

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 63-33707

Exam Date: 2/20/2015

1. Current Owner: CHARLES MADENFORD FAMILY TRUST
3605 N POLLARD LN
STAR ID 83669
(208) 830-9911
2. Accompanied by: Gary Madenford
Phone No: 208 830 9911
Address: 3605 N Pollard Ln Star ID 83669
Relationship to Permit Holder: Owner

3. SOURCE

GROUND WATER

TRIBUTARY**B. OVERLAP REVIEW**

1. Other water rights with the same place of use: None
2. Other water rights with the same point of diversion: None

C. DIVERSION AND DELIVERY SYSTEM1. LOCATION OF POINT(S) OF DIVERSION:

GROUND WATER NW¼ SW¼ Sec. 33, Twp 05N, Rge 01W, B.M. ADA County

Method of Determination: Well location found on site. Aerial photography matched with PLSS mapping.

2.

PLACE OF USE: AESTHETIC STORAGE, RECREATION STORAGE & WILDLIFE STORAGE

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	
05N	01W	33										X							

Method of Determination: Aerial photography matched with PLSS mapping.

3. ☒ Delivery System Diagram Attached (required). Indicate all major components and distances between components. Indicate weir size/pipe as applicable.
- ☐ Map Attached Showing Location(s) of point(s) of diversion and place(s) of use (required). Scale must be 1:24,000 or greater.
- ☐ Aerial Photo Attached (required for irrigation of 10+ acres).
- ☐ Photo of Diversion and System Attached

4. Well or Diversion Identification No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size
Unk.	Unk	Unk	Unk	Unk	Unk

*Code to correspond with No. on map and aerial photo

D. FLOW MEASUREMENTS

1.Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date

2. Measurements:

E. FLOW CALCULATIONS

_____Additional Computation Sheets Attached

Measured Method: 5 gallon bucket

Average time to fill 5 gallon bucket: 7.1 seconds.

5 gallons / 7.1 seconds * 0.133 ft³ / gallon = 0.094 cfs.

F. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation:

$$V_{I.R.} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) =$$

$$V_{D.R.} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation season}) \times 1.9835 =$$

$$V = \text{Smaller of } V_{I.R.} \text{ and } V_{D.R.} =$$

2. Volume Calculations for Other Uses: See pond spreadsheet.

G. NARRATIVE/REMARKS/COMMENTS

This field exam was conducted February 20, 2015 by Water Resource Agent Patrick Kelly. Permit 63-33707 authorized a diversion of 0.25 cfs from ground water for a number of storage uses. Proof of beneficial use was filed on October 19, 2012.

Gary Madenford was the contact for the field exam and directed me to the point of diversion, inlets and outlet. Mr. Madenford has constructed a pond system that allows him to fill the pond with groundwater under WR 63-33707 and surface water shares from the Farmers Union Ditch Co. The pond was dry at the time of the field exam. Historical photographs were used to establish beneficial use. Gary informed me that he has recently had seepage issues with the pond. The pond was constructed with bentonite lining. The draining of the pond has allowed for vegetation to grow and has broken up the bentonite. Gary did attempt to fill the pond in the summer of 2014, and provided a letter from the ditch company showing that 48.3 af of water from the Company entered the pond system and all of which was lost to seepage. This report is included in the field exam documents. Mr. Madenford has plans this spring to till the land, remove the vegetation, compact the ground and reseal the pond with bentonite. Because there seems to be seepage associated with the pond at the time of licensing, I am recommending a volume with seepage losses included.

The well primarily serves as domestic in-home use. Diversion from the well comes from a submersible pump located on the east side of the property and passes through 2" PVC pipe to the pond. No information on the submersible pump became available and a well drillers report for the well could not be located. Water valves were turned on at the time of the field exam so that a diversion rate could be measured. Flow did not fill the pipe, so the panametrics device was not used. A stop watch was used to measure the time required to fill a five gallon bucket. Ten flow samples were taken to get an

average fill rate of 7.1 seconds. 5 gallons per 7.1 seconds converts to a diversion rate of 0.094 cfs. Rounding up, a suggested diversion rate would be 0.10 cfs at license.

Using aerial imagery and ArcMAP tools, I was able to determine a surface area of 2.3 acres. Depth of the pond varied from 5 feet on the east side to 8 feet towards the west for an average depth of 6.5 feet. This information was used in the pond spreadsheet and gave a pond capacity of 14.95 af. Evaporation data was taken from a local measuring site managed by the U of I Kimberly Research Center. Soil data for the area suggests a seepage rate of 0.003 ft/day for low to medium clays. Given the seepage issues Mr. Madenford is experiencing, it is clear the hydraulic conductivity is much higher. Still, all of the information was used in the attached report to identify an estimated evaporation loss of 5.4 af, a seepage loss of 2.5 af, and a total volume required of 22.8 af.

Irrigation for the property is covered by surface water shares out of the canal. Irrigation water from the canal is able to enter the pond via gravity flow. There is an inlet for the irrigation system located at the bottom of the pond where water is then able to pass into the sprinkler system.

An overflow valve is located on the SW corner of the pond. The outlet leads back into the irrigation canal.

Issues with establishing beneficial use arise in this case given that the application for permit and proof of beneficial use form was filed on the same day, October 19, 2012. The permit was signed May 29, 2013. If we suggest this time frame for establishing beneficial use, then the permit is void because the pond was dry during this period, and no beneficial use of water was established. Mr. Madenford did not provide any evidence that was diverted from the well into the pond at this time. And historical aerial imagery for the period identified above supports a dry pond, or no beneficial use.

A second issue with the pond is the primary source of water. It is clear that the property owner has built a pond/irrigation system that fills using surface water shares from Farmers Union Ditch Co. The well is connected to the system, however it would be better to identify the system for what it is, and request the ditch company to transfer a portion of their water right (the diverted storage volume) to storage use, since Mr. Madenford provided evidence of such at the time of the field exam.

Have conditions of permit approval been met? ____Yes ____X____No

H. RECOMMENDATIONS

1. Recommended Amounts

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>DIVERSION RATE</u>	<u>ANNUAL VOLUME</u>
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Totals:

VOID PERMIT

2. Recommended Amendments

____Change P.D. as reflected above ____Add P.D. as reflected above ____X____None

____Change P.U. as reflected above ____Add P.U. as reflected above ____Other

I. AUTHENTICATION

Field Examiner's Name Patricia Wiley Date 2-20-2015

Reviewer _____ Date _____

Total Storage Calculations

FILE NUMBER	63-33707
REVIEWER	Patrick Kelly
DATE	2/20/2015

This spreadsheet has been designed by Idaho Department of Water Resources to estimate the total seepage, evaporation and fill capacity required for a pond.

User Input
Calculated value
Formula Explanations

Surface Area (AC.)	2.3	"Surface Area" is automatically carried over from the "Seepage Loss" sheet.
Average Pond Depth (FT.)	6.5	"Average Pond Depth" depicts the actual depth of the pond either measured or estimated. Note: If you know the maximum depth and not the average depth, the Field Examiner's Handbook suggests multiplying the maximum depth by 0.4 to get the average depth, or you can use any method that seems reasonable to attain average depth.
Pond Capacity (AF)	14.95	Pond Capacity is calculated by multiplying the Pond Surface Area by the Average Pond Depth. If you know the capacity, divide the capacity by surface area and enter the average pond depth in the space above. Note: If pond capacity is determined using a method shown on the "Pond Capacity" sheet, the user may need to modify the value of "Pond Capacity" (cell B9) manually. Note that if the value is modified manually, the formula will be altered for future use.
Multiple Fill Volume Above Initial Fill to Fulfill From Storage Needs- "Multiple Fills" (AF)	0	The "Multiple Fill Volume Above Initial Fill" is the acre-feet of water required to meet a <i>from storage</i> component if the <i>from storage</i> component exceeds a one time fill. This section should not include the amount of water needed to fill the pond initially or the amount of water needed to maintain the pond level due to evaporation or seepage. For example: if a pond has a capacity of 5 acre feet and 2.5 acre feet of seepage and evaporation, but the pond is used for irrigation that requires 10 acre feet of from storage for the irrigation use, then you would insert 5 acre feet into this location (10 acre feet needed - 5 acre feet from the initial fill = 5 acre feet of additional storage needed). Note: You must have a "From Storage" component exceeding the initial fill on the permit to include a volume in this space.
Estimated Seepage Loss (AF)	2.5	The "Estimated Seepage Loss" is automatically carried over from the "Seepage Loss" sheet.
Estimated Evaporation Loss (AF)	5.4	The "Estimated Evaporation Loss" is automatically carried over from the "Evaporation Loss" sheet.
Total Volume Required (AF)	22.8	The "Total Volume Required" is calculated by adding the Pond Capacity, Multiple Fills, Seepage Loss, and Evaporation Loss amounts to determine the total amount of storage required.

Flow Rate into Pond (CFS)	0.10	The "Flow Rate into Pond" depicts the actual flow, either measured or estimated, into the pond. For offstream facilities, this will be equivalent to "diversion to storage" rate.
Highest Daily Evaporation Rate From Evaporation Tab. (mm/Day)	4.79	This number is carried over from the "Evaporation Loss" sheet. It is the highest recorded number in the "Precipitation Deficit Table".
Required Daily Maintenance Volume (AF/Day)	0.04	"Required Daily Maintenance Volume" is the maximum volume of water needed on any given day during the year to maintain pond volume. It is calculated by adding the highest daily evaporation loss to the average daily seepage loss in acre feet. The average daily seepage loss is calculated by dividing the "Estimated Seepage Loss" by 365 days. This is acceptable, since the seepage rate shouldn't vary throughout the season unless the pond completely freezes over during the winter months. The highest daily evaporation loss is calculated by dividing the Highest Daily Evaporation Rate by the 304.8 conversion factor and multiplying this number by the pond surface area to attain a combined daily acre feet requirement.
Minimum Maintenance Flow (CFS)	0.02	The "Minimum Maintenance Flow" is the minimum amount of flow required to maintain the level of the pond. This number is determined by dividing the "Maximum Required Daily Maintenance Volume" by 1.9835. This flow can be used to determine if the flow rate into the pond is adequate to maintain the pond level.
Days Required to Fill the Pond	96	The "Days Required to Fill the Pond" is calculated by dividing the "Pond Capacity" by the "Flow Rate" minus "Minimum Maintenance Flow" multiplied by 1.9835. This section will assist you in determining if the flow rate being diverted to the pond is adequate to fill the pond while maintaining the pond level. The length of time to fill the pond will help determine if the flow rate is adequate for the size of pond being proposed. If this number is approximately 6 months (180 days) or more, the reviewer should have a discussion with the applicant to make sure he/she understands that it will take a significant length of time to fill the pond.
Days Required to Fill the Pond at 13,000 Gallons per Day	-4748	Some water users may want to fill a pond under the 13,000 gallons per day domestic exemption. The "Days Required to Fill the Pond at 13,000 Gallons per Day" is calculated by converting the "Pond Capacity" and the "Required Daily Maintenance Volume" to gallons. The "Pond Capacity" is then divided by 13,000 gallons minus the "Required Daily Maintenance Volume" in gallons to determine the number of days to fill pond. If this number is approximately 6 months (180 days) or more, the reviewer should have a discussion with the applicant to make sure he/she understands that it will take a significant length of time to fill the pond. Negative values indicate that the supply of 13,000 gallons per day is not enough volume to overcome the required daily maintenance volume; the pond will never fill.

Evaporation Loss Calculations

This spreadsheet has been designed by Idaho Department of Water Resources to estimate the annual evaporation losses from a pond.

FILE NUMBER	63-33707
REVIEWER	Patrick Kelly
DATE	2/20/2015

User Input
Calculated value
Formula Explanations

The acronyms used on the Kimberly Research Center website are defined below:
P = Precipitation
ET= Evapotranspiration
P _d = Precipitation deficit
P _d =ET-P

USING THIS SPREADSHEET

Use the link below to access the Kimberly Research Center website. This website provides the Precipitation Deficit for a station most representative of the pond under examination. The Precipitation Deficit is the total amount of free water surface evaporation minus the precipitation for a given area, which gives the total amount of evaporative losses incurred by the pond. There are several weather sites that are used throughout the state. IDWR staff can find the nearest site using Arc Map. The shape file containing the sites can be found at <X:/Spatial/Climate/ETIdahostations.shp>.

Instructions:

1. Use the link below to navigate to ET Idaho 2012.
2. Select the station which is most representative to your pond location.
3. Click Submit Query.
4. Under "Land Covers with Evapotranspiration Estimates," select "Open Water - Shallow Systems (ponds, streams)" or "Open Water - small stock ponds" depending on the pond size.
5. Click the link to "Precipitation Deficit."
6. Reference and copy (ctrl + C) the first subheading "Mean" values.
7. Click the "Paste Values from ET Idaho" button. The table will automatically enter a zero (0) for any negative precipitation deficit values.

Found at: <http://data.kimberly.uidaho.edu/ETIdaho/>

Precipitation Deficit

Station: Twin Falls 2 NNE (NWS -- 109294)

Month	mm/day ¹	Days per month	mm/Month
Jan	0.00	31	0.00
Feb	0.00	28	0.00
March	0.94	31	29.14
April	2.32	30	69.60
May	3.21	31	99.51
June	3.91	30	117.30
July	4.79	31	148.49
August	4.14	31	128.34
September	2.56	30	76.80
October	1.29	31	39.99
November	0.00	30	0.00
December	0.00	31	0.00

PLEASE NOTE: The seasonal average for precipitation deficit should not be used for calculations because precipitation often exceeds evaporation during wetter months of the year. If the pond is kept full, excess precipitation during wetter months does not serve to refill the pond during drier months.

For example, see Sandpoint KSPT (NWS -- 108137), the annual precipitation deficit is -106 mm. However, April through September have positive precipitation deficit values. To properly estimate the annual volume of water necessary to refill a pond due to evaporation losses, the table will automatically enter a zero (0) for each month that the precipitation value is reported as a negative value.

As described above, precipitation offsets evaporation in winter months, so the net effect is that wintertime precipitation deficit is usually zero.

Total mm/year = 709.17

$$[(709.17 \text{ mm/yr}) \div (\text{convert to feet})] \times (\text{Surface area of pond, in acres}) = \text{Evaporation Loss in Acre Feet}$$

$$(709.17 \div 304.8) \times 2.30 = 5.4 \text{ AFA}$$

Seepage Loss Calculations

This spreadsheet has been designed by Idaho Department of Water Resources to estimate the total annual seepage losses from a pond.

FILE NUMBER	63-33707
REVIEWER	Patrick Kelly
DATE	2/20/2015

User Input
Calculated value
Formula Explanations

INPUTS

Pond Surface Area (AC.)	2.3	AC.
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Pond Surface Area (SQ. FT.)	100188	SQ. FT.
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My Soil Classification is	CL	
Suggested Seepage Rate (FT./DAY)	0.0030	FT./DAY

Formula: (Surface Area X Seepage Rate) X 7.48 = Gallons Per Day Loss
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Convert to GPD	2248	GPD
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Total Seepage Loss (AFA)	2.5	AFA
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Though sand and gravel seepage rates may actually be higher, the maximum allowable rate is 0.2 ft/day, pursuant to Administrative Memo "Seepage Loss Standards for Ponds and Reservoirs."

Suggested Seepage Rates for Different Soil Types:

GW, GP, GM, GC, SW, SP and SM (silty sand, sand silt mixtures and gravel mixtures) = 0.2 ft per day

OL and ML (inorganic silts - very fine sands, silty, or clayey fine sands) = 0.02 ft per day

SC (clayey sands, sand clay mixtures) = 0.007 ft per day

CL (Low to medium plasticity clays) = 0.003 ft per day

MH, OH, PT and CH (high plasticity clays) = 0.0003 ft per day

LINED PONDS (liners can be chemical, fabric, or bentonite) = 0 ft per day

Ponds Intercepting Groundwater (excavated ponds filled by ground water) = 0 ft per day

PLEASE NOTE: The initial basis for the Suggested Seepage Rates in the table above is found on Page 16 of Seepage from Fish Ponds, Bulletin 599, August 1989 Alabama Agricultural experiment Station, Auburn University, Auburn University Alabama. If you don't know the soil type, please refer to the map provided at X:\Spatial\Soils\USCS\PondSoils.lyr. Use "0" if the pond fill relies on the water table.

Farmer's Union Ditch Company

2014 Water Use

Gary A. Madenford
3605 N. Pollard Ln.
Star, Idaho 83669

Lisa (Secretary for Farmer's Union Ditch Company) – (208) 870-7919

3605 N. Pollard Ln, Star, Idaho is allocated 1.15 Shares in the Farmer's Union Ditch Company.

1 Share = 11 miner's inches of water.

1 miner's inch = 9 gallons/minute = 0.02 cfs.

Calculations:

$(1.15 \text{ shares}) (11 \text{ miner's inches}) (9 \text{ gallons/minute}) = 113.85 \text{ gallons/minute}$

$(113.85 \text{ gallons/minute}) (60 \text{ minutes}) = 6,831 \text{ gallons/hour}$

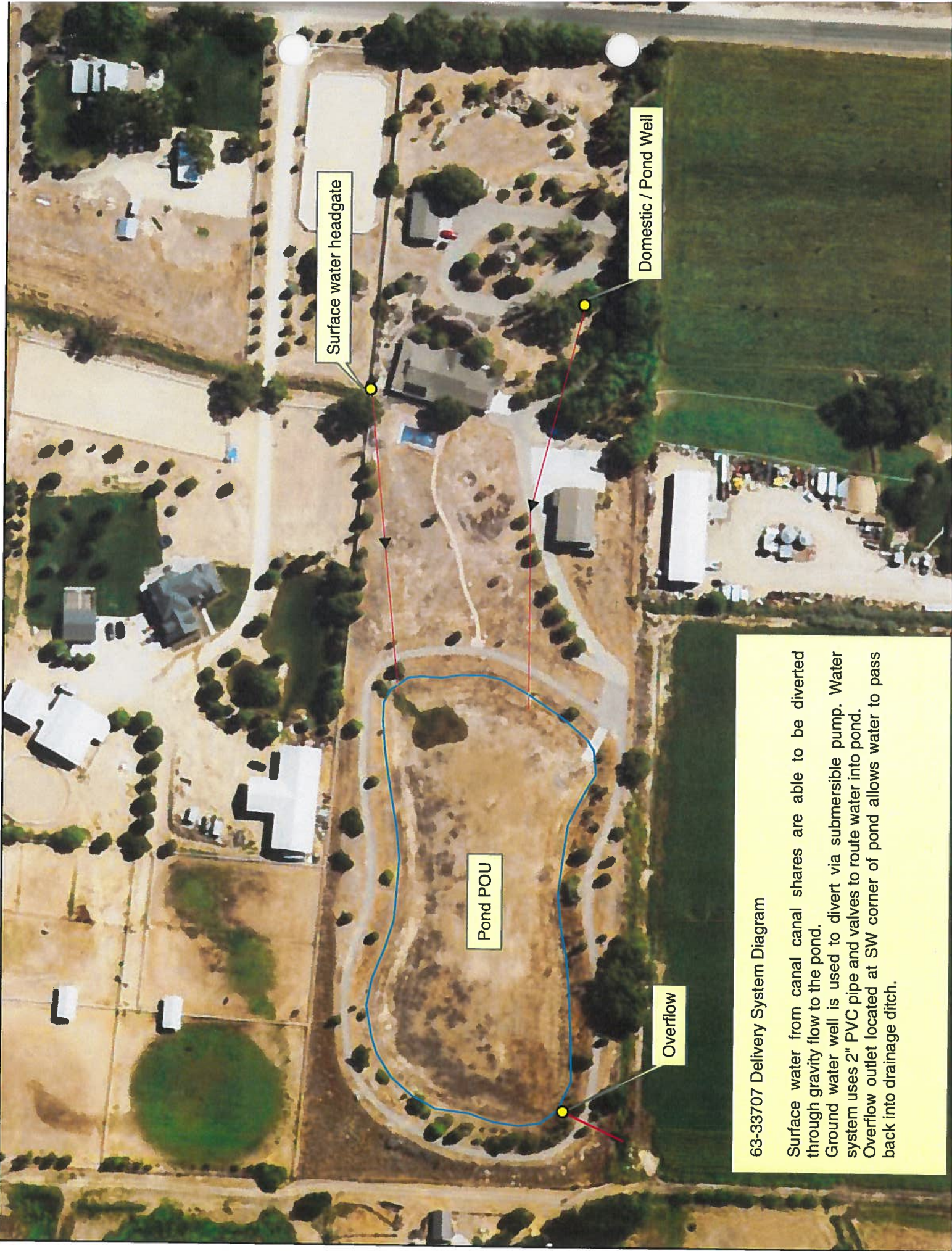
$(6,831 \text{ gallons/hour}) (24 \text{ hours/day}) = 163,944 \text{ gallons/day}$

$(163,944 \text{ gallons/day}) / (325,850 \text{ gallons/acre foot}) = 0.503 \text{ acre feet/day}$

July 11, 2014 to October 15, 2014 = 96 days

$(96 \text{ days}) (0.503 \text{ acre feet/day}) = \mathbf{48.3 \text{ acre feet.}}$

Plus I ran the well water into the pond for about 10 days.



Surface water headgate

Domestic / Pond Well

Pond POU

Overflow

63-33707 Delivery System Diagram

Surface water from canal shares are able to be diverted through gravity flow to the pond.
Ground water well is used to divert via submersible pump. Water system uses 2" PVC pipe and valves to route water into pond.
Overflow outlet located at SW corner of pond allows water to pass back into drainage ditch.



Point of Diversion located near driveway on east side of property.



Inside well house. Water lines supply domestic and pond storage use.



Inlet to pond located on east end of pond.



POU: Pond has a gradient slope with a depth of 5 to 8 feet deep.

View is at SW corner of pond looking east.



Outlet in SW
corner of pond.