1000% consumptive).  
Farmer's Korner demand and depletion are based on totals collected in Table 2.





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Table 2 - Revised  
Farmer's Korner

Final Demand Tables Phase II Including Herriksen Property  
(values in acre-feet)

Start-Up Irrigation Scenario

Month	Henriksen Property					Farmer's Korner Phase II		Total (Including Herriksen)	
	Demand	CU	Irrigation	Demand	CU	Demand	Depletions	Demand	Depletions
Jan	0.033	0.003	0	0	0.011	0.011	0.028	0.043	0.043
Feb	0.030	0.003	0	0	0.010	0.010	0.026	0.041	0.039
Mar	0.033	0.003	0	0	0.011	0.011	0.028	0.043	0.043
Apr	0.032	0.003	0	0	0.011	0.011	0.028	0.042	0.042
May	0.033	0.003	0.727	0.582	0.011	0.011	0.384	1.625	0.980
Jun	0.032	0.002	0.727	0.582	0.011	0.011	0.383	1.626	0.979
Jul	0.033	0.003	0.727	0.582	0.011	0.011	0.384	1.625	0.980
Aug	0.033	0.003	0.727	0.582	0.011	0.011	0.384	1.625	0.980
Sep	0.032	0.002	0	0	0.011	0.011	0.028	0.042	0.042
Oct	0.033	0.003	0	0	0.011	0.011	0.028	0.043	0.043
Nov	0.032	0.002	0	0	0.011	0.011	0.028	0.042	0.042
Dec	0.033	0.003	0	0	0.011	0.011	0.028	0.043	0.043
Total	0.392	0.035	2.908	2.326	0.134	8.114	1.756	11.248	4.256

Permanent Irrigation Scenario

Month	Henriksen Property					Farmer's Korner Phase II		Total (Including Herriksen)	
	Demand	CU	Irrigation	Demand	CU	Demand	Depletions	Demand	Depletions
Jan	0.033	0.003	0	0	0.011	0.011	0.028	0.043	0.043
Feb	0.030	0.003	0	0	0.010	0.010	0.026	0.041	0.039
Mar	0.033	0.003	0	0	0.011	0.011	0.028	0.043	0.043
Apr	0.032	0.003	0	0	0.011	0.011	0.028	0.042	0.042
May	0.033	0.003	0.727	0.582	0.011	0.011	0.384	1.552	0.837
Jun	0.032	0.002	0.727	0.582	0.011	0.011	0.383	1.552	0.835
Jul	0.033	0.003	0.727	0.582	0.011	0.011	0.384	1.552	0.837
Aug	0.033	0.003	0.727	0.582	0.011	0.011	0.384	1.552	0.837
Sep	0.032	0.002	0	0	0.011	0.011	0.028	0.042	0.042
Oct	0.033	0.003	0	0	0.011	0.011	0.028	0.043	0.043
Nov	0.032	0.002	0	0	0.011	0.011	0.028	0.042	0.042
Dec	0.033	0.003	0	0	0.011	0.011	0.028	0.043	0.043
Total	0.392	0.035	2.908	2.326	0.134	7.540	1.182	10.974	3.682

Notes: Irrigation estimates for this property are based on 3.5 people using 100 gallons per person.

Irrigation consumptive use is ten percent based on individual acreage of irrigated property.



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FIGURE 5

**Well drill and reports, 7/14/1999**

WELL CONSTRUCTION AND TEST REPORT STATE OF COLORADO, OFFICE OF THE STATE ENGINEER		For Office Use only	
1. WELL PERMIT NUMBER <u>MH-25403</u>			
2. OWNER NAME(S) <u>Larry Smith</u> Mailing Address <u>P.O. Box 127</u> City, St. Zip <u>Frisco, CO 80443</u> Phone ( ) <u>970-453-0353</u>			
3. WELL LOCATION AS DRILLED: <u>1/4 SW 1/4, Sec. 31 Twp. 5 S Range 77 W</u> DISTANCES FROM SEC. LINES: ft. from _____ Sec. line and _____ ft. from _____ Sec. line. OR SUBDIVISION: _____ LOT _____ BLOCK _____ FILING(UNIT) _____ STREET ADDRESS AT WELL LOCATION: _____			
4. GROUND SURFACE ELEVATION _____ ft. DRILLING METHOD <u>rotary</u> DATE COMPLETED <u>April 15, 1995</u> TOTAL DEPTH <u>38</u> ft. DEPTH COMPLETED <u>38</u> ft.			
5. GEOLOGIC LOG: Depth Description of Material (Type, Size, Color, Water Location)		6. HOLE DIAM. (in.) From (ft) To (ft)	
		9 0 28	
		5 1/2 28 38	
0 to 35 feet - boulders and gravels		7. PLAIN CASING	
		OD (in) Kind Wall Size From(ft) To(ft)	
		7 steel .231 0 23	
35 to 38 feet - black shale		PERF. CASING: Screen Slot Size:	
water at 19 feet		7 steel .231 23 28	
		5 9/16 steel .188 28 38	
		8. FILTER PACK:	
		Material _____	
		Size _____	
		Interval _____	
		9. PACKER PLACEMENT:	
		Type _____	
		Depth _____	
REMARKS:		10. GROUTING RECORD:	
		Material Amount Density Interval Placement	
		cement 1 sack 7 gal/sack 10 to 20 gravity	
11. DISINFECTION: Type <u>clorox</u> Amt. Used <u>1/8 cup</u>			
12. WELL TEST DATA: <input type="checkbox"/> Check box if Test Data is submitted on Form No. GWS 39 Supplemental Well Test. TESTING METHOD <u>air</u> Static Level <u>19</u> ft. Date/Time measured <u>April 15, 1995</u> Production Rate <u>50</u> gpm. Pumping level _____ ft. Date/Time measured _____ Test length (hrs.) <u>2</u> Remarks _____			
13. I have read the statements made herein and know the contents thereof, and that they are true to my knowledge. (Pursuant to Section 24-4-104 (13)(a) C.R.S., the making of false statements herein constitutes perjury in the second degree and is punishable as a class 1 misdemeanor.)			



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JUL-27-99 07:16P

P.01

**SAMUELSON PUMP CO. INC.**

P.O. BOX 297  
GLENWOOD SPRINGS  
COLORADO 81502

WATER SYSTEMS  
SALES, SERVICE & INSTALLATION  
945-6309

July 28, 1999

Larry Smith  
P.O. Box 127  
Frisco, Co. 80443

Attn: Larry

On July 14, 1999 a well test was conducted on Monitor Hole  
MH-35971 the following information was obtained;

Well Depth-----50'-0"  
Casing size (top)-----10" (steel)  
Standing water level-----8'-9"  
Max. drawdown stable condition----24'-9"  
Production is greater than-----200 gpm

This test was conducted with a 7 1/2 hp. Goulds submersible  
Model 225H. The well recovered back to 8'-9" in 20 min. If  
you have any questions please call me Raun Samuelson at 970-  
945-6309.

Sincerely;

Raun Samuelson



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FIGURE 6

***Equipment value/system stats letter, 6/12/2001.***

**ALPENSEE WATER DISTRICT**  
**P. O. Box 2204**  
**Frisco, CO 80443**  
**(970) 453-1002**

June 12, 2001

To Larry  
Fax 303-368-5863


From Lori Cutunilli  
Fax 970-453-8522  
Cell 970-389-1524

Hi Larry:

Following are the answers to your questions regarding insurance coverage for the  
Alpensee Water District:

There are approximately 1-1/4 miles of water line  
We anticipate using approximately 1 acre-foot of water annually  
The tank holds 270,000 gallons of water  
Value of pumps, controls, etc. is \$700,000.00  
The water lines are ductile iron  
The pump room is approximately 800 square feet

Please feel free to call or fax me if I can be of further assistance or when you have  
a quote. Thanks.

Sincerely,  
  
Lori Cutunilli

Larry phone 1-303-568-5757 x339  
1-800-530-3001 x339  
email llambrecht@wilsonins.com/website www.wilsonins.com



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FIGURE 7

**19920621 water rights start**

JUL 21 '92 02:00PM L R C H E F.1

PCB 274BDD02 PRELIMINARY ESTIMATES JUNE 21, 1992

ESTIMATED ANNUAL WATER DEMAND AND CONSUMPTIVE USE FOR RICHLAND MEADOWS, SUMMIT ADVENTURE PARK, ET AL				
PROJECT COMPONENT	QUANTITY	ANNUAL DEMAND IN:		AVERAGE ANNUAL CONSUMPTIVE USE, AC FT
		GALLONS	AC FT	
<b>HIGHLAND MEADOWS P.U.D.:</b>				
1st Filing, Residential Units	16	2,045,400	6.28	0.63
2nd Filing, Residential Units	16	2,045,400	6.28	0.63
Sub Totals	32	4,090,800	12.56	1.26
<b>ALPENSEE FILING 3:</b>				
Commercial Area, Sq Ft	22,000	1,607,100	4.93	0.43
<b>SUMMIT ADVENTURE PARK P.U.D.:</b>				
Residential Units	72	9,504,360	28.25	2.82
<b>Outdoor Recreation (a):</b>				
Summer Visitors	100	228,281	0.70	0.07
Fall Visitors	50	114,141	0.35	0.04
Winter Visitors	125	285,352	0.88	0.09
Spring Visitors	25	57,070	0.17	0.02
Sub Totals		684,844	2.11	0.22
Irrigation Under Ditch (b), Acres	10	9,735,500	30.00	15.00
Net(c) Lake Evaporation, Acres	5	2,819,073	8.95	8.95
<b>OTHER MISCELLANEOUS WELL DEMANDS?:</b>				
Related Residential Units (d)	4	511,350	1.57	0.16
Former Corner Office, Sq. Ft.	1,000	36,515	0.11	0.01
Other Existing Res. Units (e)	3	363,513	1.18	0.12
Homes (f)	15	27,394	0.08	0.08
Barn, Sq. Ft. (g)	1,000	7,325	0.02	0.02
		966,087	2.96	0.39
<b>SUMMARY:</b>				
<b>SUB TOTALS BY CATEGORY:</b>				
WELLS		16,552,131	50.81	5.18
LAKE EVAPORATION		2,819,073	8.95	8.95
POSSIBLE IRRIGATION		9,735,500	30.00	15.00
TOTALS FOR PROJECTS		29,247,704	89.77	29.14
HISTORIC IRRIGATION CONSUMPTIVE USE CREDITS				40.00
UNALLOCATED CONSUMPTIVE USE CREDITS				10.66

**DRAFT**

**ASSUMPTIONS:**

- (a) IN-BUILDING USES FOR WELLS, EXCEPT AS IN YEAR-ROUND FULL OCCUPANCY
- (b) 3.5 PEOPLE PER UNIT
- (c) 100 GALLONS PER PERSON PER RESIDENTIAL U
- (d) 10% ASSUMED IN-BUILDING CONSUMPTIVE USE
- (e) 32 INCHES OF TOTAL LAKE EVAPORATION PER
- (f) 15 INCHES OF PRECIPITATION PER YEAR
- (g) 70% CREDIT FOR EFFECTIVENESS OF PRECIPITAT
- (h) 1.5 AC FT / ACRE CONSUMPTIVE USE FOR IRRIGA
- (i) 50% FLOOD IRRIGATION EFFICIENCY
- (j) 325,850 GALLONS PER ACRE FOOT
- (k) 0.3 GAL/SQ FT/DAY FOR COMMERCIAL DEMAND
- (l) 25 GALLONS PER DAY FOR PER VISITOR
- (m) 365.25 DAYS PER YEAR
- (n) 5 GALLONS PER HORSE PER DAY
- (o) 0.01 GAL/SQ FT / DAY FOR BARN
- (p) 0.1 GAL/SQ FT/DAY FOR OFFICE SPACE
- (q) 0 ROUNDING CONSTANT FOR GALLONS
- (r) 2 ROUNDING CONSTANT FOR ACRE FEET

(a) EACH SEASON IS 1/4 OF A YEAR  
(b) FLOOD IRRIGATION UNDER BLUE DANUBS DITCH  
(c) TOTAL EVAPORATION LESS 'EFFECTIVE' PRECIPIT  
(d) PRIVATE PARTIES RELATED TO LARRY SMITH  
(e) OTHER EXISTING BUT UNRELATED PARTIES  
(f) HORSES AND BARN ASSUMED TO BE 100% DEPLET

1 of pages 1  
Ron Carlson  
19 Highland Meadows  
Breckenridge, CO 80424  
455-9589  
1-688-3757

1992-06-23 15:03 PAGE = 01

LEONARD KIES CONSULTING WATER ENGINEERS, INC. FILE: WTRDEMND.WQ1





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FIGURE 8

**Hydrant count 8/4/2004**

Lori Cutunelli 485-0819  
Matt fax 262-0217

8-12-04

Hi Matt~

① Fire Hydrant Count for Alpensee Water Dist

13	Subdivision
4	Alp 3 Commercial
1	by Mobile Home Park & School
<hr/> 18	Total

② Following is Nov 2001 letter stating flow test results from the furthest, highest hydrant from pump house which is what was requested & approved by RWB.

③ Also letter from system engineer

④ Missing page with "Water Supply Info" requested.

We were never required to test all the hydrants flow - only at the top of the system.

But Diggers did flushing & kept records of pressure (hopefully - I witnessed all tests on ea hydrant but do not have the records)

Thanks Lori

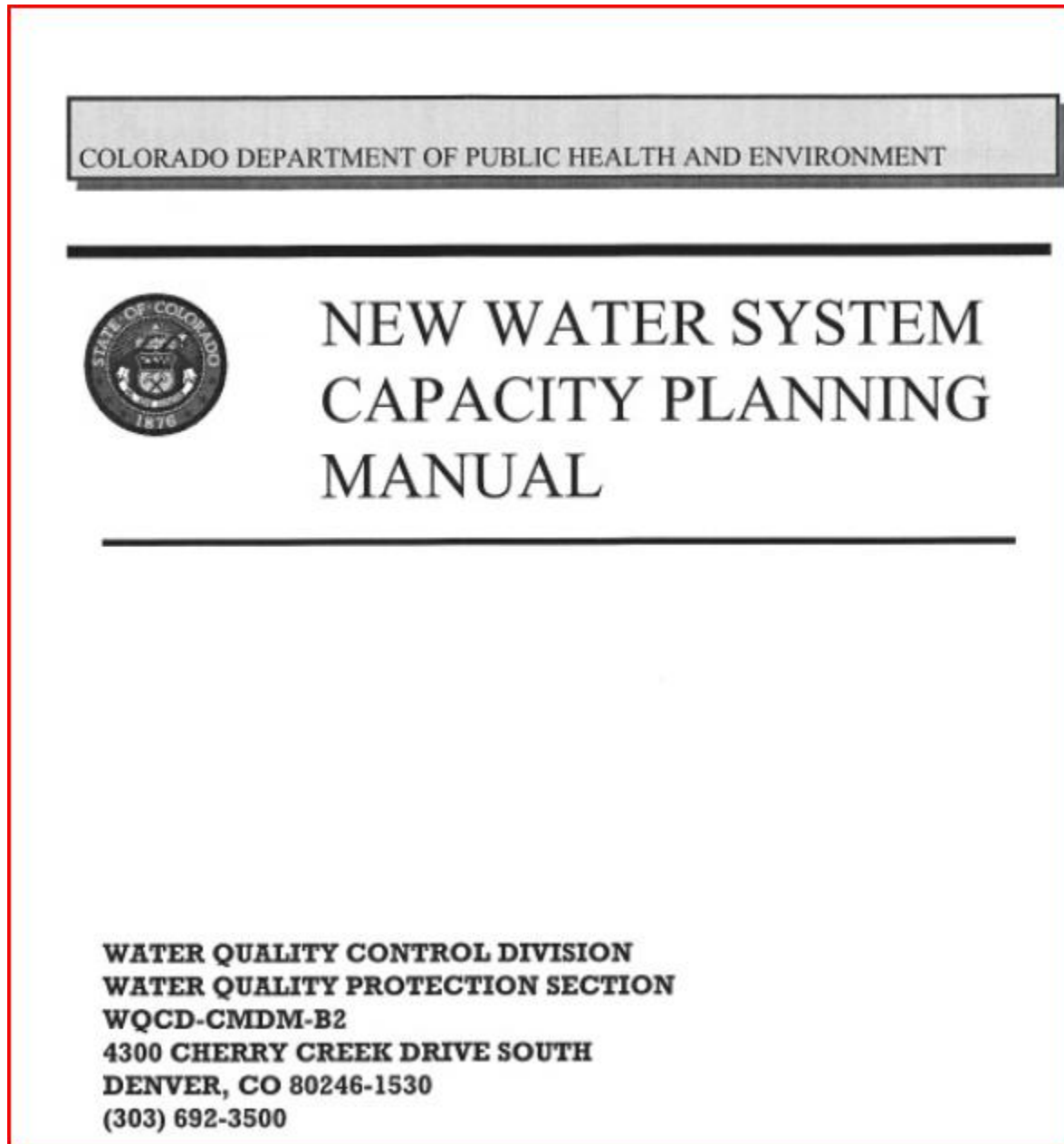


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FIGURE 9

*Cover of Capacity Plan Manual no date*

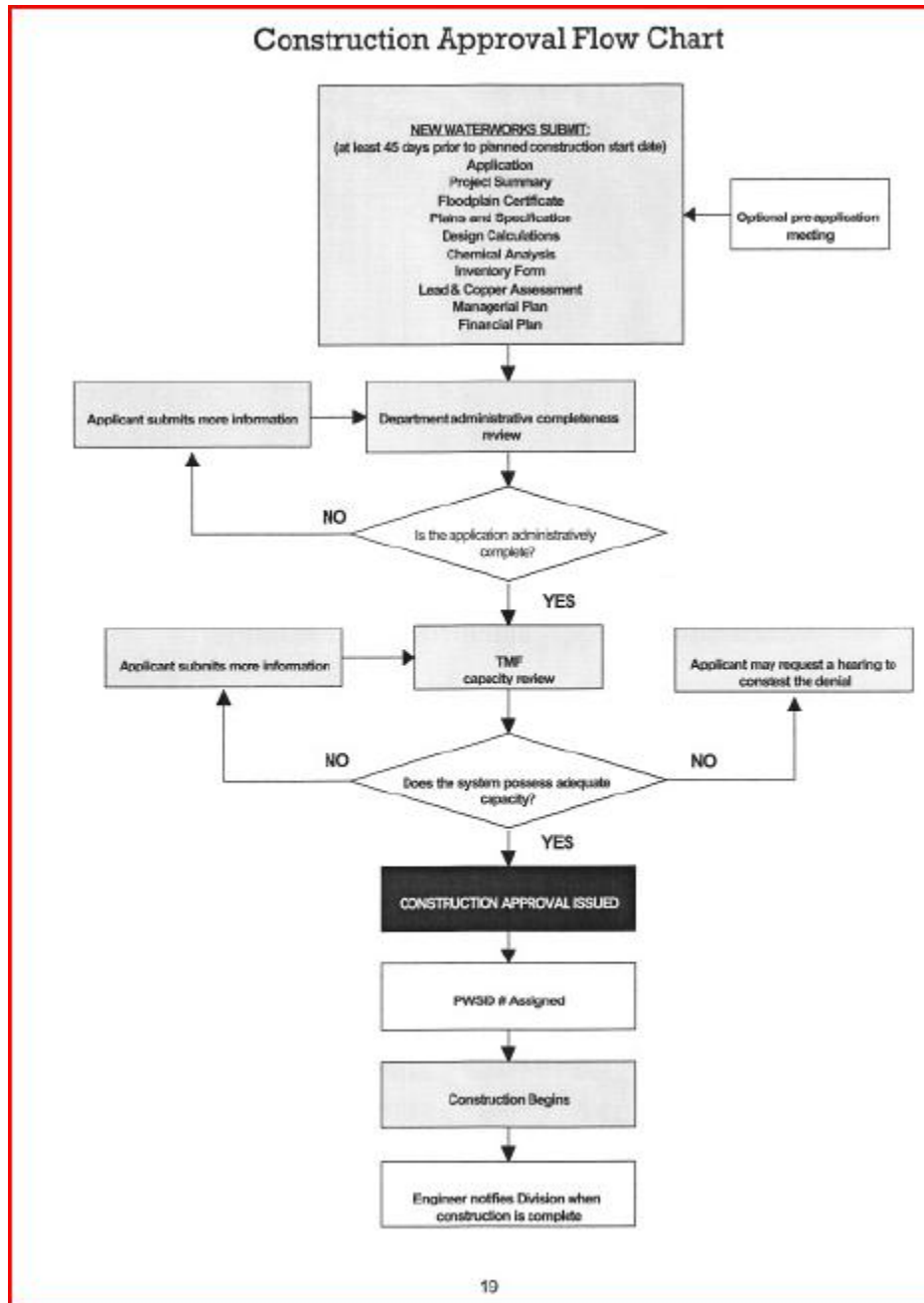






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SAN MIGUEL CO ENV HEALTH DEPT Env Hlth Officer      Dave Schnock      970-728-0447  
P.O. Box 4130  
Telluride, CO 81435  
970-728-0447, Fax No. 970-728-6325

### SEDGWICK COUNTY

NORTHEAST COLORADO HEALTH DEPT	Director:	Denise Hase	970-522-3741x120
700 Columbine Street	Adm Dir:	Laura Jorstad*	970-522-3741x117
Sterling, CO 80751	Env Hlth Dir:	Rob Witt	970-522-3741x122
970-522-3741, Fax No. 970-522-1412	Nurs Dir:	Joy Vondy-Butt	970-522-3741x150

### SUMMIT COUNTY

SUMMIT CO PH NURSING SERVICE	PH Nurse	Debby Crook	970-668-4181
P.O. Box 2280	Hlth Officer	Pat Duletsky	970-668-5584
Frisco, CO 80443			
970-668-5230, Fax No. 970-668-4115			

SUMMIT COUNTY ENV HEALTH DEPT	Env Hlth Officer	Jim Rada	970-668-4072
P.O. Box 5660 - 37 Summit County Rd #1005			
Frisco, CO 80443			
970-668-4070, Fax No. 970-668-4225			

### TELLER COUNTY

TELLER CO PH NURSING SERVICE	Director	Karen O'Brien	719-687-5248
P.O. Box 5079			
Woodland Park, CO 80866			
719-687-1404, Fax No. 719-687-5256			

TELLER CO ENV HEALTH DEPT	Env Hlth Officer	Tom Wood, MD	719-687-5250
P.O. Box 5079			
Woodland Park, CO 80866			
719-687-5250, Fax No. 719-687-5256			

### WASHINGTON COUNTY

NORTHEAST COLORADO HEALTH DEPT	Director:	Denise Hase	970-522-3741x120
700 Columbine Street	Adm Dir:	Laura Jorstad*	970-522-3741x117
Sterling, CO 80751	Env Hlth Dir:	Rob Witt	970-522-3741x122
970-522-3741, Fax No. 970-522-1412	Nurs Dir:	Joy Vondy-Butt	970-522-3741x150

### WELD COUNTY

WELD COUNTY HEALTH DEPT	Director:	John Pickle	970-304-6410x2104
1555 N. 17th Avenue	Office Mgr:	Judy Nero*	970-304-6410x2122
Greeley, CO 80631	Env Hlth Prot:	Jeff Stoll	970-304-6410
970-304-6416	Public Health		
	Hlth Educ:	Karen Spink	970-304-6410x2350
	Nurs Dir:	Linda Carlson	970-304-6420x2304

