

## Page 1 of 12

Method of Determination: Field visit and Aerial Imagery

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.

| <u>Well or Diversion</u><br><u>ID No.*</u> | <u>Motor Make</u> | <u>Hp</u> | <u>Motor Serial No.</u> | <u>Pump Make</u> | <u>Pump Serial No. or Discharge</u><br><u>Size</u> |
|--------------------------------------------|-------------------|-----------|-------------------------|------------------|----------------------------------------------------|
| NO PUMP—GRAVITY FLOW                       |                   |           |                         |                  |                                                    |

#### D. FLOW MEASUREMENTS

1.

| <u>Measurement</u><br><u>Equipment</u> | <u>Type</u> | <u>Make</u> | <u>Model No.</u> | <u>Serial No.</u> | <u>Size</u> | <u>Calib. Date</u> |
|----------------------------------------|-------------|-------------|------------------|-------------------|-------------|--------------------|
| Float and stopwatch                    |             |             |                  |                   |             |                    |

2. Measurements:

#### STORAGE

There are two 24" culverts right above the reservoir that carry water from the W-drain to the reservoir. I was able to conduct a measurement by timing a float through the culverts to find the total amount of water going into the reservoir that day. Note that the day I conducted the measurement the flow in the W-drain was very high and the diversion into the reservoir is usually much less according to Clifton and that the flow varies widely on an hourly basis.

IRRIGATION rate calculations are not important as the live flow component will be converted to "Diversion to Storage"

#### E. FLOW CALCULATIONS

☒ Additional Computation Sheets Attached

Measured Method:

#### DIVERSION TO STORAGE

Culvert #1 —  $1.24\text{ft}^2 \times 28/8 \text{ seconds} = 4.34 \text{ cfs}$

Culvert #2 —  $1\text{ft}^2 \times 28/5.56 \text{ seconds} = 5.04 \text{ cfs}$

9.38 cfs total from W-drain into reservoir

IRRIGATION from STORAGE —Note that the irrigation from storage component gets a volume designation, no diversion rate. The following rate information is for informational purposes only:

Clifton told me when the pond is full the water can last up to 10 days when used with the neighbor (with no water going into pond). Note that the portion of the reservoir that can be diverted is 67 af because the location of the irrigation outlet (14 acres x 8' deep x 0.6). Usable irrigation water of 67 AF/10 days = 6.7 AF/day or 3.38 cfs. Based on acres, Jensens divert 37% of the water and Awalts divert 63% which means that Jensens divert 1.24 cfs and Awalts divert 2.14 cfs.

- Permitted Diversion Rate: 2.76 cfs
- Capacity of ditch into reservoir: >9.38 cfs
- Licensing Examination Fee = \$150 for up to 3.0 cfs

Conclusion: The ditch can carry more than the permitted diversion rate. The license will be issued with the full permitted diversion rate.

**F. VOLUME CALCULATIONS**

| Water Right | Storage in AF | Diversion Rate in CFS | Acres | 4 af x acres | Evaporation/Seepage | Total |
|-------------|---------------|-----------------------|-------|--------------|---------------------|-------|
| 37-21456    | 25            | 1.80                  | 65    | 260          | 58.4                | 318.4 |
| 37-21486    | 25            | 2.76                  | 111   | 444          | 58.4                | 502.4 |
| 37-21827    | 74            | 1.80                  | 65    | 260          | 58.4                | 318.4 |
| 37-21828    | 74            | 2.76                  | 111   | 444          | 58.4                | 502.4 |
| Totals      | 99            | 4.56                  | 176   | 704          | 58.4                | 762.4 |

Please see the attached analysis of evaporation/seepage losses that amount to 58.4 AF.

**Conclusion:** The storage component must be for the total amount of water that can be impounded throughout the season. Therefore, irrigation storage and irrigation from storage will both have a volume of 502.4 AF. The reservoir capacity will be addressed in the conditions.

**G. NARRATIVE/REMARKS/COMMENTS**

**System Notes:** There is a headgate at the in-let where wastewater is diverted away from the W-drain. The wastewater entering the reservoir travels in a ~4600' channel before reaching the 14 acre reservoir. There is a second headgate where the channel bifurcates as illustrated on the diagram system. For the most part, water is fed through the eastern channel but, Cliff told me they allow 5" to pass into the western channel for the trees along the channel for Parks and Rec. During the field examination there was no water in the western channel. (note there is currently no water right for the Parks and Rec irrigation). In addition there is a 15" irrigation outlet located 4' up from the bottom of the reservoir that carries water down the western side of the reservoir to the Jensens and the Awalts for irrigation purposes. There is an "as-built" drawing of the outlet in the system diagram section of this report. The reservoir has a maximum depth of 12'.

**Converting Irrigation Use to Diversion to Storage:** Originally, the permits were issued as ONSTREAM but this is not how the system was developed. To correctly describe what is happening under the Jensen/Awalt permits, the permits must be amended to reflect an OFFSTREAM scenario. The point of diversion under the rights will be amended to the point where water is diverted away from the WDrain. In addition, there are multiple fills at the reservoir so, converting the live flow irrigation component means that we could cover additional volume under the irrigation from storage and storage components. In addition, the evaporative losses and seepage will be covered. Most likely the permittees will need to file another permit for any live irrigation flow.

The analysis for converting live flow to storage considers how much volume could have been available under the permit. Permit 37-21486 was permitted with 2.76 cfs on 275.8 acres. The potential volume under the permit is 1,103.2 af (275.8 x 4). The total volume required for the system is 502.4 af so no enlargement will occur when converting the live flow volume to a storage component.

Permit 37-21828 will also be getting a diversion to storage component. During permitting there was a disconnect between what was intended by the permit holders and how the system was interpreted by the Department. It turns out that the channel off of the WDrain is not part of the WDrain. Because of the misunderstanding the permit was issued incorrectly. Because the system has always been operated the same since development, no enlargement will occur by clarifying the uses on the permit. In addition, permit 37-21828 can be considered an extension of permit 37-21486 as there will be combined limits between the two that recognizes the shared diversion rate and volumes.

Have conditions of permit approval been met? ☒ Yes ☐ No During the exam no measuring device was installed at any point on the system but, there is a lockable device at the 15" outlet pipe. Cindy Yenter, watermaster, has overseen the installation of a measuring device at a location upstream of the reservoir and has confirmed that this requirement has been met (see photos).

**H. RECOMMENDATIONS****1. Recommended Amounts**Recommendation for 37-21486

| <u>BENEFICIAL USE</u>   | <u>PERIOD OF USE</u> | <u>DIVERSION RATE</u> | <u>ANNUAL VOLUME</u> |
|-------------------------|----------------------|-----------------------|----------------------|
| DIVERSION TO STORAGE    | 3/15 to 11/15        | 2.76 CFS              |                      |
| IRRIGATION STORAGE      | 01/01 to 12/31       |                       | 502.40 AF            |
| IRRIGATION FROM STORAGE | 03/15 to 11/15       |                       | 502.40 AF            |
|                         | <u>Totals:</u>       | 2.76 CFS              | 502.40 AF            |

Recommendation for 37-21828

| <u>BENEFICIAL USE</u>   | <u>PERIOD OF USE</u> | <u>DIVERSION RATE</u> | <u>ANNUAL VOLUME</u> |
|-------------------------|----------------------|-----------------------|----------------------|
| DIVERSION TO STORAGE    | 3/15 to 11/15        | 2.76 CFS              |                      |
| IRRIGATION STORAGE      | 01/01 to 12/31       |                       | 502.40 AF            |
| IRRIGATION FROM STORAGE | 03/15 to 11/15       |                       | 502.40 AF            |
|                         | <u>Totals:</u>       | 2.76 CFS              | 502.40 AF            |

**2. Recommended Amendments**

☒ Change P.D. as reflected above    ☐ Add P.D. as reflected above    ☐ None

☐ Change P.U. as reflected above    ☐ Add P.U. as reflected above    ☒ Other (change irrigation to diversion to storage for 37-21486 and add diversion to storage for 37-21828)

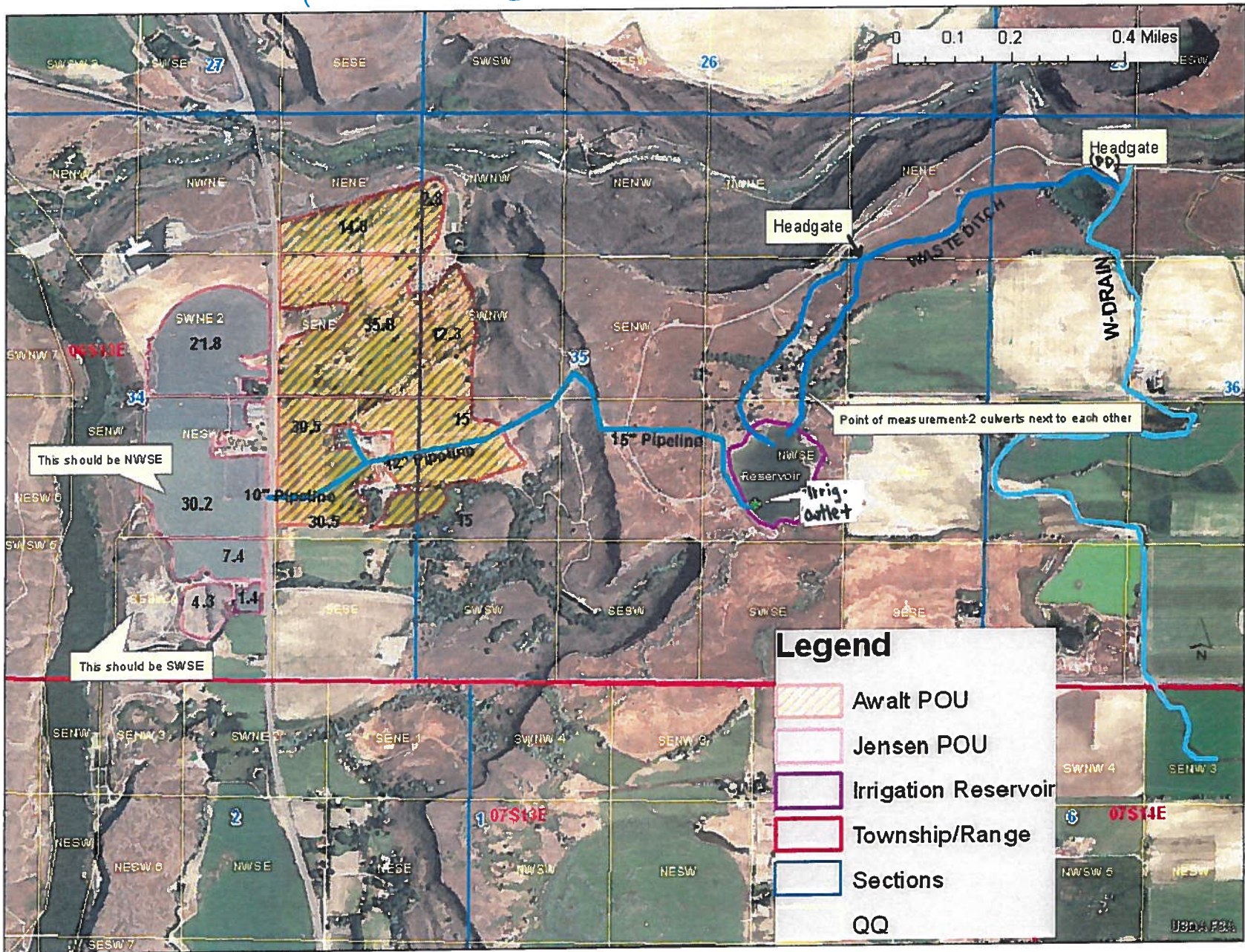
**I. AUTHENTICATION**

Field Examiner's Name Cherie Palmer Date 6/13/13

Reviewer \_\_\_\_\_ Date \_\_\_\_\_

ATTACHMENTS : (A) OVERLAP ANALYSIS  
 (B) CROSS SECTIONAL AREA of FLOW CALC. - 2 pages  
 (C) EVAP. + SEEPAGE CALC - 4 pages  
 (D) FLOWS in W DRAIN - from dam safety files  
 (E) PHOTOS of MEASURING DEVICE  
 (F) NRCS DRAWINGS + SPECS - 10 pages

## System Diagram





Looking NW

This photo shows the channel that extends off the W Drain and the headgate where water can be turned down the "western" channel that goes to water trees under the Parks + Rec.



Photo taken in March 2013

- Notice there is water in the reservoir. Still; water is carry over from last irrigation season. Photo looking south.

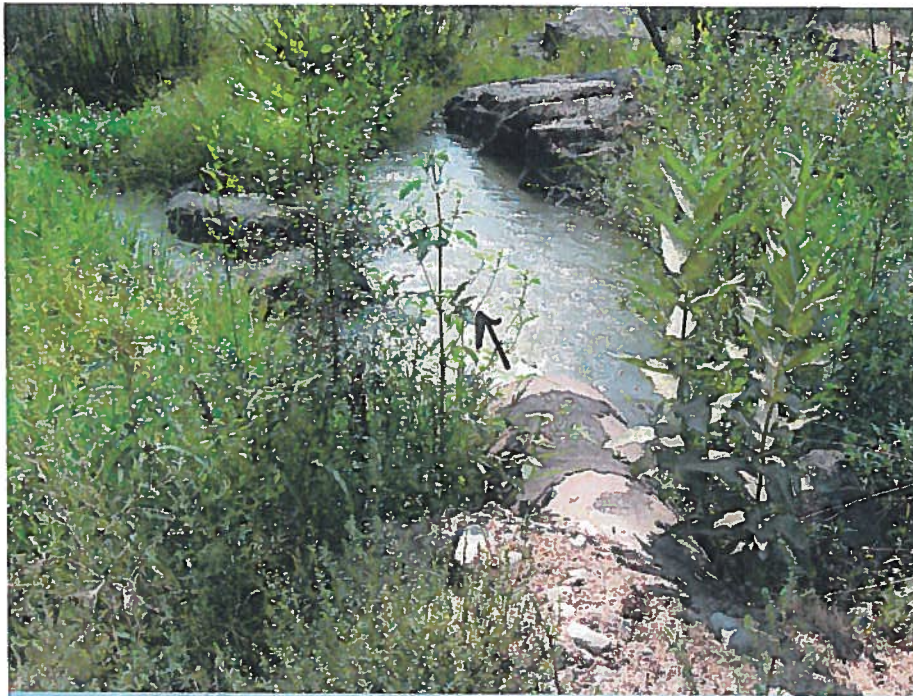
(Note all other photos were taken 8/20/12)



Point of measurement



channel before water  
discharges into reservoir  
(as above)  
Looking North w/  
reservoir at my back



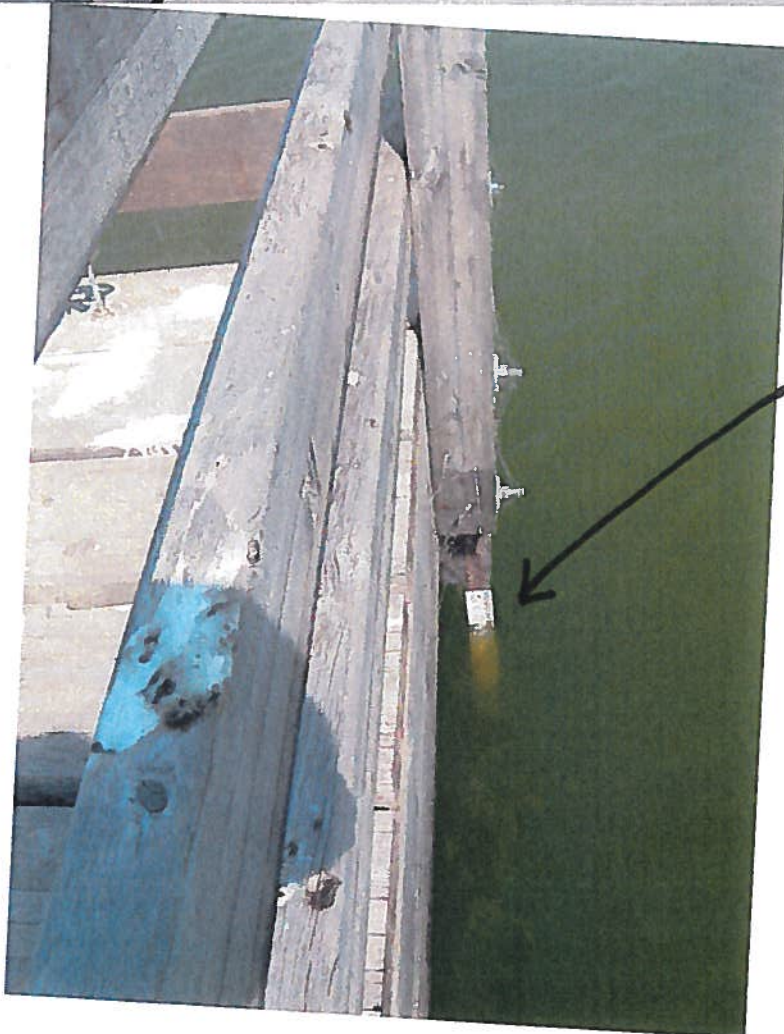
2nd point of  
measurement  
- Looking south



Looking SE  
at the reservoir



Looking east  
at the control  
device for the  
irrigation outlet



Staff gage at  
the wooden bridge  
where reservoir  
levels can be  
monitored.

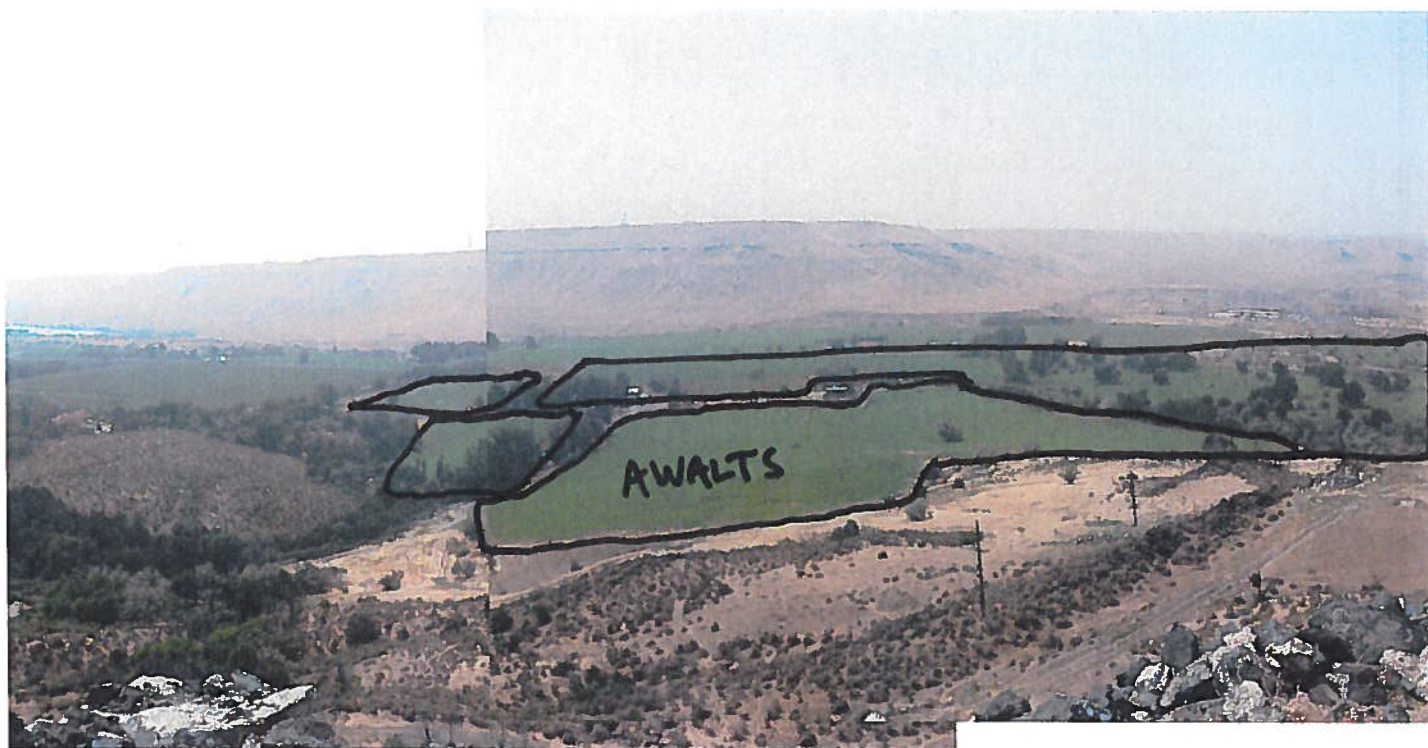




Slide gate Mr.  
Jensen controls in  
order to maintain  
reservoir level



Irrigation works at Anatts property



Panoramic photos of POU

- 80 psi where water comes in from reservoir

# Attachment A

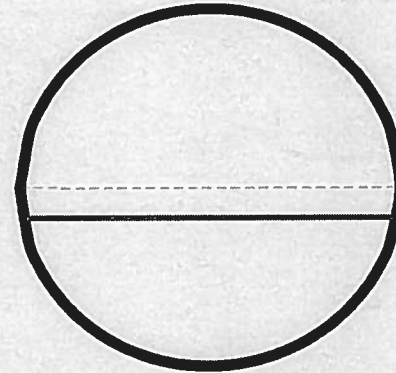
| Process                     | Basin Sequence | Draft | Owner                        | Source         | POD/POU | NENE | SENE | NESE | Total Acres |                                                |
|-----------------------------|----------------|-------|------------------------------|----------------|---------|------|------|------|-------------|------------------------------------------------|
| Adjudication Recommendation | 37-12868       |       | AWALT FAMILY REVOCABLE TRUST | UNNAMED STREAM | POU     | 15.0 | 40.0 | 35.0 | 90          | OVERLAP                                        |
| Adjudication Recommendation | 37-3155        |       | SCARROW, JIM D               | BIRCH CREEK    | POU     |      |      | 2.6  | 34.6        | No-Overlap, Scarrow lot is to the south of POU |
| Adjudication Recommendation | 37-795         |       | SCARROW, JIM D               | BIRCH CREEK    | POU     |      |      | 2.6  | 0           | No-Overlap, Scarrow lot is to the south of POU |
| Adjudication Recommendation | 37-796         |       | SCARROW, JIM D               | BIRCH CREEK    | POU     |      |      | 2.6  | 34.6        | No-Overlap, Scarrow lot is to the south of POU |
| Adjudication Recommendation | 37-798         |       | SCARROW, JIM D               | BIRCH CREEK    | POU     |      |      | 2.6  | 34.6        | No-Overlap, Scarrow lot is to the south of POU |
| Water Right                 | 37-21486       | Y     | AWALT, CHRISTY LOU           | WASTE WATER    | POU     | 15.0 | 36.0 | 30.0 | 81          |                                                |
| Water Right                 | 37-21828       | Y     | AWALT, CHRISTY LOU           | WASTE WATER    | POU     | 15.0 | 36.0 | 30.0 | 81          |                                                |
| Water Right                 | 37-797         | N     | AWALT FAMILY REVOCABLE TRUST | BIRCH CREEK    | POU     | 15.0 | 40.0 | 35.0 | 90          | OVERLAP                                        |

The POU is within the boundary of the Northside Canal Co. Decreed rights 37-797 and 37-12868 fully overlap 37-21486 and 37-21828

Attachment A

**Cross Sectional Area of Flow Calculator  
for Water Flowing in Circular Conduit****READ ME****Was the Diameter or Radius of the Pipe Measured?**☒ Diameter ☐ Radius**Was Sediment Observed & Measured in the Pipe?**☐ Sediment ☒ No Sediment**Converter: Inches --> Feet** (Use as Needed)X =  inches = 2.00 feet**Input Observed Conditions** (Units Must be in Feet)D =  feet (radius of pipe)h =  feet (depth of water)

h' = 0.10 feet (depth of sediment)

**Cross Sectional Area of Flow** $A_{\text{FLOW}} = 1.24$  square feet**X-Sectional Flow Area  
Sketch** Conduit Wall Horizontal Center Line Water Surface Sediment Surface

**Cross Sectional Area of Flow Calculator  
for Water Flowing in Circular Conduit**

**READ ME**

**Was the Diameter or Radius of the Pipe Measured?**

☒ Diameter    ☐ Radius

**Was Sediment Observed & Measured in the Pipe?**

☐ Sediment    ☒ No Sediment

**Converter: Inches --> Feet**    (Use as Needed)

X =  inches =    2.00    feet

**Input Observed Conditions**    (Units Must be in Feet)

D =  feet (radius of pipe)

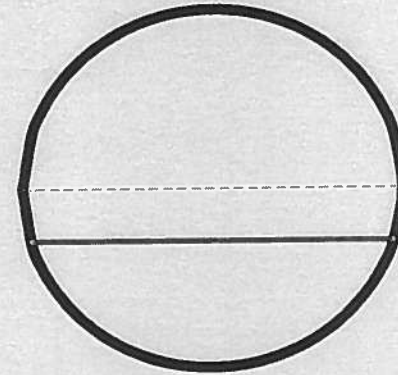
h =  feet (depth of water)

h' =    0.10    feet (depth of sediment)

**Cross Sectional Area of Flow**

A<sub>FLOW</sub> =    1.00    square feet

**X-Sectional Flow Area  
Sketch**



——— Conduit Wall

——— Water Surface

----- Horizontal Center Line

——— Sediment Surface

# ET Idaho 2012 -- Evapotranspiration and Consumptive Irrigation Water Requirements for Idaho

Please send suggestions for improving this site to robison at kimberly dot uidaho dot edu Copyright 2012, University of Idaho.

Attachment C

## Hagerman 2 SW (NWS -- 103932)

Statistics based on thirty year normal spans 1983 to 2010 years

For a different land cover or crop click on the above link.

You can highlight this table and copy via the clipboard to a Microsoft Excel or OpenOffice spreadsheet to plot or otherwise work with this data.

| Open water - deep systems (lakes, reservoirs)  |        |      |      |      |      |      |      |      |      |      |      |       |                             |                                 |
|------------------------------------------------|--------|------|------|------|------|------|------|------|------|------|------|-------|-----------------------------|---------------------------------|
| Precipitation Deficit (Click here for a graph) |        |      |      |      |      |      |      |      |      |      |      |       |                             |                                 |
|                                                | Jan    | Feb  | Mar  | Apr  | May  | Jun  | Jul  | Aug  | Sep  | Oct  | Nov  | Dec   | Growing Season <sup>a</sup> | Non Growing Season <sup>b</sup> |
| Mean <sup>j</sup>                              | mm/day |      |      |      |      |      |      |      |      |      |      |       | mm                          |                                 |
| Monthly <sup>c</sup>                           | 0.13   | 0.21 | 0.70 | 1.21 | 1.59 | 2.28 | 2.73 | 2.47 | 2.32 | 2.00 | 0.42 | -0.64 | 471                         | 0                               |
| 15-Day Moving Average <sup>d</sup>             | 0.16   | 0.06 | 0.74 | 1.25 | 1.63 | 2.32 | 2.75 | 2.46 | 2.24 | 2.10 | 0.43 | -0.46 |                             |                                 |
| 7-Day Moving Average <sup>e</sup>              | 0.14   | 0.09 | 0.69 | 1.24 | 1.63 | 2.29 | 2.73 | 2.46 | 2.28 | 2.07 | 0.45 | -0.57 |                             |                                 |
| 3-Day Moving Average <sup>f</sup>              | 0.13   | 0.15 | 0.69 | 1.23 | 1.61 | 2.29 | 2.73 | 2.47 | 2.31 | 2.00 | 0.46 | -0.64 |                             |                                 |
| Standard Deviation <sup>k</sup>                | mm/day |      |      |      |      |      |      |      |      |      |      |       | mm                          |                                 |
| Monthly <sup>c</sup>                           | 0.78   | 0.82 | 1.19 | 0.56 | 1.22 | 0.75 | 0.69 | 0.68 | 0.37 | 1.07 | 0.85 | 1.63  | 105                         | 0                               |
| 15-Day Moving Average <sup>d</sup>             | 0.68   | 1.13 | 1.09 | 0.78 | 1.22 | 0.84 | 0.57 | 0.64 | 0.46 | 0.90 | 1.20 | 1.23  |                             |                                 |
| 7-Day Moving Average <sup>e</sup>              | 0.91   | 1.35 | 1.35 | 1.25 | 1.54 | 1.27 | 0.70 | 0.85 | 0.63 | 1.32 | 1.53 | 1.79  |                             |                                 |
| 3-Day Moving Average <sup>f</sup>              | 1.32   | 1.72 | 1.85 | 1.78 | 2.06 | 1.63 | 0.91 | 1.18 | 0.84 | 1.91 | 2.02 | 2.63  |                             |                                 |
| 20% Exceedance <sup>l</sup>                    | mm/day |      |      |      |      |      |      |      |      |      |      |       | mm                          |                                 |
| Monthly <sup>c</sup>                           | 0.57   | 0.87 | 1.25 | 1.63 | 2.13 | 2.71 | 3.02 | 2.77 | 2.51 | 2.46 | 1.24 | 0.37  | 536                         | 0                               |
| 15-Day Moving Average <sup>d</sup>             | 1.04   | 0.99 | 1.94 | 2.23 | 3.04 | 3.34 | 3.27 | 3.07 | 2.91 | 3.13 | 1.78 | 1.08  |                             |                                 |
| 7-Day Moving Average <sup>e</sup>              | 1.30   | 1.57 | 2.15 | 2.90 | 3.60 | 3.71 | 3.59 | 3.35 | 3.24 | 3.45 | 2.15 | 1.32  |                             |                                 |
| 3-Day Moving Average <sup>f</sup>              | 1.60   | 1.84 | 2.47 | 3.74 | 3.97 | 4.01 | 3.83 | 3.69 | 3.52 | 3.73 | 2.46 | 1.51  |                             |                                 |

Attachment C

## TOTAL STORAGE

|             |               |
|-------------|---------------|
| FILE NUMBER | Pond 1        |
| REVIEWER    | Cherie Palmer |
| DATE        | 6/10/2013     |

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

|                                 |       |                                                                                                          |
|---------------------------------|-------|----------------------------------------------------------------------------------------------------------|
| Surface Area<br>(in Acres)      | 14    | "Surface Area" depicts the actual surface area of the pond measured, determined by ArcMap, or estimated. |
| Average Pond Depth<br>(in feet) | 7.075 | "Average Pond Depth" depicts the actual depth of the pond either measured or estimated.                  |
| Pond Capacity<br>(in acre feet) | 99.05 | Pond Capacity is calculated by multiplying the Pond Surface Area by the Average Pond Depth.              |

|                                                                                                                |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Volume Needed<br>Above Initial Fill to<br>Fulfill From Storage<br>Needs- "Multiple<br>Fills"<br>(in acre feet) | 605   | The "Volume Needed 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).<br><b>PLEASE NOTE: You must have a "From Storage" componet exceeding the intial fill on the permit to include a volume in this space.</b> |
| Estimated Seepage<br>Loss (in acre feet)                                                                       | 35.8  | The "Estimated Seepage Loss" is automatically is automatically carried over from the Seepage Loss Sheet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Estimated<br>Evaporation Loss<br>(in acre feet)                                                                | 22.6  | The "Estimated Evaporation Loss" is automatically is automatically carried over from the Evaporation Loss Sheet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Total Volume<br>Required<br>(in acre feet)                                                                     | 762.4 | "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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

58.4 of

|                                                                              |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Flow Rate Into Pond<br>(in cfs)                                              | 4.56 | The "Flow Rate" Into the Pond depicts the actual flow either measured or estimated into the pond.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Highest Daily<br>Evaporation Rate<br>From Evaporation<br>Tab.<br>(in mm/day) | 2.73 | To determine the "Highest Daily Evaporation Rate" go the the Evaporation Loss Sheet and enter in the highest number recorded in the Precipitation Deficit table.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Maximum Required<br>Daily Maintenance<br>Volume (in<br>acre feet per day)    | 0.22 | "Maximum Required Daily Maintenance Volume" is the maximum volume of water needed on any given day during the year, and is caluated 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 multiplying 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<br>Maintenance Flow<br>(in cfs)                                      | 0.11 | The "Mininum Maintenance Flow" is the mlinimum amount of flow required to maintain the level of the pond. This number is determine by dividing the "Daily Required 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<br>the Pond                                            | 11   | 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.                                                                                                                                                                                                                                                                                  |

Attachment C

## SEEPAGE CALCULATIONS

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

|             |               |
|-------------|---------------|
| FILE NUMBER | Pond          |
| REVIEWER    | Cherie Palmer |
| DATE        | 6/10/2013     |

### INPUTS

|                            |
|----------------------------|
| SQ FT. Calculator          |
| Pond Surface area in acres |
| 14                         |

|                          |        |
|--------------------------|--------|
| POND SURFACE AREA (SQFT) | 609840 |
|--------------------------|--------|

|                                 |        |
|---------------------------------|--------|
| SUGGESTED SEEPAGE RATE (FT/DAY) | 0.0070 |
|---------------------------------|--------|

Use the table below to find the  
"SUGGESTED SEEPAGE RATES".

|                                                             |
|-------------------------------------------------------------|
| FORMULA:                                                    |
| (Surface Area X Seepage Rate) / 7.48 = Gallons Per Day loss |

|                |       |     |
|----------------|-------|-----|
| CONVERT TO GPD | 31931 | GPD |
|----------------|-------|-----|

|                          |      |     |
|--------------------------|------|-----|
| TOTAL SEEPAGE LOSS (AFA) | 35.8 | AFA |
|--------------------------|------|-----|

#### SUGGESTED SEEPAGE RATES FOR DIFFERENT SOIL TYPES:

**SM** (silty sand, sand silt mixtures) = 0.20 ft per day

**ML** (inorganic silts - very fine sands, silty, or clayey fine sands) = 0.016 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

**CH** (high plasticity clays) = 0.0003 ft per day

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

**PLEASE NOTE:** Seepage Rates taken from 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 P:/MCiscell/Soils Soils.lyr. Use "0" if the ponds intersect the water  
table.

Notes:

Attachment C

# Evaporation Loss Calculation

|             |           |
|-------------|-----------|
| FILE NUMBER | Pond 1    |
| REVIEWER    | Cpalmer   |
| DATE        | 6/10/2013 |

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

The acronyms used on the Kimberly Research Center website are defined below:

|                                        |
|----------------------------------------|
| P = Precipitation                      |
| ET= Evapotranspiration                 |
| P <sub>d</sub> = Precipitation deficit |
| P <sub>d</sub> =ET-P                   |

## ABOUT THIS SPREADSHEET

To ascertain the evaporation from a pond, you will need to go to the Kimberly Research Center website. The link is found below. This web site provides the Precipitation Deficit for the area where the pond is located. The Precipitation Deficit is the total amount of free pan 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, and the entire state is pretty much covered. You can find the nearest site using ArcMap. The shape file containing the sites can be found at X:\Spatial\Climate\ETIdahostations.shp.

Found at: <http://www.kimberly.uidaho.edu/ETIdaho/online.php>

## Precipitation Deficit

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

| Month     | mm/day <sup>1</sup> | Days per month | mm/Month |
|-----------|---------------------|----------------|----------|
| Jan       | 0.13                | 31             | 4.03     |
| Feb       | 0.21                | 28             | 5.88     |
| March     | 0.70                | 31             | 21.70    |
| April     | 1.21                | 30             | 36.30    |
| May       | 1.59                | 31             | 49.29    |
| June      | 2.28                | 30             | 68.40    |
| July      | 2.73                | 31             | 84.63    |
| August    | 2.47                | 31             | 76.57    |
| September | 2.32                | 30             | 69.60    |
| October   | 2.00                | 31             | 62.00    |
| November  | 0.42                | 30             | 12.60    |
| December  | 0.00                | 31             | 0.00     |

**PLEASE NOTE:** We cannot use the season average, because there are several areas in Northern Idaho with a negative Precipitation Deficit. Therefore, we must enter each monthly deficit, and enter in a zero (0) for each negative month. The reason for this is that precipitation can only offset evaporation to the extent of the evaporation.

Please enter the daily average Precipitation Deficit as shown in the example below.

<sup>1</sup>Negative monthly mean values should be entered in the above table as "0".

Total mm/year = 491.00

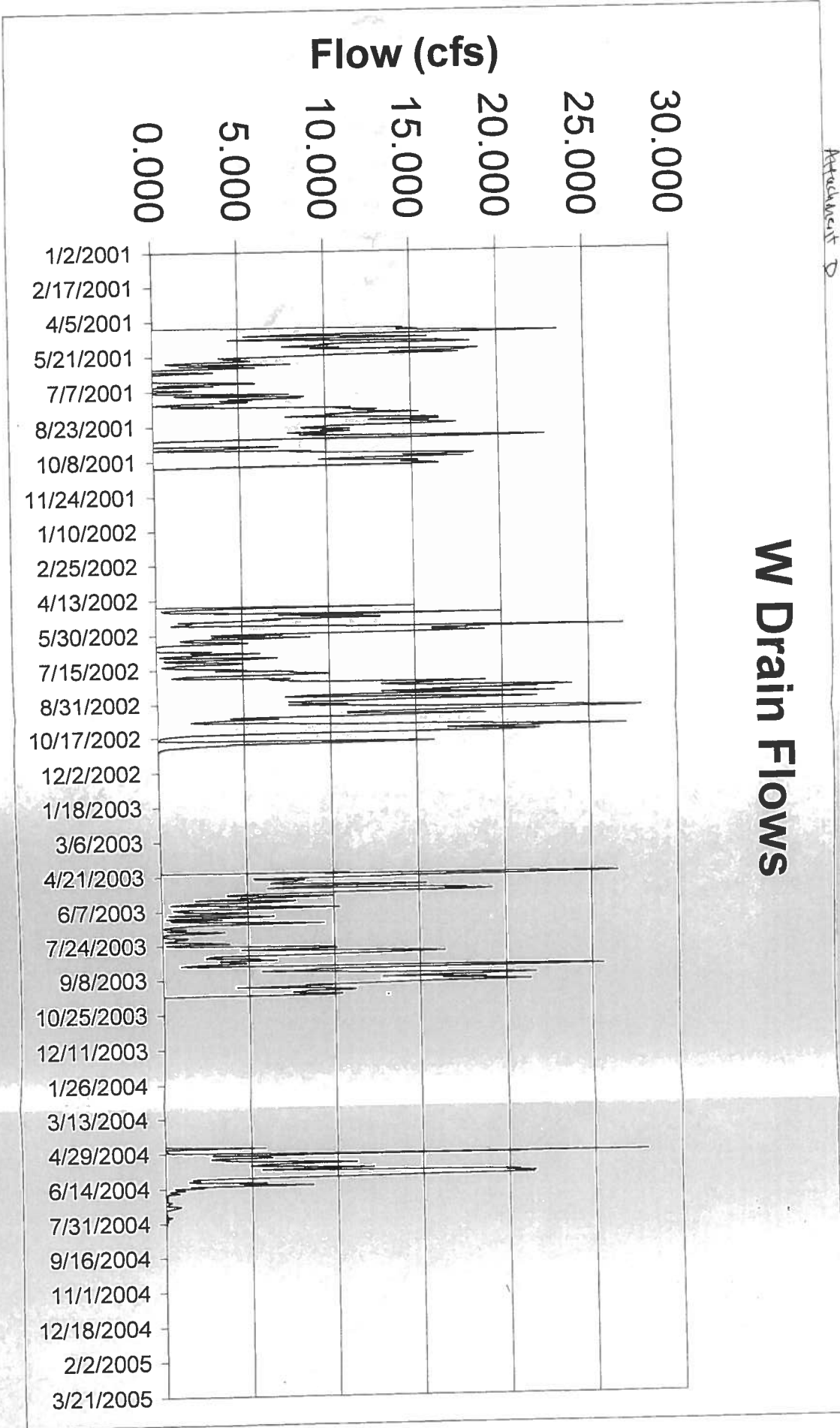
P<sub>d</sub>= Convert to (mm/yr) ÷ (convert Surface area of pond, in acres.

491.00 304.8 14

(conversion factor)

P<sub>d</sub> = 22.6 AFA

# W Drain Flows



Permit Nos. 37-21456, 37-21456, 37-21827 and 37-21828 (Jensen & Awalt)  
Verification of installation of control structure and measurement device.  
Photos taken by C Yenter, watermaster, 4.16.2013



Point of  
Diversion ↑

Screw-type control headgate at  
head of diversion ditch from W-  
drain.



Attachment E

4 – foot rectangular contracted weir with  
staff gage (on bulkhead) and stilling well  
(for monitor equipment) placed in ditch  
above reservoir, near park office.



Attachment E

Attachment F

**PROJECT:  
MODIFICATION OF TOP END OF TOTAL PROJECT  
DRAWINGS AND SPECIFICATIONS**

**PREPARED FOR: W DRAIN PARTICIPANTS  
GOODING SWCD – GOODING, ID  
SEPTEMBER 25, 2006  
Record Drawings  
August 11, 2008**



**Natural Resources  
Conservation Service**

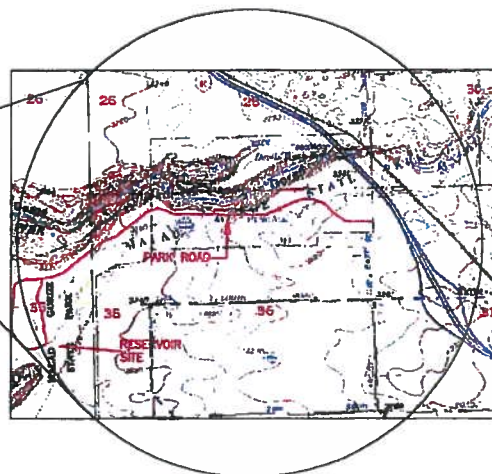
**COMPLETED BY ABW  
TWIN FALLS, IDAHO FIELD OFFICE**

Attachment F

North



Project is located in Sections 34, 35 and 36 of Township 6 South, Range 13 East Approximately 1 mile West of the Tuttle Freeway Interchange



# MODIFIED PLANS OF ORIGINAL DESIGN DATED APRIL 7, 2006 FOR W DRAIN IN MALAD GORGE STATE PARK; RESERVOIR AND BEGINNING OF PIPELINE

## LIST OF DRAWINGS

- SHEET 1. TITLE SHEET
- SHEET 2. NOTES
- SHEET 3. SYSTEM LAYOUT AND STATIONS WITH PHOTO
- SHEET 4. SYSTEM LAYOUT AND STATIONS WITH TOPO
- SHEET 5. RESERVOIR WITH INFO.
- SHEET 6. RESERVOIR WITH INFO. AND CONTOURS
- SHEET 7. ROCK SPILLWAY
- SHEET 8. GRAVEL INLET FILTER
- SHEET 9. PIPE TRENCH OPTIONS
- SHEET 10. INLET AT W DRAIN
- APPENDIX A. W DRAIN HYDROGRAPH
- APPENDIX B. COMPONENTS FLOW WORKSHEETS
- APPENDIX C. NRCS STANDARDS
- APPENDIX D. NRCS O&M STATEMENTS
- APPENDIX E. ROCK CHUTE DESIGN SPREADSHEET
- APPENDIX F. IDWR DAM SAFETY RULES
- APPENDIX G. IDWR LETTER OF CONDITIONS

## UTILITIES STATEMENT

NO REPRESENTATION IS MADE AS TO THE EXISTENCE OR NONEXISTENCE OF ANY UTILITIES, PUBLIC OR PRIVATE, EXCEPT AS SHOWN ON THE DRAWINGS. IT IS THE LANDOWNER'S RESPONSIBILITY TO LOCATE AND PROTECT ALL UTILITIES (UNDERGROUND OR OVERHEAD) WITHIN THE WORK AREA(S). DIGILINE MAY BE CONTACTED AT 1-800-342-1585.

I RECEIVED AND REVIEWED A COPY OF THE PLANS AND SPECIFICATIONS FOR THE FOLLOWING IRRIGATION SYSTEM.  
I AGREE TO CONSTRUCT THIS PROJECT OR TO HAVE IT CONSTRUCTED IN ACCORDANCE WITH THESE NRCS PLANS. IF ANY CHANGES TO THESE APPROVED PLANS AND SPECIFICATIONS ARE PROPOSED, I AGREE TO CONTACT THE RESPONSIBLE NRCS REPRESENTATIVE PRIOR TO ANY CHANGES BEING MADE.  
I UNDERSTAND THAT ANY DEVIATION(S) FROM THESE APPROVED PLANS AND SPECIFICATIONS WITHOUT PRIOR NRCS APPROVAL AND/OR COVERING/BURYING ANYTHING WITHOUT NRCS INSPECTION MAY RESULT IN MY BECOMING INELIGIBLE FOR COST-SHARING PAYMENTS.

\_\_\_\_\_  
COOPERATOR  
\_\_\_\_\_  
NRCS REPRESENTATIVE  
\_\_\_\_\_  
DATE  
\_\_\_\_\_  
DATE



10/28/08

NRCS JOB CLASS IV

Design: \_\_\_\_\_  
Drawn: \_\_\_\_\_  
Checked: \_\_\_\_\_  
Approved: \_\_\_\_\_

W DRAIN  
COVER SHEET  
GOODING SWCD, GOODING, ID



File Name

Drawing Name

Sheet 1 of 10

# GENERAL NOTES

INITIALS

1. CONSTRUCTION SHALL BE IN ACCORDANCE WITH NRCS DESIGN AND CONSTRUCTION SPECIFICATIONS 10-43000, HIGH PRESSURE PIPELINE, FEB-03; ID-4300F, STEEL PIPE, FEB-03; ID-652, IRRIGATION REGULATING RESERVOIR, FEB-03; ID-657A, AND ID-657F, STRUCTURE FOR WATER CONTROL (CULVERT), FEB-03. NRCS CONSTRUCTION SPECIFICATIONS AND O&M AGREEMENTS HAVE BEEN INCLUDED IN COOPERATOR'S DESIGN PACKET. A SEPARATE O&M AGREEMENT BETWEEN THE IDAHO DEPARTMENT OF PARKS AND THE TWO LANDOWNERS WILL BE PRESENTED IN A SEPARATE DOCUMENT.

2. THE CONTRACTOR IS RESPONSIBLE FOR VISITING THE SITE, REVIEWING THE DESIGN, AND HAVING A THOROUGH KNOWLEDGE OF THE SCOPE OF WORK TO BE PERFORMED.

3. ALL DESIGN CHANGES MUST BE REQUESTED BY THE CONTRACT HOLDER AND APPROVED BY AN NRCS REPRESENTATIVE PRIOR TO INSTALLATION. SIGNIFICANT CHANGE REQUESTS MUST BE SUBMITTED IN WRITING.

4. IT IS THE CONTRACT HOLDER'S RESPONSIBILITY TO OBTAIN ANY REQUIRED PERMITS OR EASEMENTS PRIOR TO CONSTRUCTION.  
\*\* OVERHEAD AND UNDERGROUND UTILITIES

5. MANUFACTURERS' NAMES ARE USED FOR PERFORMANCE DATA ONLY. EQUALLY PERFORMING PRODUCTS ARE ACCEPTABLE. ALL PRODUCTS SHALL HAVE PERFORMANCE DATA AVAILABLE. ALL COMPONENTS WILL BE IDENTIFIED WITH MANUFACTURE'S NAME AND DOCUMENTATION AVAILABLE.

6. A COPY OF THE PUMP CURVE(S) WITH DESIGN POINT IDENTIFIED SHALL BE FURNISHED BY THE COOPERATOR TO THE NRCS.

7. IF CHEMIGATION IS USED, THE STATE OF IDAHO LAWS AND REGULATIONS MUST BE FOLLOWED.

8. DAILY ET IS AVAILABLE THROUGH THE AGRIMET WEB SITE WHICH IS LOCATED ON THE IDAHO STATE NRCS WEB PAGE AT [WWW.ID.NRCS.USDA.GOV/TECHNICAL/AGRIMET](http://WWW.ID.NRCS.USDA.GOV/TECHNICAL/AGRIMET).

9. THIS PROJECT MUST BE COMPLETED IN ITS ENTIRETY BEFORE CERTIFICATION CAN BE COMPLETED AND PAYMENT TO THE CONTRACT HOLDER CAN BE MADE.

10. THE CONTRACT HOLDER, NOT THE INSTALLATION CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL DOCUMENTATION AND COMPLETING INSPECTIONS.

11. DURING INSTALLATION, PARTICULAR ATTENTION SHALL BE PAID TO THE PRESENCE OF CULTURAL RESOURCES. IF CULTURAL RESOURCES ARE ENCOUNTERED, ALL WORK SHALL CEASE AND AN NRCS REPRESENTATIVE SHALL BE CONTACTED.

12. THIS DESIGN IS BASED ON THE INSTALLATION OF NEW EQUIPMENT.

13. THE PRODUCER SHALL GIVE NRCS A 48-HOUR WINDOW TO MAKE AN INSPECTION BEFORE BACKFILLING OR COVERING A COMPONENT.

14. CARE SHOULD BE TAKEN TO AVOID UNNECESSARY DAMAGE TO VEGETATION WITH THE CONSTRUCTION RIGHT-OF-WAY. DISTURBED AREAS NOT FARMED, SUCH AS THE RESERVOIR, NEED TO BE SEEDED. AN IDAHO CPA-25 SEEDING PLAN WILL BE COMPLETED WITH THE DESIGNATED CONSERVATIONIST AND BE CONSIDERED PART OF THIS DESIGN.

15. ALL METAL NEEDS TO BE PROTECTED.

16. ALL ROAD CROSSINGS NEED TO BE SLEEVED, THICKER PIPE INSTALLED, INSTALLED DEEPER, OR GRAVEL BACKFILL.

17. TRENCH BACKFILL WILL BE WALKED-IN AND RODDED WITH A HANDLE EVERY FOUR INCHES ON BOTH SIDES OF PIPE (SHEET 9).

18. THE DAM CONSTRUCTION AND CONDUIT THROUGH THE DAM FOLLOWS BOTH IDWR AND NRCS STANDARDS.

Elevation and volume were obtained through a Garmin GPS unit, laser level, and through ArcView, Eaglepoint and AUTOCAD software.



## DESIGN SUMMARY:

This is a modification of the design dated April 7, 2006 which involved two small reservoirs. After reviewing the design, the parties involved decided to use one reservoir and to move it to the east of the original design. The concept of the original design remains the same.

This modification of the project also involves diverting tailwater from the W Drain through an existing diversion and ditches to a new storage/regulating reservoir and then again into a new pipe network that descends down the canyon wall providing gravity pressure to operate two existing sprinkler systems.

This portion of the design only covers the upper end of the project which includes the reservoir, the overflow of the reservoir, and the outlet pipe from the reservoir to the pipe that descends down the canyon wall. The pipeline from the top of the canyon wall to the bubble screen and then to the two separate pumping stations will be presented under separate cover.

## DESIGN FLOW:

The W Drain has experienced flows up to 25 cfs as shown in the hydrograph in Appendix A. In a letter dated August 16, 2006, Mike Stubblefield with IDWR lists the maximum flow as 35.9 cfs occurring on November 10, 2003.

There are several limiting elements in this project that will restrict either of the maximum flows listed above from reaching the reservoir. The inlet structure at Station 0+00 that diverts water out of the W Drain is a concrete diversion structure with a 21" throat. A 2.58' flow depth in the inlet will pass a 18 cfs flow. The 12.0' weir in the W Drain 10' downstream from the diversion will require some modifications to back up the water for full flow through the diversion, however the modifications are not covered in this project. The water surface elevation at this 2.58' height will be 1.0' lower than the high water mark in the existing reservoir, so the water elevation in the existing reservoir will not be affected by this change in the existing operating conditions.

|                                                     |                    |
|-----------------------------------------------------|--------------------|
| 2.58' Water depth at inlet =                        | 16.7 cfs flow      |
| 1.5' Water depth in ditch from inlet to reservoir = | 16.8 cfs flow      |
| Full pipe at picnic tables =                        | 37.3 cfs flow      |
| Full pipe at service road =                         | 22.6 cfs flow      |
| Maximum system demand =                             | 2125 gpm = 4.7 cfs |
| 0.5' Water depth in emergency spillway =            | 40 cfs             |

## DITCHES:

The existing ditch will be cleaned to transfer water to the reservoir. The water will flow 3250' to a rock diversion that may be constructed. No design was completed on this structure because the function of the structure has not been determined. Water will flow in the existing ditch to the reservoir if this structure is not installed and if it is installed, water can be made to flow two directions; 1) in the existing channel to the reservoir and/or 2) flow into a grove of trees on the east side of the park headquarters and then into the reservoir.

## RESERVOIR/DAM:

An 1100' long dam that, at its highest point, is 17.3' in height from the downstream toe to the top of the embankment will be constructed. The bottom of the spillway, which is the maximum water surface elevation before water begins discharging, will be 3' lower than the top of the embankment making the effective height of the dam 14.3'. IDWR classifies this dam as a small dam and with significant risk because of the downstream conditions. NRCS classifies this dam as a Type 2. The reservoir created by the dam will store 97 acre-feet of water with a surface area of 14.4 acres.

The material to be used for construction for the dam will be obtained from the upstream side of the dam. Several holes were dug with a backhoe and the depths of the holes were from 2' to 8'. An NRCS soil scientist determined there was 17% clay in the soil that will be used for the dam (Appendix E).

Rock rip-rap will be installed on the water side of the embankment from three feet below the maximum water surface elevation to the top of the dam as per Mike Stubblefield with IDWR. A filter fabric will be installed under the rip-rap which will be the rock uncovered during the excavation of material for the dam, which will be of varying sizes.

A keyway or cutoff trench will be dug approximately 2' deep, or to solid rock, and approximately 10' wide. The width will accommodate the width of the contractor's equipment.

## OUTLET:

One 15" CMP or 100 psi (minimum) PVC/PIP pipe with anti-seep collars, or encased in concrete, will be installed through the dam to provide the flow for the downstream systems. There will be a gravel filter on the inlet end of the pipe and a valve to control flow on the outlet end. A 1900'-15" - 80 psi PVC/PIP line will continue from the reservoir in a northwesterly direction between the canyon rim and the park road to an abandoned road that traverses down the canyon wall. At this point steel pipe will go down the abandoned road to a bubble screen and then to the existing systems.

## OVERFLOW:

One rock spillway, which will act as an emergency spillway, will be constructed on the east side of the embankment (sheet 7). It will be 13' wide at the bottom and will pass a flow of 40 cfs at a depth of 0.5'. IDWR states the spillway depth shall be 3.0' to allow for freeboard, wave action, and maximum discharge of inflow. The water that flows over the spillway will flow back into the original ditch going towards Dick Waites. Part of the flow may be diverted to flow over the canyon rim south of Woody's Cove.

## IDAHO POWER LINES:

Daron Beasley with Idaho Power determined on 9/7/06 that there was enough clearance between the maximum water surface elevation in the reservoir and a main transmission that is directly above the reservoir. The dam and spillway will be constructed on the north side of the south set of power poles and an approximately 10' high berm will need to be constructed to keep the north set of power poles out of the reservoir.

## ADDITIONAL CONCERNS:

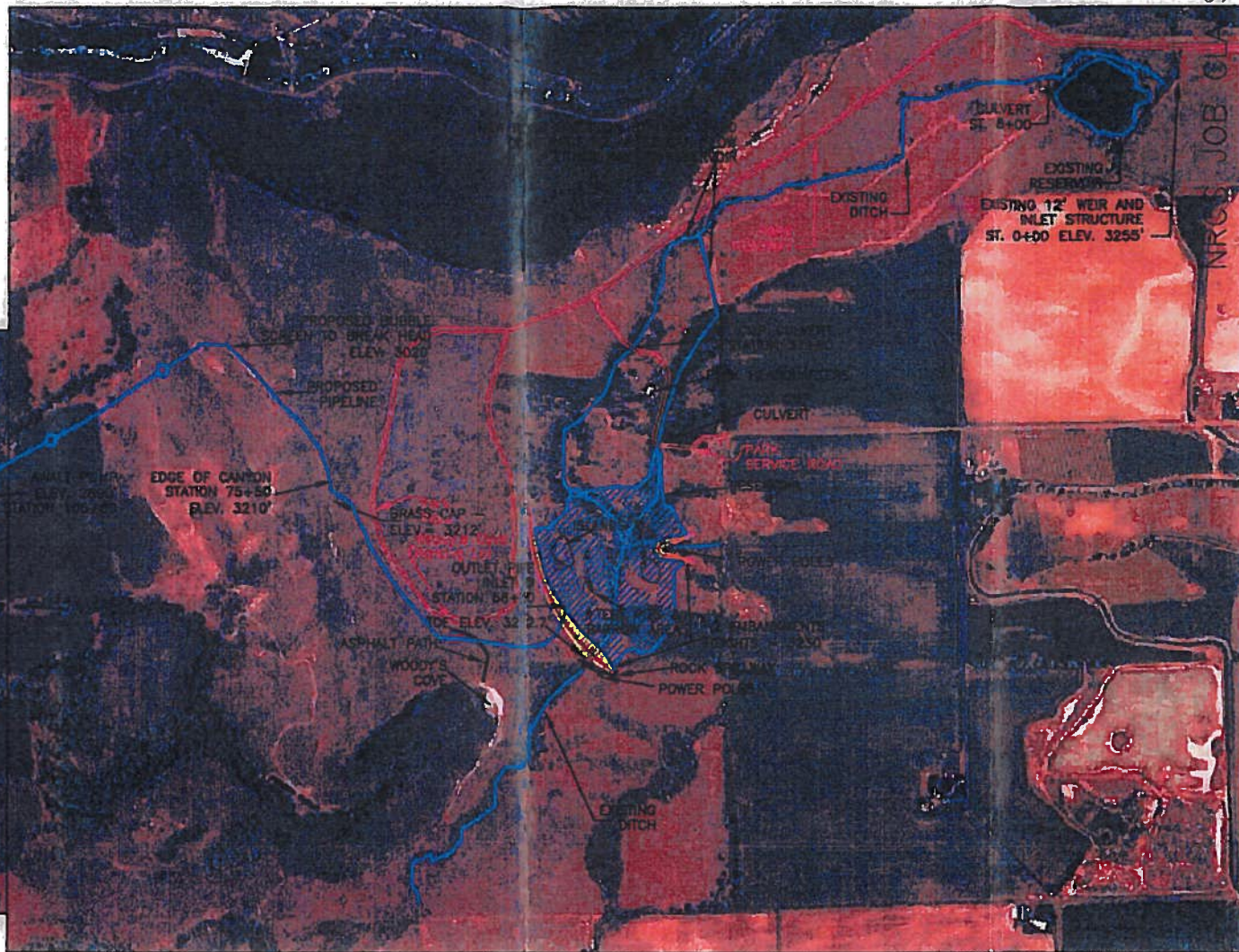
Shrubs and plants will be planted along the berms for habitat cover and two islands (location not determined yet) will also be created in the reservoir for the same purpose. An electric ditch pump may be installed in the original ditch near the park office where electricity is available. A 2", or appropriate size, poly line will be shanked in to the reservoir berm to provide water for establishing plants. The plants, pump, and poly line are not covered in this design.

|                                                                          |        |         |
|--------------------------------------------------------------------------|--------|---------|
| Date                                                                     | SFP DR | SFP DR  |
| Designed                                                                 | Drawn  | Checked |
| Approved                                                                 |        |         |
| W DRAIN<br>GENERAL NOTES<br>GOODING SWCD, GOODING, ID                    |        |         |
|                                                                          |        |         |
| National Conservation Council<br>United States Department of Agriculture |        |         |
| File Name                                                                |        |         |
| Drawing Name                                                             |        |         |
| Sheet 2 of 10                                                            |        |         |



SCALE  
1" = 600'

North



NRCS JOB CLASS IV



File Name

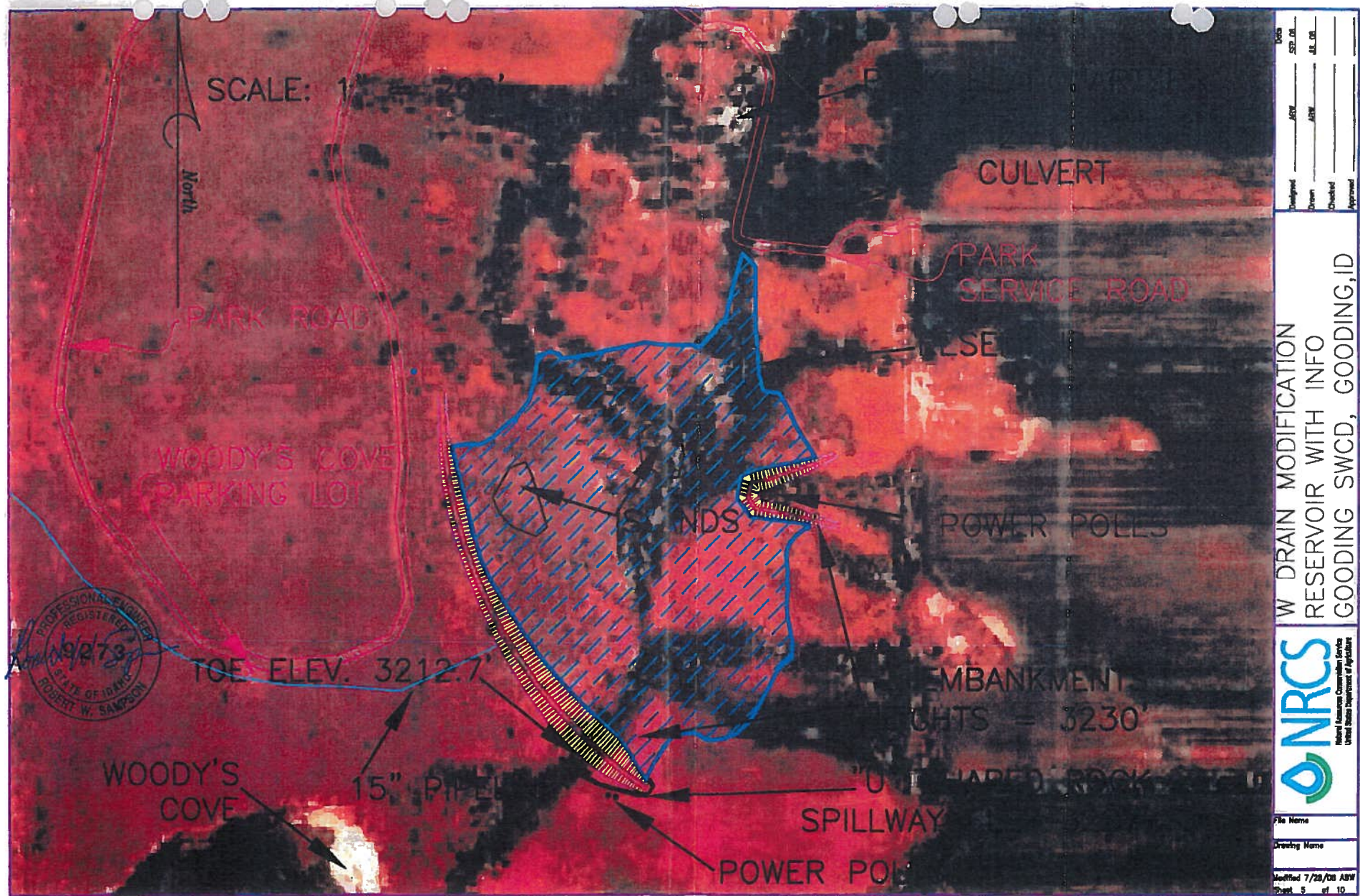
Drawing Name

Sheet 3 of 3

W DRAIN  
OVERVIEW WITH PHOTO AND STATIONS  
GOODING SWCD, GOODING, ID

|          |       |      |       |
|----------|-------|------|-------|
| Designed | _____ | SELT | _____ |
| Drawn    | _____ | SELD | _____ |
| Checked  | _____ |      | _____ |
| Approved | _____ |      | _____ |





W DRAIN MODIFICATION  
 RESERVOIR WITH INFO  
 GOODING SWCD, GOODING, ID



File Name  
 Drawing Name  
 Modified 7/28/08 ASW  
 Page 5 of 10

|          |     |        |
|----------|-----|--------|
| Designed | ASW | SEP 08 |
| Drawn    | ASW | ALL 08 |
| Checked  |     |        |
| Approved |     |        |

| Elevations | (2)Area (ft2) | (3)Calculated<br>Area (ft2) | (4)Area of<br>Rip-Rap<br>(ft2) | (5)Volume<br>Rip-Rap<br>(ft3) | (6)Cumulative<br>Storage<br>(Acres Feet) |
|------------|---------------|-----------------------------|--------------------------------|-------------------------------|------------------------------------------|
| 3215       | 6554          | 0                           | 0                              | 0                             | 0                                        |
| 3216       | 59608         | 33080                       | 160                            | 240                           | 0.76                                     |
| 3217       | 170072        | 114839                      | 267                            | 401                           | 3.39                                     |
| 3218       | 271551        | 220812                      | 355                            | 533                           | 8.46 Invert of Outlet                    |
| 3219       | 315488        | 293520                      | 414                            | 621                           | 15.19                                    |
| 3220       | 352472        | 333980                      | 445                            | 668                           | 22.86                                    |
| 3221       | 384199        | 368336                      | 476                            | 714                           | 31.32                                    |
| 3222       | 417035        | 400617                      | 497                            | 746                           | 40.51                                    |
| 3223       | 461498        | 439267                      | 541                            | 812                           | 50.59                                    |
| 3224       | 500769        | 481134                      | 820                            | 1230                          | 61.63                                    |
| 3225       | 534045        | 517407                      | 858                            | 1287                          | 73.51                                    |
| 3226       | 570046        | 552046                      | 883                            | 1325                          | 86.18                                    |
| 3227       | 605844        | 587945                      | 900                            | 1350                          | 99.68 Spillway                           |
| 3228       | 652507        | 629178                      | 916                            | 1374                          | 114.12                                   |
| 3229       | 685488        | 673998                      | 918                            | 1377                          | 129.80                                   |
| 3230       | 736708        | 716098                      | 925                            | 1388                          | 146.04                                   |
| TOTALS     |               |                             | 9375                           | 14063                         |                                          |

SCALE  
1" = 250'

#### Prismoidal Volume Results

Original Surface Model:  
Final Surface Model:  
Cut Compaction Factor:  
Fill Compaction Factor:

Raw Cut Volume:  
Compacted Cut Volume:  
Total Cut Volume:

Raw Fill Volume:  
Compacted Fill Volume:  
Total Fill Volume:

Surface1  
Embankment  
0.00 %  
-10.00 %

994.99 cu yd  
0.00 cu yd  
994.99 cu yd

15805.74 cu yd  
-1580.57 cu yd  
14225.16 cu yd

Original Surface Model:  
Final Surface Model:  
Cut Compaction Factor:  
Fill Compaction Factor:

Raw Cut Volume:  
Compacted Cut Volume:  
Total Cut Volume:

Raw Fill Volume:  
Compacted Fill Volume:  
Total Fill Volume:

Surface1  
PP Embankment  
0.00 %  
-10.00 %

994.99 cu yd  
0.00 cu yd  
994.99 cu yd

15805.74 cu yd  
-1580.57 cu yd  
14225.16 cu yd

| ELEVATION<br>(FT) | STORAGE<br>(ACRES) | STORAGE<br>(AC-FT) |
|-------------------|--------------------|--------------------|
| 3213              | 0.0                | 0.0                |
| 3214              | 0.2                | 0.2                |
| 3215              | 0.6                | 0.9                |
| 3216              | 1.1                | 1.9                |
| 3217              | 1.5                | 3.4                |
| 3218              | 2.6                | 6.0                |
| 3219              | 3.9                | 9.9                |
| 3220              | 5.5                | 15.4               |
| 3221              | 7.2                | 22.6               |
| 3222              | 8.5                | 31.1               |
| 3223              | 9.7                | 40.8               |
| 3224              | 10.7               | 51.5               |
| 3225              | 11.6               | 63.1               |
| 3226              | 12.6               | 75.7               |
| 3227              | 14.4               | 90.1               |

See table  
above

Volume of dirt for dam = 15,805 cu yds. = 426,735 cu feet = 9.8 ac-ft  
TOTAL RESERVOIR VOL 99.9

ASSUME: Volume of dirt used in constructing dam increases volume of  
reservoir storage. Volume of dirt for embankment around PP equals the  
same volume lost in reservoir.

Control Point  
Screw in Asphalt  
Elev. 32.5

Date  
SEP 08  
SEP 08  
Designed  
Drawn  
Checked  
Approved

W DRAIN MODIFICATION  
RES. WITH INFO & CONTOURS  
GOODING SWCD, GOODING, ID



File Name  
Drawing Name

Sheet 8 of 10

## Reservoir and Rock Spillway

Elev of Top of Embankment  
3230.0' with 2.0' Freeboard and  
1.0' for overflow and wave action

Rock Rip-Rap with fabric liner, from top of dam to 3' below max water surface, or 6' deep and length of dam. Use rock uncovered during dam construction

Gravel Filter at Pipe Inlet  
Invert of Pipe = 3218'

Brass Cap at Canyon Rim  
Elev = 3212'  
Head Loss in 15" Pipe = 6' +  
2.0' of Head to get Full Pipe

1900' 15" PVC/PIP  
Installed on Grade  
and with proper cover

Downstream Toe  
Elev 3212.7'

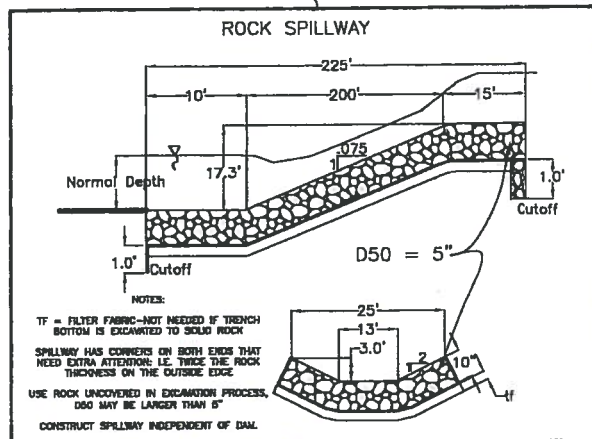
Valve Station.  
See Page 8

2' x 10' Keyway

Upstream Toe  
Elev 3213.2'

Channel Slope = 1':175'

Dam and Keyway Backfill Material- No rocks larger than 4" or any organic material, compact in 6" lifts with optimum moisture.



W DRAIN  
RES. AND ROCK SPILLWAY  
GOODING SWCD, GOODING, ID

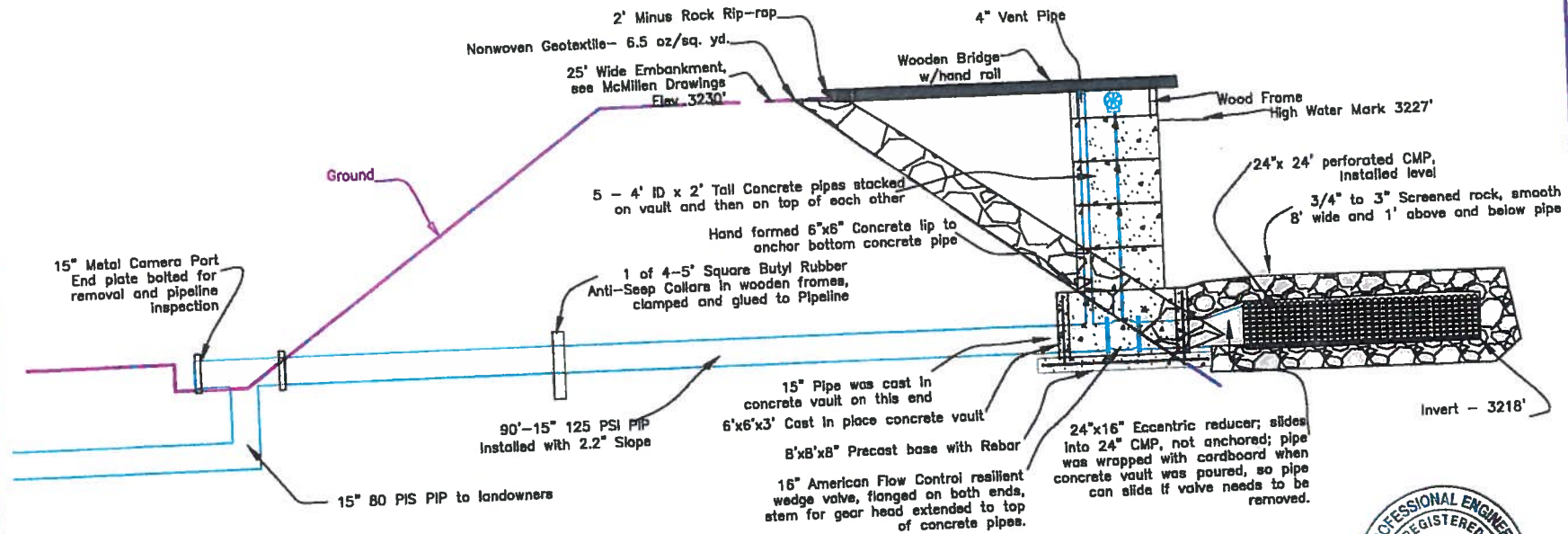


Natural Resources Conservation Service

File Name

Drawing Name

Sheet 7 of 9



NOTE: Drawing not  
to Scale



W DRAIN MODIFICATION  
FINAL INSTALLATION OF VALVE  
GOODING SWCD, GOODING, ID



File Name

Drawing Name

MODIFIED JULY 28, 2009  
Sheet 8 of 10

DESIGNED BY: \_\_\_\_\_  
DRAWN BY: \_\_\_\_\_  
CHECKED BY: \_\_\_\_\_  
APPROVED BY: \_\_\_\_\_

### TRENCH METHOD OPTIONS FOR 15" PIP OR 14" HDPE



Diagram showing a typical trench cross-section. The trench is 15' wide at the top and 14' wide at the bottom. The depth is approximately 30'. The trench is lined with 6" rigid material (no compaction reqd.) and filled with 1/3" minus material (8" layer) plus water and vibratory compact with hand tools. The bottom is a rock free zone (over excavation not reqd. except in rocky areas). The trench is finished with a 2'-6" fill on an 8' wide base. The original ground surface is shown above the trench.

TYPICAL TRENCH CROSS-SECTION



Diagram showing a trench cut with a rock saw. The trench is 15' wide at the top and 14' wide at the bottom. The depth is approximately 30'. The trench is lined with 6" rigid material (no compaction reqd.) and filled with 1/3" minus material (8" layer) plus water and vibratory compact with hand tools. The bottom is a rock free zone (over excavation not reqd. except in rocky areas). The trench is finished with a 2'-6" fill on an 8' wide base. The original ground surface is shown above the trench.

TRENCH CUT WITH ROCK SAW CROSS SECTION

NOTE: REQUIRES ALL VEHICULAR TRAFFIC BE ELIMINATED FROM TRAVEL OVER PIP PIPE; SMALL VEHICLE TRAFFIC MAY CROSS HDPE PIPE.

ANCHORING METHOD  
OPTION FOR 14" HDPE

Min 4" of 1/2" Minus Material or Pao Gravel

Electrofusion Restraint

HDPE Pipe

Ground/Rock Surface

Rubber Padding

Metal Profile Band

20' Centers

Allows 5% Strain

Min 1" x 10" Anchor

Augered Anchor Stabilization

NOTE:  
Major thrust blocks required at ends

**MOUNDING METHOD OPTIONS  
FOR 15" PRC OR 14" HDPE**

**NOTE:**  
REQUIRES 0.75 CUBIC YARD OF MOUND  
MATERIAL PER LINEAL FOOT OF PIPE  
REQUIRES THRUST BLOCKS

### MOUNDING AND TRENCH METHODS FOR 10" STEEL

**NOTE:**  
 REQUIRES 0.75 CUBIC YARD OF MOUND MATERIAL PER LINEAR FOOT OF PIPE  
 REQUIRES THRUST BLOCKS

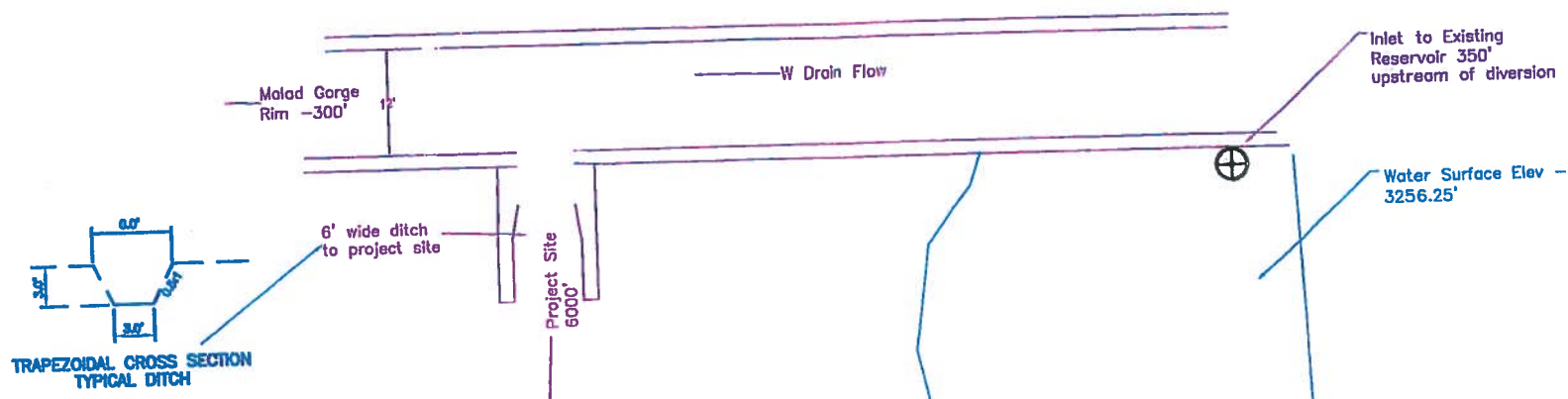
**NOTE:**  
 REQUIRES ALL HEAVY VEHICULAR TRAFFIC BE ELIMINATED FROM TRAVEL OVER STEEL PIPE; SMALL VEHICULAR TRAFFIC MAY CROSS PIPE. SLEEVE ROAD CROSSINGS


**NRCS**  
 National Resource Conservation Service  
 United States Department of Agriculture

File Name  
 Drawing Name  
 Sheet 9 of 10

Sheet 8 of 10

A circular professional engineer seal for Robert W. Sampson, State of Idaho, No. 9278. The seal is stamped in blue ink. The text around the border reads "PROFESSIONAL ENGINEER" at the top and "STATE OF IDAHO" at the bottom. The center contains the name "ROBERT W. SAMPSON" and the number "9278". The date "10/29/08" is handwritten in blue ink below the seal.



NOTES:

- Elevation of weir base - 3251.4'
- Elevation of invert of 21" wide concrete check structure - 3252.1'
- Elevation of north bank at weir - 3254.1'
- Elevation of top of check structure and south bank - 3255.0'
- Elevation of top of wing walls on weir - 3255.15'

Based on the above elevations, if the weir was completely checked to send all the water into the ditch check structure, the maximum height of water would be 2.9'. This will allow a maximum flow of 16.4 cfs through the check into the ditch and then to the project site. If more water comes down the W Drain, it will overflow the north bank of the W Drain and flow back into the drain below the weir.

PLAN VIEW



|        |          |       |         |          |
|--------|----------|-------|---------|----------|
| Date   | DESIGNED | DRAWN | CHECKED | APPROVED |
| SEP 06 | ASW      | ASW   |         |          |
| SEP 06 |          |       |         |          |

W DRAIN MODIFICATION  
INLET AT W DRAIN  
GOODING SWCD, GOODING, ID

**NRCS**  
National Natural Resources Conservation Service  
United States Department of Agriculture

File Name

Drawing Name

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