RECEIVED
SEP 11 2009
DEPARTMENT OF
WATER RESOURCES

SNAKE RIVER Farm MITIGATION

OVER THE RIM

OPENING TESTIMONY REPORT

EXHIBIT 2000

Prepared for

THE IDAHO GROUND WATER APPROPRIATORS, INC.

NORTH SNAKE GROUND WATER DISTRICT

MAGIC VALLEY GROUND WATER DISTRICT

Prepared by

SPF Water Engineering, LLC

PROFESSIONAL ENGINEER
REGISTERED
9/11/09
8616
STATE OF IDAHO
ROBERT ROY HARDGROVE

September 11, 2009

LICENSED PROFESSIONAL GEOLOGIST
TERRY M. SCANLAN
646
STATE OF IDAHO

PROFESSIONAL ENGINEER
REGISTERED
6266
STATE OF IDAHO
TERRY M. SCANLAN

SPF WATER ENGINEERING

Table of Contents

List of Exhibits

Appendices

1. "OVER THE RIM" PROJECT SUMMARY

SPF Water Engineering, LLC (SPF) was hired to design the infrastructure required to implement the North Snake Ground Water District and Magic Valley Ground Water District (Districts') 2009 Replacement Water Plan and Third Mitigation Plan ("The Plan"). The Plan proposed construction of a pipeline from Eastern Snake Plain Aquifer wells located above the Snake River canyon rim for delivery of replacement water to Clear Springs Food's Snake River Farm facility located north of Buhl, Idaho and adjacent to the Snake River. This project is referred to as the "Over the Rim" option. This memorandum summarizes the work SPF completed.

1.1. Alignments and Project Approaches

The original project intent was to utilize water from seven wells, collect the water in a common pipe, and deliver approximately 3 CFS of the water to Snake River Farm. The original alignment and approach was created by AMEC. SPF utilized AMEC's alignment figure as their guide during their March 30, 2009 site visit. Initially there were two over the rim options; a western route over the rim directly above the Snake River Farm Visitor Center and an eastern route over the rim east of the Snake River Farm facility along the Idaho Fish and Game property line. Based on conditions in the field, SPF determined (and the directional drilling contractors confirmed) that the eastern over-the-rim alignment was favorable to the western alignment. Also during the March 30 site visit, SPF modified the alignment between Wells 5, 6, and 7 to a more direct route that avoided multiple topographical high and low spots, thereby eliminating potential pipeline air vent locations. The original AMEC alignment figure and the initial SPF figure are both included below as Exhibit 2001 and Exhibit 2002 for comparison purposes.

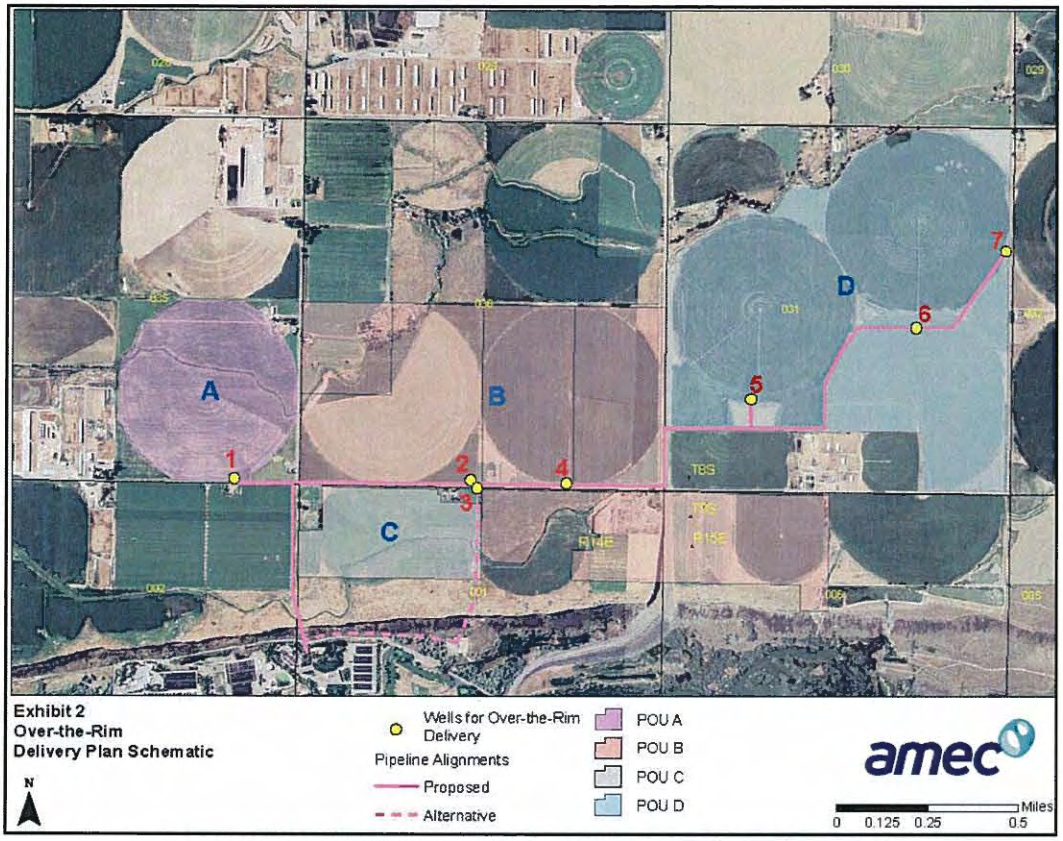


Exhibit 2001 – AMEC's Original Alignment

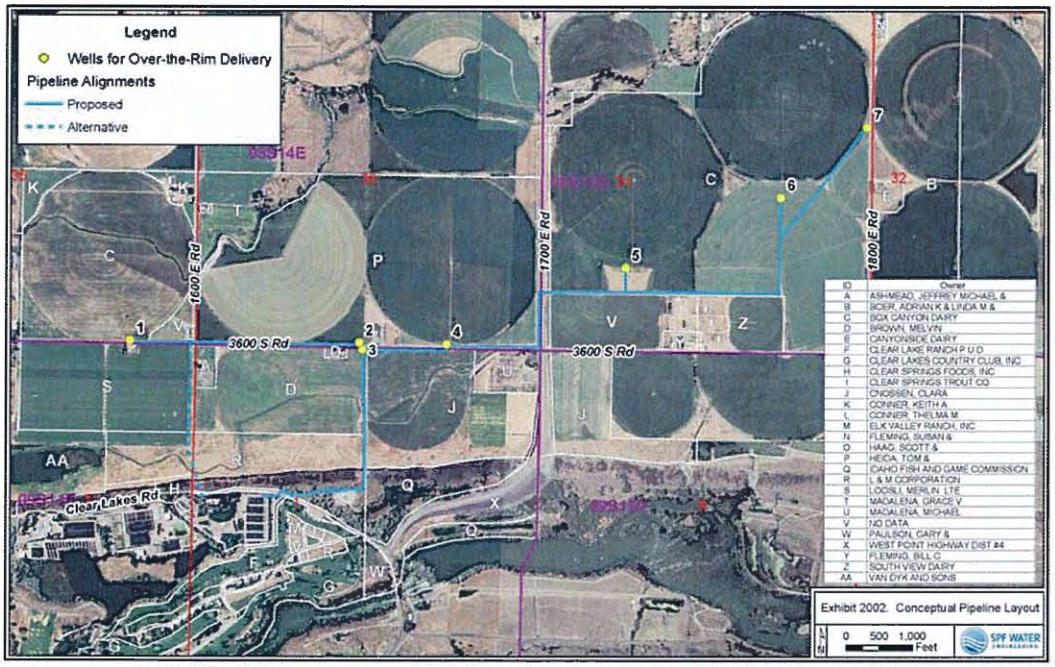


Exhibit 2002 – Conceptual Pipeline Layouts – Wells 1 through 7

SPF determined directional drilling (boring) through the basalt rim was the appropriate way to get the pipe from the top of the rim to the bottom. The directional drilling work was bid out, but the pipeline bid package did not get completed prior to the project being put on hold April 10, 2009.

SPF was given authorization to proceed on March 28, 2009. The project had a requirement to deliver water to Snake River Farm on or before June 1, 2009. SPF strongly believes the June 1, 2009 date for water delivery to the Snake River Farm facility was achievable.

SPF led the design effort for all of the ground water delivery from the wells to Snake River Farm. The Districts took care of all of the design and construction for the work necessary to convert the participating farms' ground water irrigation sources to surface water irrigation sources. Due to the timeframe, SPF determined they could use some assistance with the Snake River Farm coordination and the specialized design that may be required prior to discharging water to Snake River Farm's facilities. SPF added Engineering Science and Construction (ESC) to the project design team. ESC was familiar with the overall history between the Districts and Snake River Farm, as they had previously worked on the pump back mitigation plan for the Districts at the Snake River Farm facility. ESC took over the coordination and design of all work that was to take place on Snake River Farm property. This included direct coordination with the Snake River Farm management to determine where the pipeline and the proposed aerator structure could be placed on Snake River Farm property and where the point of delivery was to be. ESC met with Snake River Farm only one time. During this meeting with Randy MacMillan, Dr. MacMillan stated to ESC that the water would have to be delivered to the head waters of the springs and Snake River Farm would not consider water delivery directly to the raceways. Snake River Farm also strongly discouraged any damage to their landscaped areas, especially at their entrance. These constraints made the piping alignment across their property to the spring head waters much more challenging and forced the flow control and filter vaults east onto L&M property instead of the preferred location on Snake River Farm's property.

1.2. Project Approach

The original seven-well scenario and associated pipeline alignment are shown in Exhibits 2001 and 2002 respectively. Exhibit 2003 represents a modified seven-well scenario, where Well 3 was replaced with Well 8. Exhibit 2004 illustrates a scenario that includes only Well 4 and a new Well 4A adjacent to Well 4. More detailed information about these individual scenarios is discussed in Section 2 of this report.

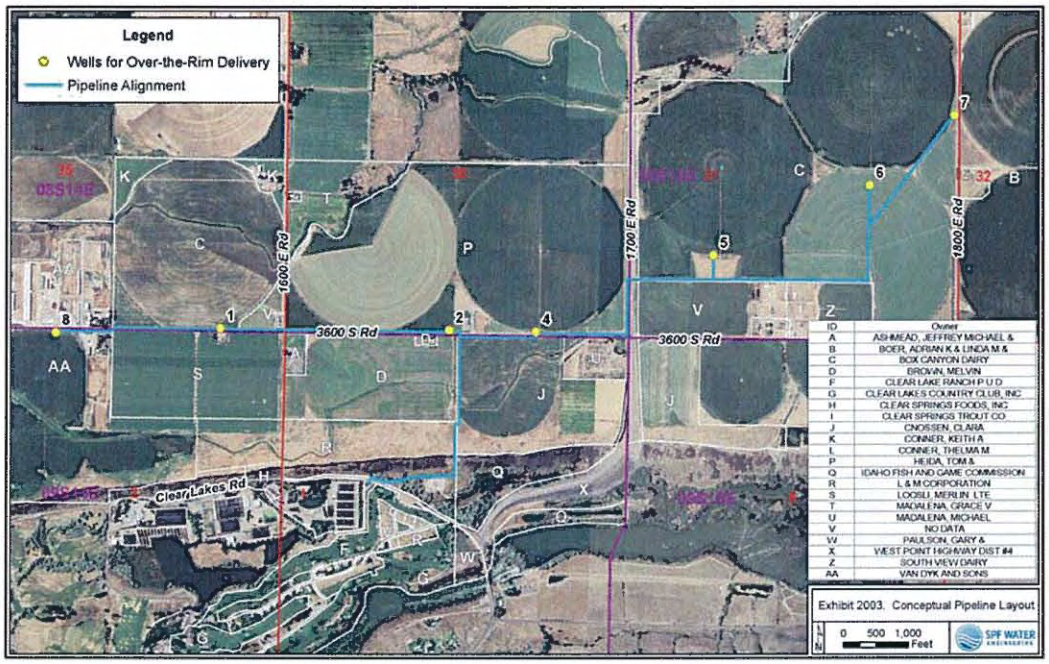


Exhibit 2003 – Conceptual Pipeline Layout – Wells 1 through 8

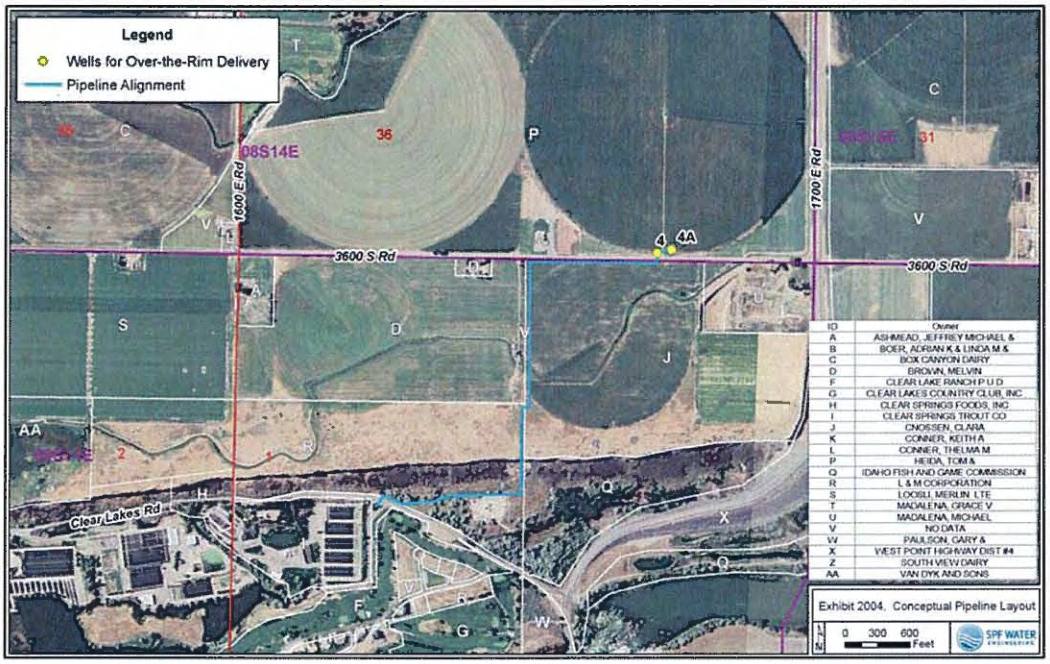


Exhibit 2004 – Conceptual Pipeline Layout – Wells 4 and 4A

If a shorter alignment, such as the one shown in Exhibit 2004 was utilized, the construction approach by the bidding contractors may change significantly. They may choose to deal with the basalt with a hydraulic rock hammer as they encounter it, instead of potentially taking a proactive approach of using a rock saw to excavate the

entire length of trench. Also with the shrinking size of the project, it would be easier to consider smaller qualified contractors as prospective bidders.

1.3. Status of Documents and Work Completed

SPF made significant steps towards completing preliminary design documents for their portion of the design. A topographical survey for the Wells 1 through 7 alignment option (does not include survey for the Well 8 option) to the Snake River Farm property was completed. Snake River Farm would not allow the survey crew on their property during the two days the surveyors were in the field, so additional work will be required to obtain topographical information for the pipe alignment through Snake River Farm property. The survey was the basis for the 19 sheet set of design drawings that are included as Exhibit 2006 in the appendices of this report. These drawings overall can be considered approximately 50% complete. These SPF drawings stop at the Snake River Farm's property line. ESC's design drawings start at this point and continue the pipeline alignment to their aeration degassing structure prior to discharging the water into the spring head works.

Contact was made with West Point Highway District. Prior to doing any work within their right of way, West Point Highway District will need to issue a permit to the contractor doing the work. The Highway District requires board approval of all permits. They were very cooperative and said they would consider granting board pre-approval of all of the proposed road crossings, which would allow the contractor to pull permits for these crossings as needed.

Substantial discussions were made with Intermountain Gas Company (IGC). They have an existing tunnel that was considered as an option to get the pipe through the rim. After working through the schedule constraints and the cost associated with installing pipe in their tunnel, it was decided the tunnel was not cost or schedule effective. IGC did not take issue with the water pipe alignment running parallel to their pipe through the rim with the proposed 40-foot separation. They stated we would have to coordinate with their Twin Falls office during construction when digging adjacent to their line, and for the locations the water line crossed their gas line.

Idaho Power Company (IPCO) was contacted as well. There are several areas where the proposed alignments run alongside or under their overhead facilities. Additional work with IPCO will be required to coordinate these crossings as well as coordinate additional power services and service upgrades for the well facilities.

1.4. Design and Construction Timelines

If the "Over the Rim" project is completed in the future, the project completion requirement at that time will dictate the project approach and the pace of the design and construction schedules. If the project was to follow a non-schedule driven approach where the construction was not impacted by crops or weather (maybe in the late summer and early fall), it could be expected that the design and completion of construction will take approximately five to seven months.

2. PUMP SYSTEM DESIGN AND OPERATION

This section of the report outlines the conceptual plan for the "Over the Rim" pump system design and operation.

2.1. Design Criteria

Design criteria are listed below.

1. Target flow rate is 3.0 cfs (1,347 gpm), expandable to 5.0 cfs (2,244 gpm).
2. Operation will be year-round, continuous flow, with rates maintained within 10% (+/-) of target.

2.2. Design Alternatives

Two alternatives are under consideration for construction and operation. Piping and facilities between Well 4 and Snake River Farm are identical for both alternatives. Piping has been sized for a 5.0 cfs flow rate.

2.2.1. Alternative A

Pumping will be distributed from seven existing wells, based on historical annual pumping volumes from those wells. Originally, the seven wells consisted of Wells 1 through 7. Currently, the seven wells would consist of Wells 1, 2, and 4 through 8. Exhibit 2003 is a schematic of the piping required for Alternative A. This alternative requires extensive piping to reach each well, upgrades of pumping equipment at seven wells, and seasonal pumping operations at seven locations.

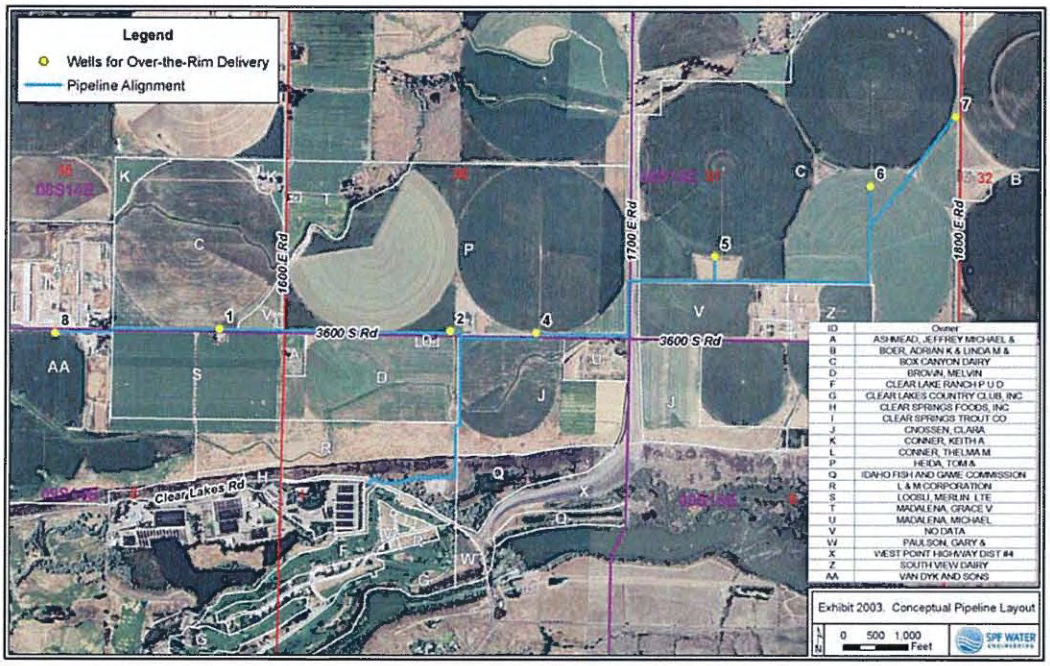


Exhibit 2003 – Alternate A Piping Schematic

2.2.2. Alternative B

Pumping will be distributed from two wells: one existing (Well 4) and one proposed (Well 4A). Both wells will be located on the same site. This alternative requires significantly less pipe, upgrade of only one existing well pump, and installation of one new well and pump. Exhibit 2004 is a schematic of the piping required for Alternative B. Alternative B concentrates all pumping operations at one location. **Note that an alternative well site (such as Well 5) can be considered if the quality or quantity of water available at the Well 4 site is not acceptable.**

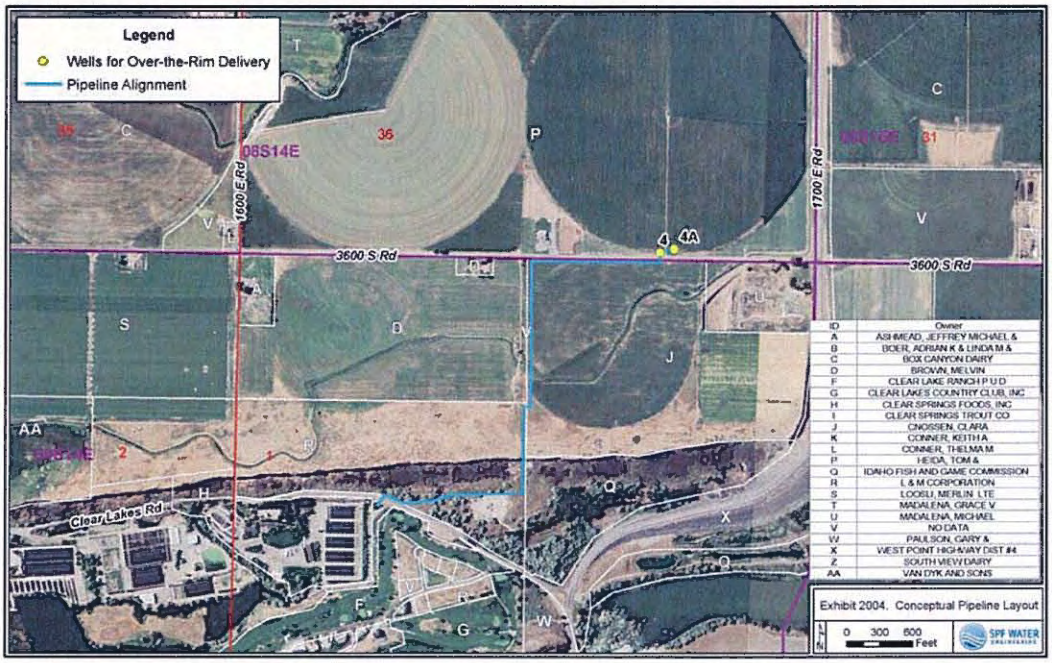


Exhibit 2004 – Alternative B Piping Schematic

2.3. Existing Wells and Pumps

Existing well facilities locations and equipment are described below, based on the March 30, 2009 site visit and follow-up investigation.

- Well 1 - SWSESE Section 35, T8S, R14E; 30-hp vertical turbine; 50-hp booster (B4JPB, 13 1/8" impeller 1000 gpm 150 feet)
- Well 2 – SESESW Section 36, T8S, R14E; 100-hp vertical turbine
- Well 4 – SESWSE Section 36, T8S, R14E; 100-hp vertical turbine,
- Well 5 – SWNESW Section 31, T8S, R15E; 125-hp, 8-inch discharge
- Well 6 – NENWSE Section 31, T8S, R15E; 100-hp vertical turbine, 8-inch discharge; discharge head nameplate Vertiline 12RH 1320 gpm 252 feet
- Well 7 – NESENE Section 31, T8S, R15E; 100-hp vertical turbine, discharge head nameplate Vertiline 12RL 1000 gpm 306 feet
- Well 8 – NWNENW Section 2, T9S, R14E; 75-hp vertical turbine

Note that Well 3 was dropped because the well owner decided not to participate in the project. Well 8 was visited on September 1, 2009.

Well drillers reports have been located for Wells 1, 2, 4 and 8 only.

- Well 1 is 12-inch diameter, 113 feet deep, with casing from 0 to 7 feet. Static water level in 1960 was 90 feet.
- Well 2 was deepened in 1995 to 144 feet. Static water level was 76 feet. A 12-inch diameter borehole is reported from 100 to 124 feet and 8-inch diameter from 124 to 144 feet.
- Well 4 was constructed in 1976 with 16-inch casing to 19 feet, and total depth of 85 feet. The well was deepened in 1995 to 144 feet. Static water levels were 70 feet in 1976 and 69 feet in 1999. Static water level on September 1, 2009 was 75 feet.
- Well 8 was constructed in 1973 with 12-inch casing to 18 feet and a total depth of 80 feet. Static water level in 1973 was 73 feet.

Static water levels in the seven wells will likely range from 75 to 100 feet. Pumping water levels may range from 80 to 125 feet. Well pump performance curves will need to be reviewed, or the pumps will need to be test, to determine if existing pumps are applicable for use in the Over-the-Rim system. If existing well pumps do not meet project performance requirements, then new pumps will be installed.

For initial design purposes, a pump lift and column friction totaling 110 feet, plus 25 psi (58 feet) discharge pressure, has been assumed as typical for each well. Therefore, assumed total dynamic head will be approximately 168 feet. At 75 percent efficiency, 168 feet TDH, and 1350 gpm flow rate, the required brake horsepower is 76 hp at each well. Therefore, Wells with 100 hp or 125 hp motors can theoretically pump the entire 3 cfs target flow rate, but Well 1 (30 hp well pump with 50 hp booster pump) may need a pump and motor upgrade or will need to be operated simultaneously with Well 8. The remaining pump motors (with speed control, throttling, or pump replacement) should be able to operate stand-alone to supply 1,350 gpm.

2.4. Pipeline Elevations and Pipeline Operating Pressures

The pipeline will be operated to provide a minimum static pressure of 0 psi at the highpoint in the system (Well 7 in Alternative A or either Well 4 or a standpipe near the top of the rim in Alternative B). Static pressure will be maintained through the use of a rate of flow control valve with pressure sustaining control located near Snake River Farm. Approximate elevations and static pressures required to maintain a full pipeline under all conditions are listed below in Exhibit 2007. Depending on location, pipeline operating pressures will be 5 psi to 20 psi more than the static pressure due to hydraulic friction.

	Approximate Elevation	Alternative A Static Pressure (psi)	Alternative B Static Pressure (psi)
Well 1	3230	30.3	
Well 2	3250	21.6	
Well 4	3260	17.3	0.0
Well 5	3280	8.7	
Well 6	3290	4.3	
Well 7	3300	0.0	
Well 8	3230	30.3	
Edge of rim	3255	19.5	2.2
Snake River Farm Raceway	3042	111.7	94.4
Snake River Farm Headworks	3057	94.4	87.9

Exhibit 2007 – Elevations and Static Pipeline Pressures

The static pressures listed above suggest that typical operating pipeline pressures above the rim may be in the range of 5 to 50 psi, depending on location and pipe sizing. Pressures below the rim may range from 90 to 130 psi upstream of the flow control valve, depending on location and pipe sizing.

Note that Alternative B static pressures are approximately 17 psi lower than the Alternative A pressures. However, for Alternative A it may be possible to seasonally lower static and operating pressures by approximately 17 psi if the static pressures upstream of Well 4 are allowed to fall below 0 psi (i.e., the pipeline between Wells 7 and 4 will drain). This upper portion of the pipeline can be isolated when not in use. Given the cost of pumping the water an additional 17 psi on a year-round basis, consideration should be given to seasonally operating at the lower static pressure.

2.5. Pipeline Protection

The pipeline will be protected by a rate of flow control valve with back pressure (i.e., pressure sustaining), pressure relief valve, and air vents.

A pressure control and flow metering facility will be constructed below the rim. The preliminary location is on the L&M property, across the road from the northeast corner of Snake River Farm. Elevation of the pressure control station will be approximately equal to the Snake River Farm head works. The station will have the following components.

1. Rate of flow control valve with back pressure. This valve is designed to provide a constant rate flow while maintaining a positive pressure in the pipeline under all static and operating conditions. Flow rate and pressure are adjustable over a wide range. Pressure settings in the range of 90 to 110 psi are likely. The valve could be an 8-inch Cla-Val Model 40-25.

2. Pressure relief valve. This valve will be located upstream from the rate of flow control valve, and will protect the system in the event that Snake River Farm shuts off the flow or if the rate of flow control valve were to fail in a closed position. Under such a scenario, all of the flow will discharge to waste. The pressure relief valve could be an 8-inch Cla-Val Model 50-01.

3. Instantaneous and totalizing flow meter. The meter will provide compliance monitoring and allow adjustment of the rate of flow control valve. The meter can either be a magnetic-style (if power is available) or mechanical-style meter.

4. Filter or strainer. The filter or strainer will protect the control valves from pipeline construction debris and sand or cinders produced from the wells.

Exhibit 2008 is a schematic of the pressure and flow control, pressure relief, and flow meter facility.

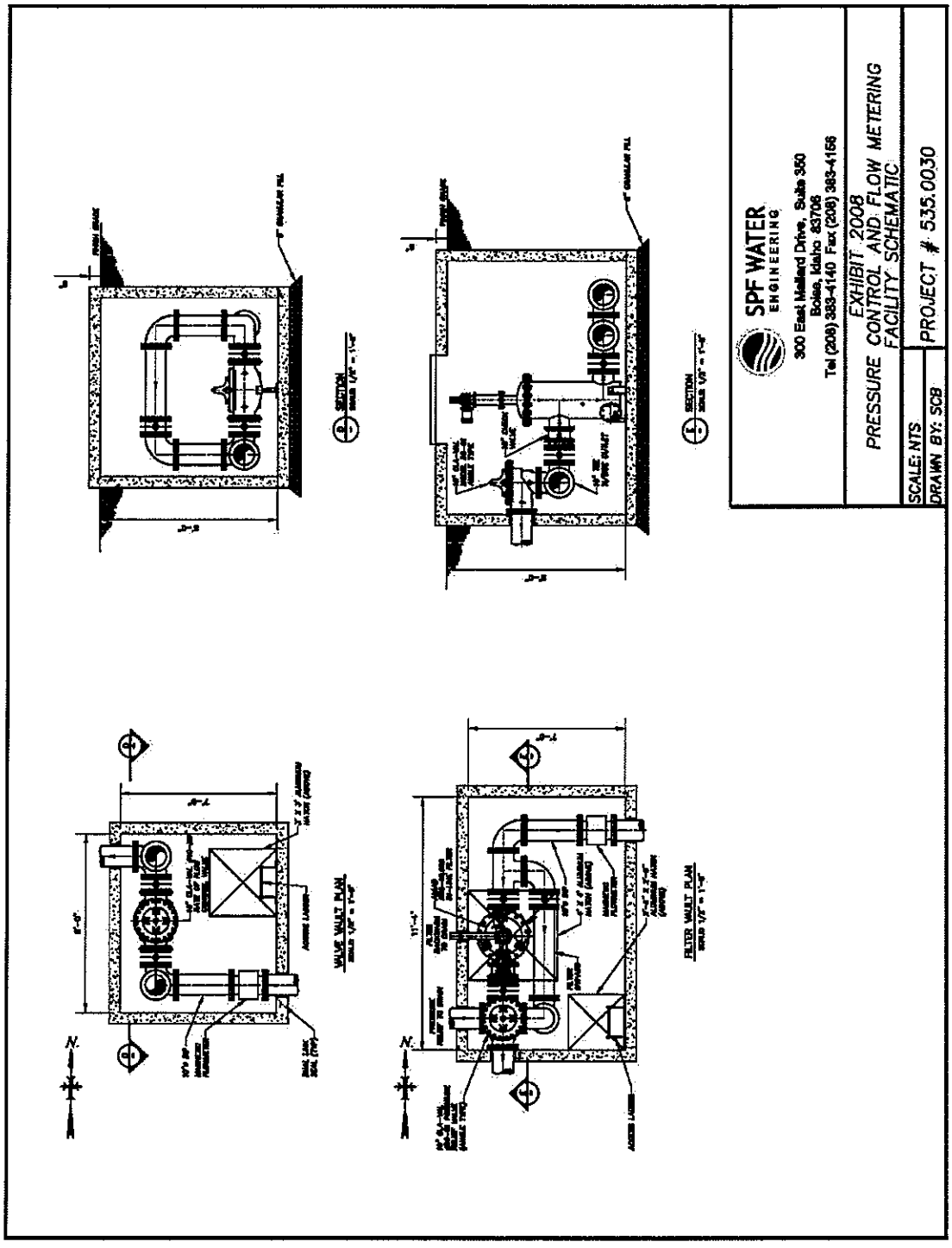


Exhibit 2008 – Schematic of Pressure Control & Flow Meter Facility

2.6. Pumping Volumes

Exhibit 3 of The Plan described the water rights to be diverted, and the historical pumping from each of five well groups (i.e., Well 1, Wells 2&4, Well 3, Wells 5&6, and Well 7). We have modified this grouping to exclude Well 3 and added Well 8 as shown below in Exhibit 2009.

Wells	Average AF/yr (2003-2007)	% of Total	Days to Operate Annually
1	322.9	13%	48
2&4	724.2	30%	107
5&6	946.5	39%	141
7	211.9	9%	31
8	255.0	10%	38
Total	2460.5	100%	365

Exhibit 2009 – Distribution of Pumping Volumes and Durations by Well Groups

Note that the 2,460.5 acre foot volume is equivalent to a year-round average pumping rate of 3.40 cfs, which is slightly higher than the target flow rate of 3.0 cfs.

2.7. Operational Alternative A – Seven Wells

2.7.1. Pumping Equipment

Each well will be modified for pumping the target rate by pump replacement or modification as needed. We anticipate that the discharge at each well pump will be replaced with new 8-inch piping, air/vacuum relief and air release, check valve, throttling/isolation valve, and flow meter. A water quality sample tap will be provided for each individual well. Exhibit 2010 is a typical well head detail for Alternative A.

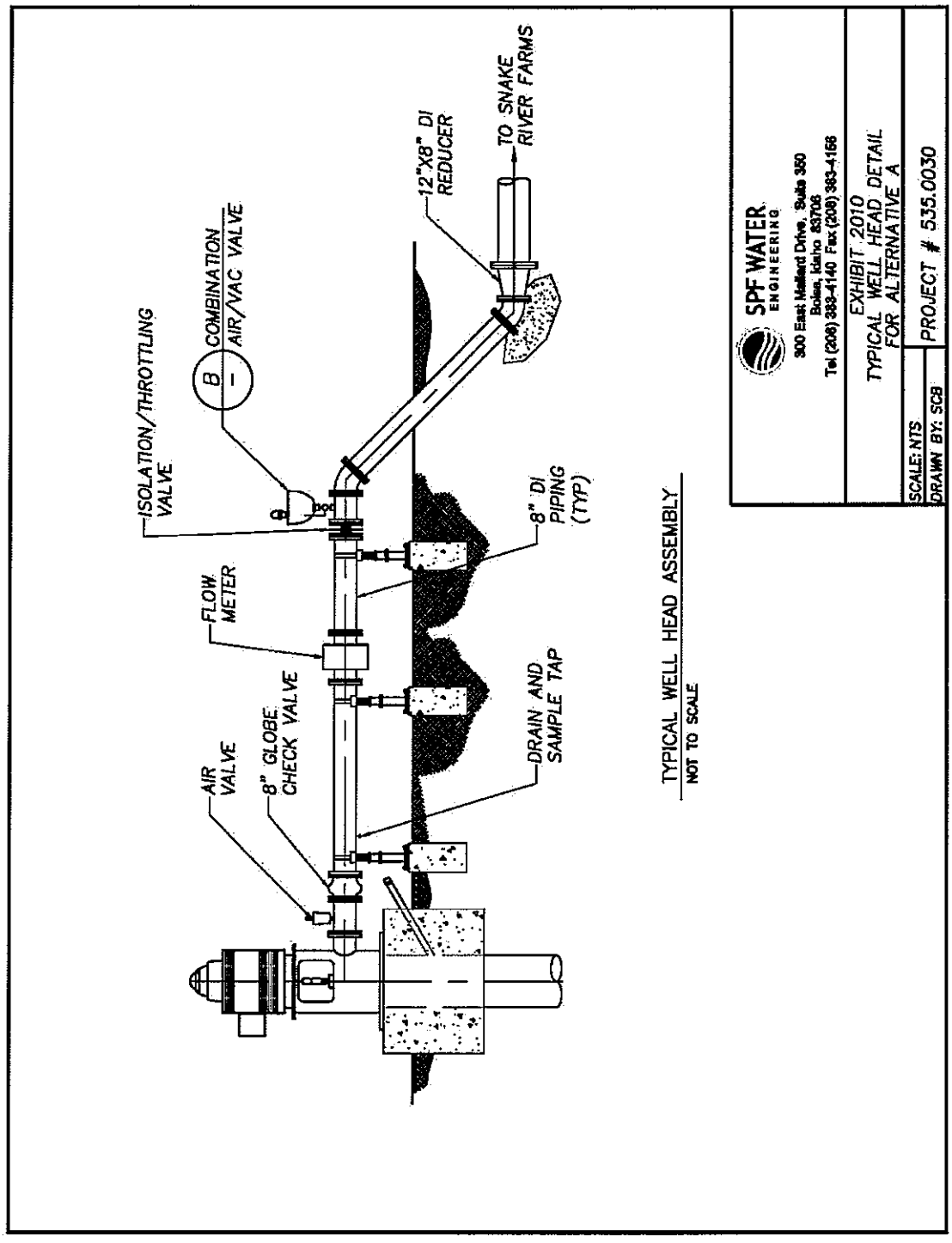


Exhibit 2010 – Typical Well Head Detail

2.7.2. Schedule

Under Alternative A, the volume pumped from each well will be equivalent to historical pumping volume. A proposed operation schedule is provided below as Exhibit 2011. Since wells 1 and 8 individually are not equipped to produce 3 cfs, they will operate together.

Wells	Average AF/yr (2003-2007)	% of Total*	Days to Operate Annually	Discharge Rate (cfs)	Discharge Rate (gpm)	Scheduled Start Date	Scheduled End Date
1	322.9	13%	86	1.68	752	8-Oct	2-Jan
2	362.1	15%	54	3.00	1346	2-Jan	25-Feb
4	362.1	15%	54	3.00	1346	25-Feb	20-Apr
5	473.25	19%	70	3.00	1346	20-Apr	29-June
6	473.25	19%	70	3.00	1346	30-Jul	8-Oct
7	211.9	9%	31	3.00	1346	29-June	29-June
8	255.0	10%	86	1.32	594	8-Oct	2-Jan
Total	2460.5	100%	365				

*Assumes historical volume split evenly at well pairs 2&4 and 5&6

Exhibit 2011 – Distribution of Pumping Volumes and Durations by Wells for Alternative A

2.7.3. Redundancy

For purposes of redundancy, Wells 2 and 4 can be set for automatic start in the event of pump failure. Pump failure can be detected by low flow rate (flow switch downstream from Well 2). When Well 2 is operating, Well 4 can be set for automatic start. When Well 4 is operating, Well 2 can be set for automatic start.

2.7.4. Winterization

The proposed operating schedule allows for winterization of the pipeline between Wells 4 and 7, and does not require operation of Wells 5, 6, and 7 during winter months. Therefore, no climate protection will be required for the Wells 5, 6, and 7 pump systems or air valves.

The pipeline between Wells 1 and 2 can be drained after January 1, and Wells 1 and 8 can be winterized at that time. The level of climate protection for these wells shall be adequate for protection during November and December.

Wells 2 and 4 will be operational during winter months. Well 4 will operate March and April, and be available for standby duty in event of Well 2 pump failure during January and February. Well 2 will operate January through February, but will be available for standby duty in event of pump failure of any operating well for the remainder of the year. Insulated well houses with heating will be required for both wells.

Given the stand-by status of Well 2 for 10 months per year, consideration should be given to changing the pump to either a submersible or water-lubricated turbine (with continuous pre-lube flow). This will prevent excessive pump oil use. Otherwise, the

pump oiler will need to run continuously on a year-round basis. During March and April, the pump oiler for Well 4 will remain on while Well 4 is functioning as a backup for Well 2 unless the pump is converted to submersible or water-lubricated turbine. At Well 4, this may be acceptable given the short annual duration as a back-up source.

2.7.5. Back-Up Power

Back-up power supply (generator with automatic transfer switch) will be provided at Well 2. Well 2 will start in the event of low flow rate detection. For purposes of surge control, we may equip Well 2 for variable speed operation.

2.8. Operation Alternative B – Two Wells

2.8.1. Schedule

Under Alternative B, all pumping will occur at the Well 4 site. The Well 4 site is approximately midway between all of the wells. Chuck Brendecke with AMEC will address the aquifer and spring impacts for a single well alternative.

Well 4 will function as the primary well, and will operate 365 days per year. The existing Well 4 turbine pump will be modified to efficiently produce the target pumping rate at the design head. In addition, the pump will be modified for water-lubricated operation.

Proposed Well 4A will function exclusively as a backup well, and will start in the event of a pump or power failure. Well 4A will be equipped with a submersible pump that will not require pre-lubrication for starting.

The well pumps can be operated to maintain constant pressure (10 psi +/-) using variable frequency drives.

A schematic piping diagram for the Well 4/4A site is provided as Exhibit 2012.

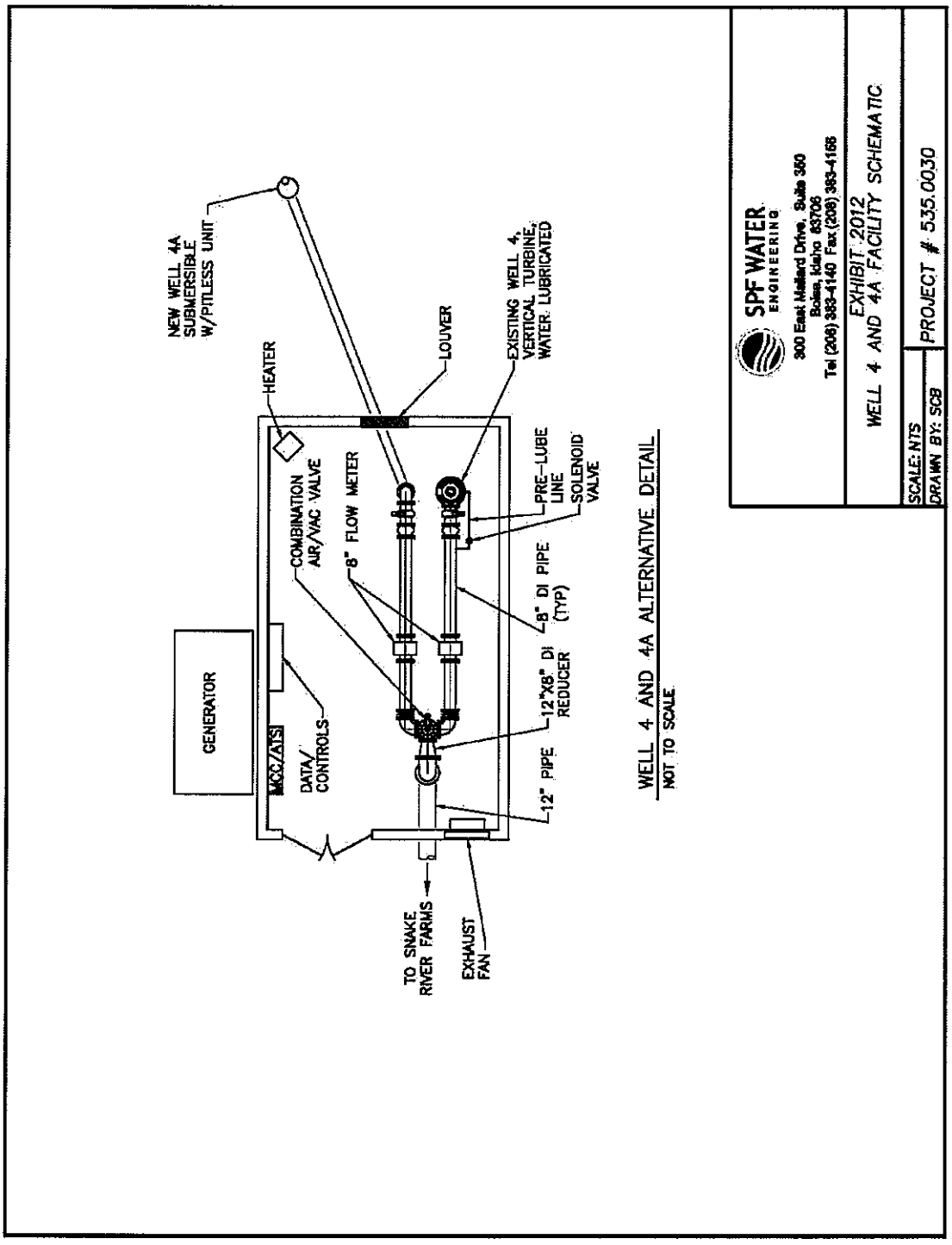


Exhibit 2012 – Schematic of Well 4 and 4A Facility

2.8.2. Redundancy

For purposes of redundancy, Well 4A can be set for automatic start in the event of pump or power failure. Pump failure can be detected by a flow switch.

2.8.3. Winterization

Well 4 will be located within a heated and ventilated well house, suitable for year-round operation. Well 4A will be located outside of the well house, with discharge to the well house through buried piping. Therefore, Well 4A pump and piping will be protected from freezing through burial depth.

2.8.4. Back-Up Power

A back-up power supply (generator with automatic transfer switch) will be provided at the well house. Well 4A will start in the event of a power outage and low flow. For purposes of surge control, Well 4A will be equipped with a variable speed drive. In the event of a power outage or pump failure requiring starting of Well 4A, it will remain on until Well 4 is manually restarted.

2.8.5. Standpipe Tank (Optional)

In the event of a power outage, the Well 4 pump will immediately stop. During this short duration of zero flow, pipeline pressure will drop and the pressure sustaining valve (i.e., back pressure control valve) will close to maintain a full pipeline. Simultaneously, the generator will start and the Well 4A pump will likely begin pumping within 30 to 60 seconds. Upon start of the Well 4A pump, pipeline pressure will rise, and the pressure sustaining valve will open. These changes in pipeline pressure have the potential to cause pressure surges and pump control challenges.

As an alternative to controlling the pumps based on discharge pressure, consideration could be given to providing a standpipe tank at the high point of the pipeline (probably near the canal crossing just north of the top of the rim), and controlling the well pumps to maintain constant level of 15 feet in this tank. A nominal 12,000 gallon tank, 10 feet in diameter and 20 feet tall could be used for this purpose. Upon a power outage, flow from the tank will maintain the constant pipeline discharge pressure and constant flow to Snake River Farm for up to 4 minutes. During this 4-minute period, Well 4A can easily start and begin to refill the tank while maintaining constant pipeline flow. Such a system should prevent pipeline surges during power outages or pump failures. The tank could also function as a vent for the pipeline above the rim.

3. "Over the Rim" Directional Drilling Information

In the overall pipeline design, getting the proposed pipeline over the rim was one of the larger design and construction challenges. SPF visited the site on March 30, 2009 and April 2, 2009 to evaluate the different methods that could be utilized. The original pipeline layout created by AMEC (Exhibit 2001) showed two potential locations to bring the pipeline over the rim. This was later updated by SPF and is included as Exhibit 2002. The western alignment was directly above Snake River Farm's visitor

center and the eastern alignment was on L&M Corporation property just west of the Idaho Fish and Game (IDFG) property. After SPF considered cost, schedule, constructability, and liability the western alignment was not pursued any further.

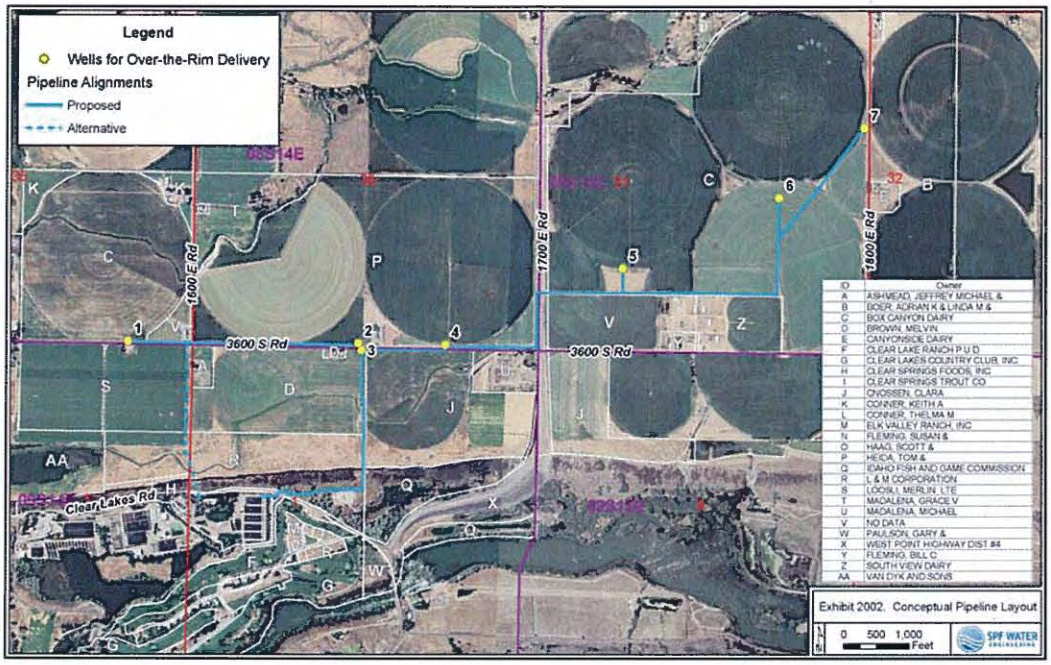


Exhibit 2002 – Conceptual Pipeline Layouts

3.1. Eastern Over-the-Rim Alignment

The eastern alignment is approximately 2500 feet east of the western alignment. The Exhibit 2013 photo shows where the Snake River Farm facility is located in relation to this alignment. The face of the cliff is approximately 80 feet high in this location. The bottom of the talus slope ends above a large previously disturbed area that is fairly level. This open area is several hundred feet north of the county road and is distinguishable in Exhibit 2002 and also shown in the Exhibit 2014 photo.

Exhibit 2013 – View of Snake River Farm from the East Alignment on top of the Rim

Exhibit 2014 – View of Open area at the Base of the Eastern Alignment

Intermountain Gas (IGC) has an existing gas line running north and south in this same area. They have a concrete vault on the top of the rim (Exhibit 2015) and a brick and mortar sealed portal at the bottom of the face of the cliff (Exhibit 2016). IGC excavated the tunnel and installed the 6-inch steel line circa 1957. The pipe alignment is proposed to be 40 feet east of the gas line and approximately 10 feet west of the L&M/IDFG property line.

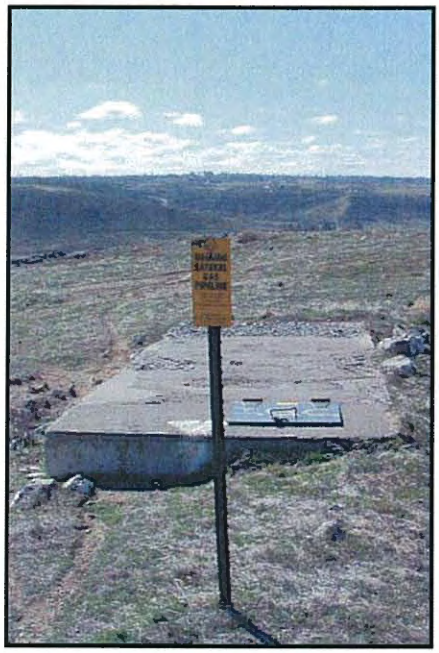


Exhibit 2015 – IGC Vault

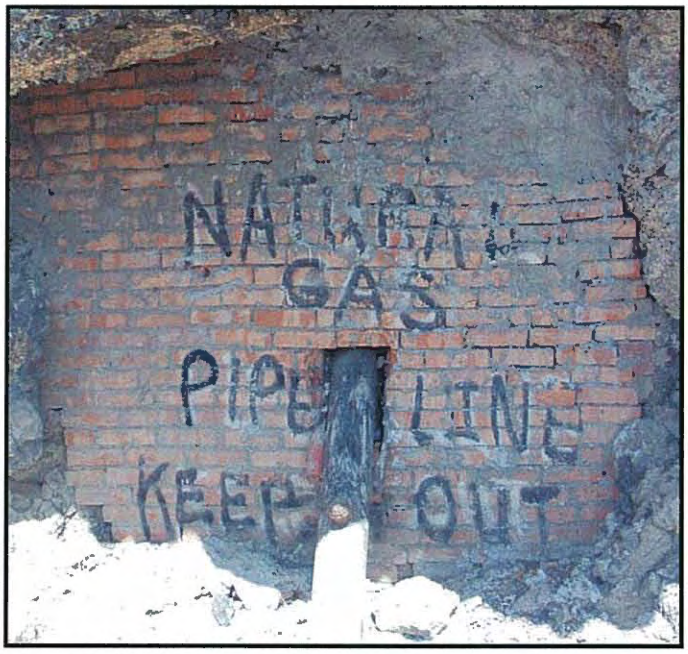


Exhibit 2016 – IGC Portal and 6-inch Gas Line

The tunnel has a nominal 4-foot diameter and the existing 6-inch gas is located on the east side of the tunnel. IGC stated there were four concrete foundations in the tunnel for restraint of the existing piping. The Exhibit 2017 photo shows the inside of the tunnel.

After the March 30, 2009 site visit, SPF determined the constructability of the eastern alignment appeared very feasible. The open area at the bottom of the slope provides an ample area to work without the safety concerns of working directly above the county road and the liability concerns of working near the Snake River Farm facility and springs.

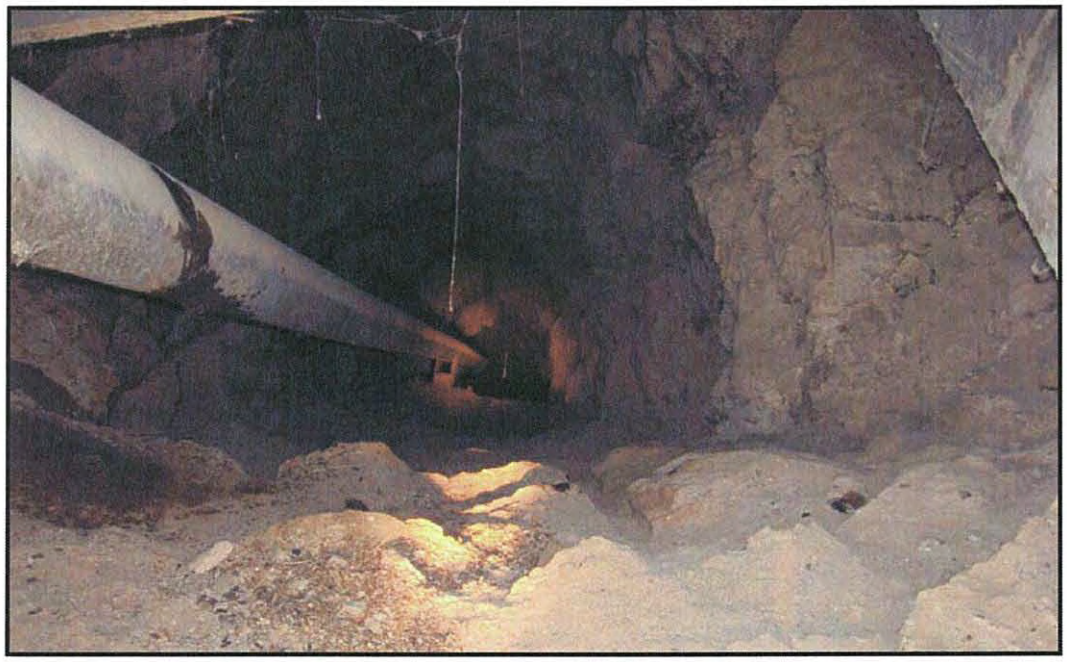


Exhibit 2017 – Inside of IGC Pipe Tunnel

3.2. Directional Drilling

Two directional drilling contractors provided bids for boring through the rim and boring under the roadways. The low-bid contractor was directed not to order any material or commit any money until they received a written notice to proceed from SPF.

SPF explored and priced several different design options for boring through the rim and under roadways. The three main items considered included (1) should the water pipe be downsized to minimize the size of the borehole, (2) should a sleeve be used, and (3) should the pipe and/or sleeve be grouted?

After careful consideration, SPF decided the bore through the rim would include a sleeve with the annular space between the pipe and the sleeve fully grouted and the annular space between the sleeve and the borehole fully grouted. The low bidder included a 16-inch diameter HDPE sleeve in their bid. The water pipe would be reduced down to a 10-inch diameter HDPE pipe through the length of the bore. The 10-inch pipe would be centered in the sleeve with spacers and both pipe and sleeve would be pulled into the borehole at the same time. The pipe and sleeve would be properly restrained at both the top and bottom of the borehole.

Other yet to be explored items included whether or not using a steel sleeve would provide enough inside diameter to allow the use of a 12-inch pipe through the bore or alternatively could it save money by reducing the borehole diameter, and whether eliminating the spacers could do the same.

3.3. Roadway Crossings

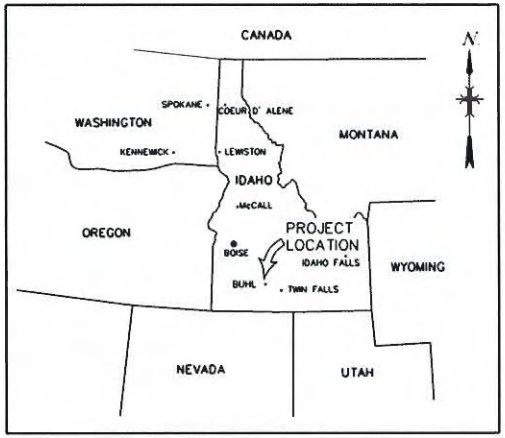
After reviewing the boring costs and crossing locations, SPF determined the two 3600 South crossings would be open cut, the Old Clear Lakes Grade Road crossing near the Snake River Farm entrance would be bored, and the 1700 East crossing would most likely be bored, but open cutting would be reserved as an option until further discussion could take place with the West Point Highway District.

APPENDICES

Exhibit 2006 – SPF's Preliminary Design Drawings

Drawing Pages 1 through 19

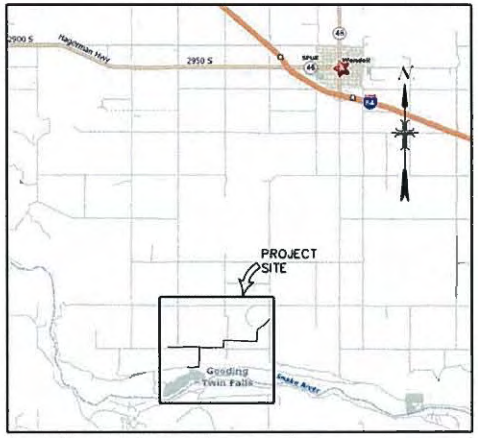
OVER THE RIM WATER SUPPLY PROJECT
SNAKE RIVER FARMS REPLACEMENT WATER



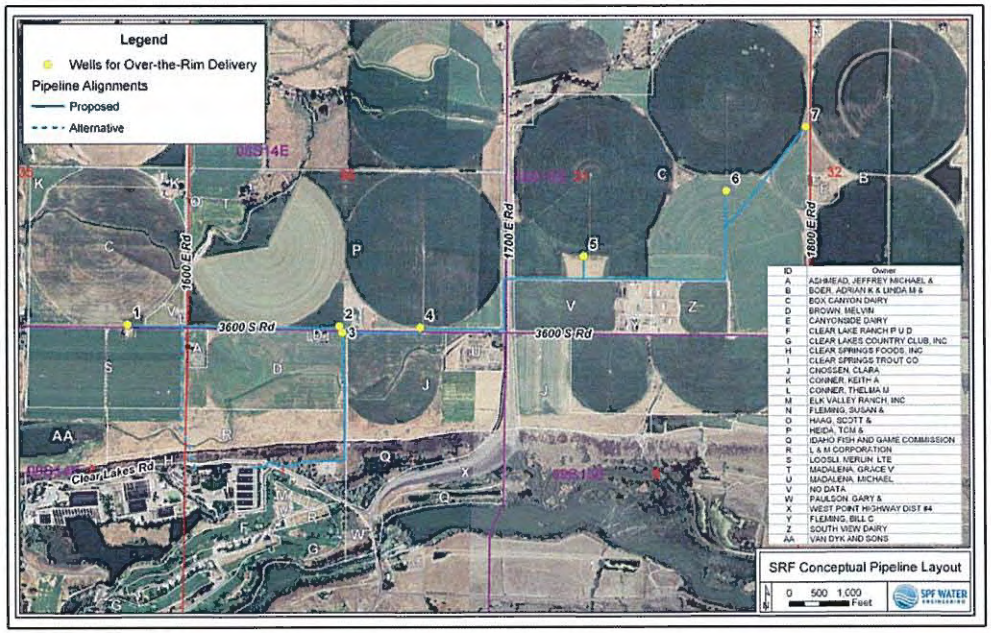
VICINITY MAP
NOT TO SCALE

SHEET INDEX

PAGE NO.	DWG NO.	SHEET TITLE
1	G-1	COVER SHEET
2	G-2	PROCESS FLOW DIAGRAM
3	G-3	HYDRAULIC PROFILE
4	C-1	PROJECT SCOPE
5	C-2	MAIN PIPELINE STA. 20+00 TO STA. 33+00
6	C-3	MAIN PIPELINE STA. 33+00 TO STA. 40+00
7	C-4	MAIN PIPELINE STA. 40+00 TO STA. 54+00
8	C-5	MAIN PIPELINE STA. 54+00 TO STA. 68+00
9	C-6	MAIN PIPELINE STA. 68+50 TO STA. 82+00
10	C-7	MAIN PIPELINE STA. 82+00 TO STA. 94+00
11	C-8	MAIN PIPELINE STA. 94+00 TO STA. 108+00
12	C-9	MAIN PIPELINE STA. 108+00 TO STA. 122+00
13	C-10	MAIN PIPELINE STA. 122+00 TO STA. 136+00
14	C-11	MAIN PIPELINE STA. 136+00 TO STA. 150+00
15	C-12	MAIN PIPELINE STA. 150+00 TO STA. 158+43
16	C-13	PIPELINE FROM WELL #1 STA. 0+00 TO STA. 12+00
17	C-14	PIPELINE FROM WELL #1 STA. 12+00 TO STA. 24+00
18	C-15	PIPELINE FROM WELL #1 STA. 24+00 TO STA. 36+53.49
19	GC-1	MISCELLANEOUS DETAILS



LOCATION MAP
NOT TO SCALE



LEGEND

- PIPELINE
- EP — EDGE OF PAVEMENT
- OP — OVERHEAD POWER
- X — FENCE
- IR — IRRIGATION LINE
- G — GAS LINE
- UTILITY POLE
- PROPOSED GATE VALVE
- DECIDUOUS TREES
- CONIFEROUS TREES

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

SPF WATER ENGINEERING
300 East Mallard Drive, Suite 350
Boise, Idaho 83706
Tel (208) 383-4140 Fax (208) 383-4156

OVER THE RIM WATER SUPPLY PROJECT
SNAKE RIVER FARMS REPLACEMENT WATER
COVER SHEET

NORTH SNAKE AND MAGIC VALLEY GROUND WATER DISTRICTS, C/O LYNN CARLQUIST
921 E. MAIN STREET
JEROME, ID 83338
(208) 324-8995

ENGINEER
BOB HARDGROVE
300 E MALLARD DRIVE, SUITE 350
BOISE, IDAHO 83706
(208) 383-4140

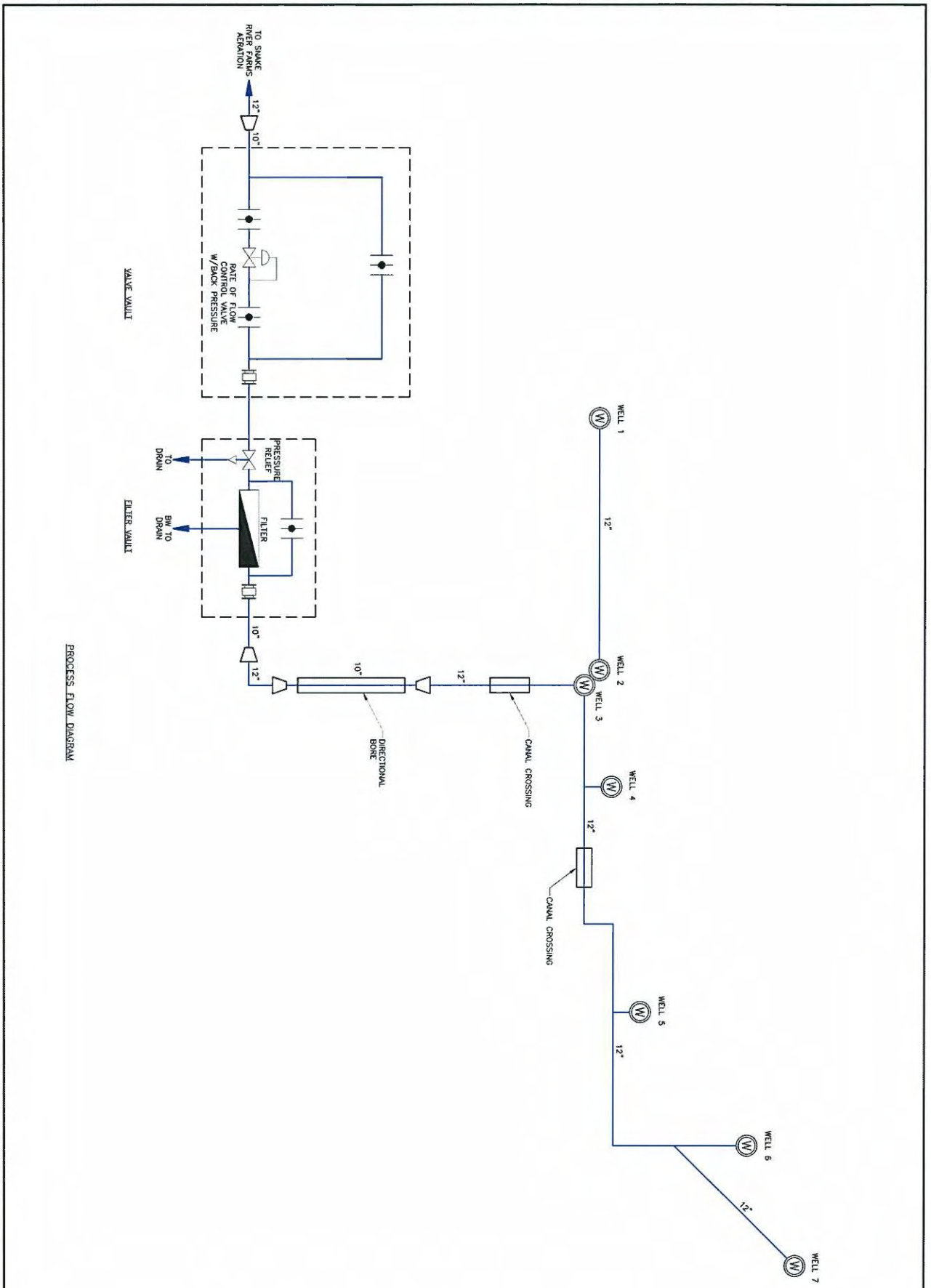
PRELIMINARY DRAFT NOT FOR CONSTRUCTION
BY BOB HARDGROVE
PROFESSIONAL ENGINEER

DRAWN BY:	J. PORTER
CHECKED BY:	R. HARDGROVE
SCALE:	NONE
PLOT SCALE:	1 = 1

DRAWING DIRECTORY

ITEM	REVISIONS DESCRIPTION	DATE
A	SOSE DESIGN SET	4/22/09

G-1 1 OF 19



DRAWING DIRECTORY

REVISIONS		
ITEM	DESCRIPTION	DATE
A	50% DESIGN SET	4/22/09

DRAWN BY: S.BENNETT
CHECKED BY: M. HARDGROVE
SCALE: AS NOTED
PLOT SCALE: 1 = 1

PRELIMINARY DRAFT NOT FOR CONSTRUCTION

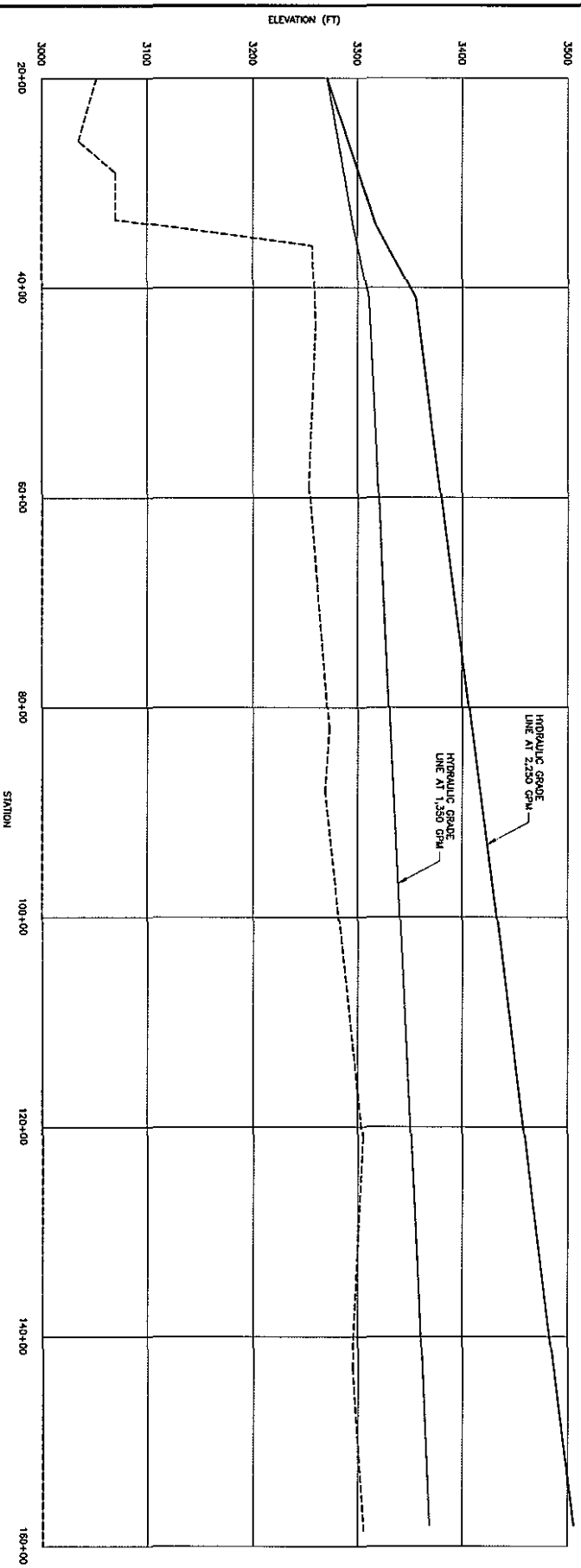
OVER THE RIM WATER SUPPLY PROJECT
SNAKE RIVER FARMS REPLACEMENT WATER
PROCESS FLOW DIAGRAM

ENGINEER
BOB HARDGROVE
300 E. MALLARD DRIVE, SUITE 350
BOISE, IDAHO 83706
(208) 383-4140

NORTH SNAKE AND MAGIC VALLEY
GROUND WATER DISTRICTS, C/O LYNN CARLQUIST
152 E. MAIN STREET
JEROME, ID 83338
(208) 324-8995

SPF WATER ENGINEERING
300 East Mallard Drive, Suite 350
Boise, Idaho 83706
Tel (208) 383-4140 Fax (208) 383-4156

G-2
2 OF 19



NOTE:

1. HYDRAULIC PROFILES ARE BASED ON MAINTAINING 100 PSI AT FILTER VAULT.

HYDRAULIC PROFILE

LEGEND:

——— HGL (2250 GPM)

——— HGL (1350 GPM)

– – – – GRADE

C-3

3 OF 19

DRAWING DIRECTORY

REVISIONS		
ITEM	DESCRIPTION	DATE
A	50% DESIGN SET	4/22/09

PLOT SCALE: 1 = 1

SCALE: AS NOTED

DRAWN BY: S.BENNETT

CHECKED BY: R. HARDGROVE

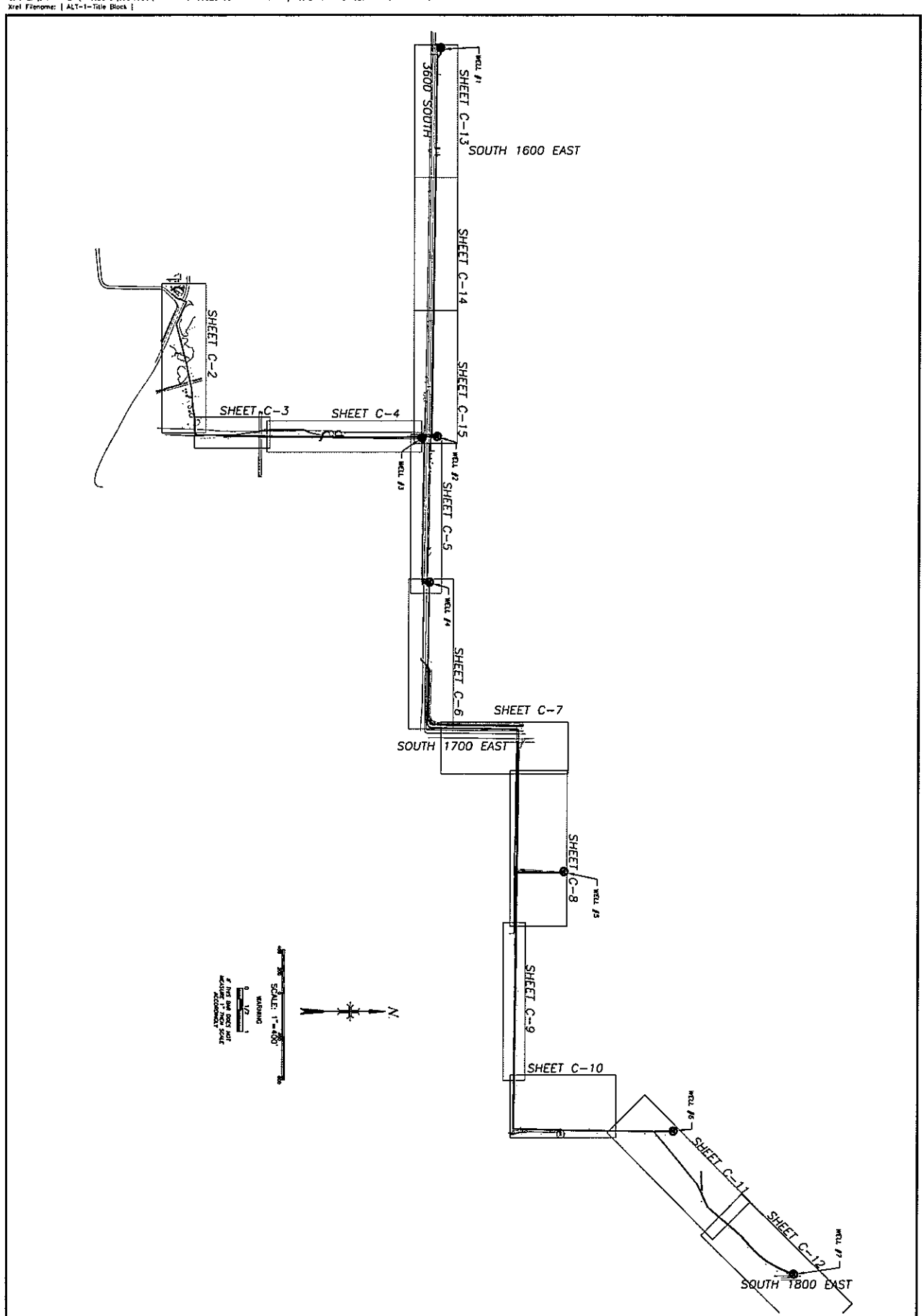
PRELIMINARY DRAFT NOT FOR CONSTRUCTION

OVER THE RIM WATER SUPPLY PROJECT
SNAKE RIVER FARMS REPLACEMENT WATER
HYDRAULIC PROFILE

ENGINEER
BOB HARDGROVE
300 E. MALLARD DRIVE, SUITE 350
BOISE, IDAHO 83706
(208) 383-4140

NORTH SNAKE AND MAGIC VALLEY
GROUND WATER DISTRICTS, C/O LYNN CARLQUIST
152 E. MAIN STREET
JEROME, ID 83338
(208) 324-8895

SPF WATER ENGINEERING
300 East Mallard Drive, Suite 350
Boise, Idaho 83706
Tel (208) 383-4140 Fax (208) 383-4156



C-1
4 OF 19

DRAWING DIRECTORY

REVISIONS		
ITEM	DESCRIPTION	DATE
A	50% DESIGN SET	4/22/09

PLOT SCALE: 1" = 400'
DRAWN BY: S. CRANE
CHECKED BY: R. HARDGROVE

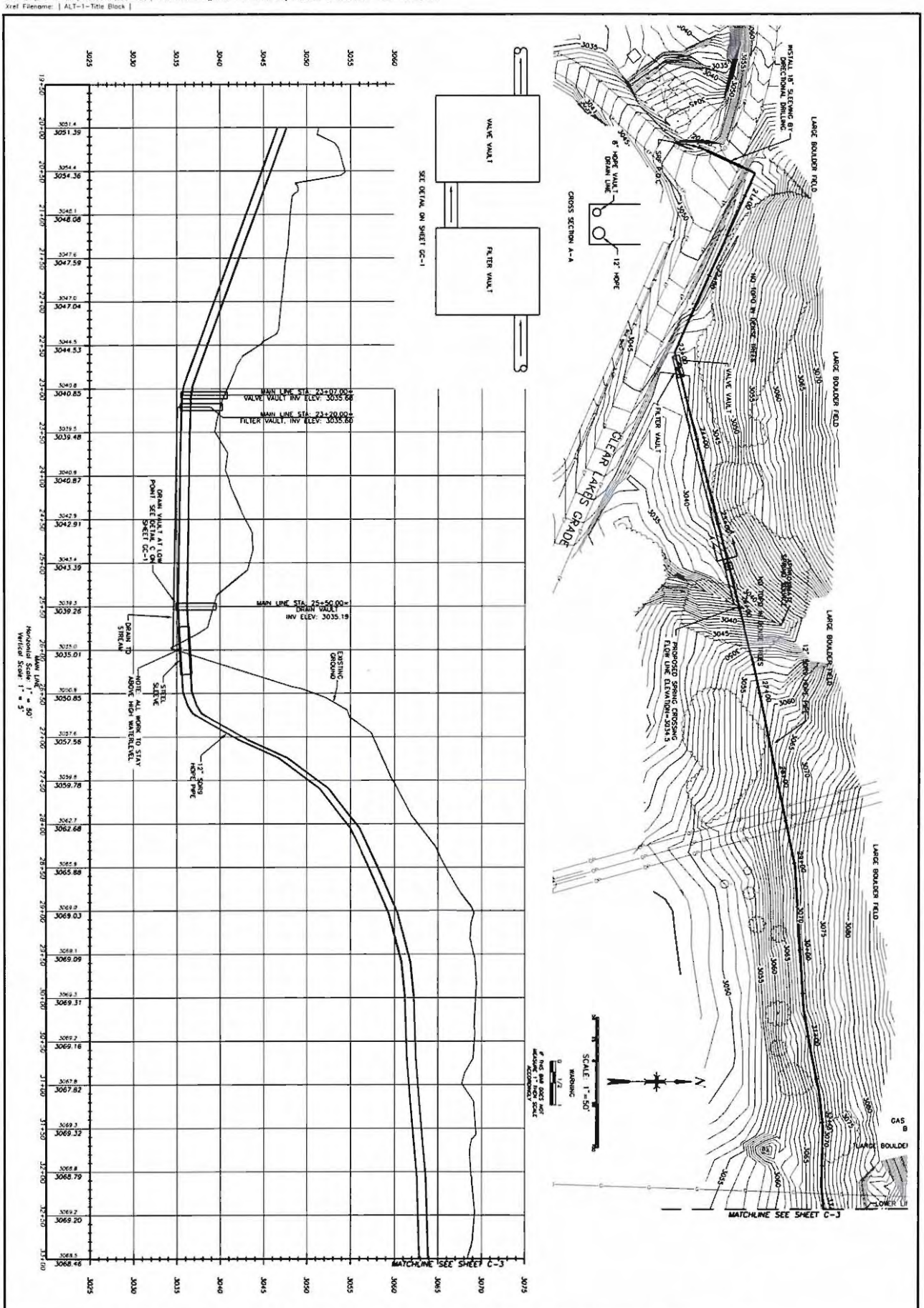
PRELIMINARY
DRAFT NOT FOR CONSTRUCTION

OVER THE RIM WATER SUPPLY PROJECT
SNAKE RIVER FARMS REPLACEMENT WATER
OVERALL PROJECT SHEET LAYOUT

ENGINEER
BOB HARDGROVE
300 E. MALLARD DRIVE, SUITE 350
BOISE, IDAHO 83706
(208) 383-4140

NORTH SNAKE AND MAGIC VALLEY
GROUND WATER DISTRICTS, C/O LYNN CARLQUIST
152 E. MAIN STREET
JEROME, ID 83338
(208) 324-8995

SPF WATER ENGINEERING
300 East Mallard Drive, Suite 350
Boise, Idaho 83706
Tel (208) 383-4140 Fax (208) 383-4156



C-2
5 OF 19

DRAWING DIRECTORY

REVISIONS

ITEM	DESCRIPTION	DATE
A	50% DESIGN SET	4/22/09

PLOT SCALE: 1" = 50'

DRAWN BY: S. CRANE
CHECKED BY: R. HARDGROVE

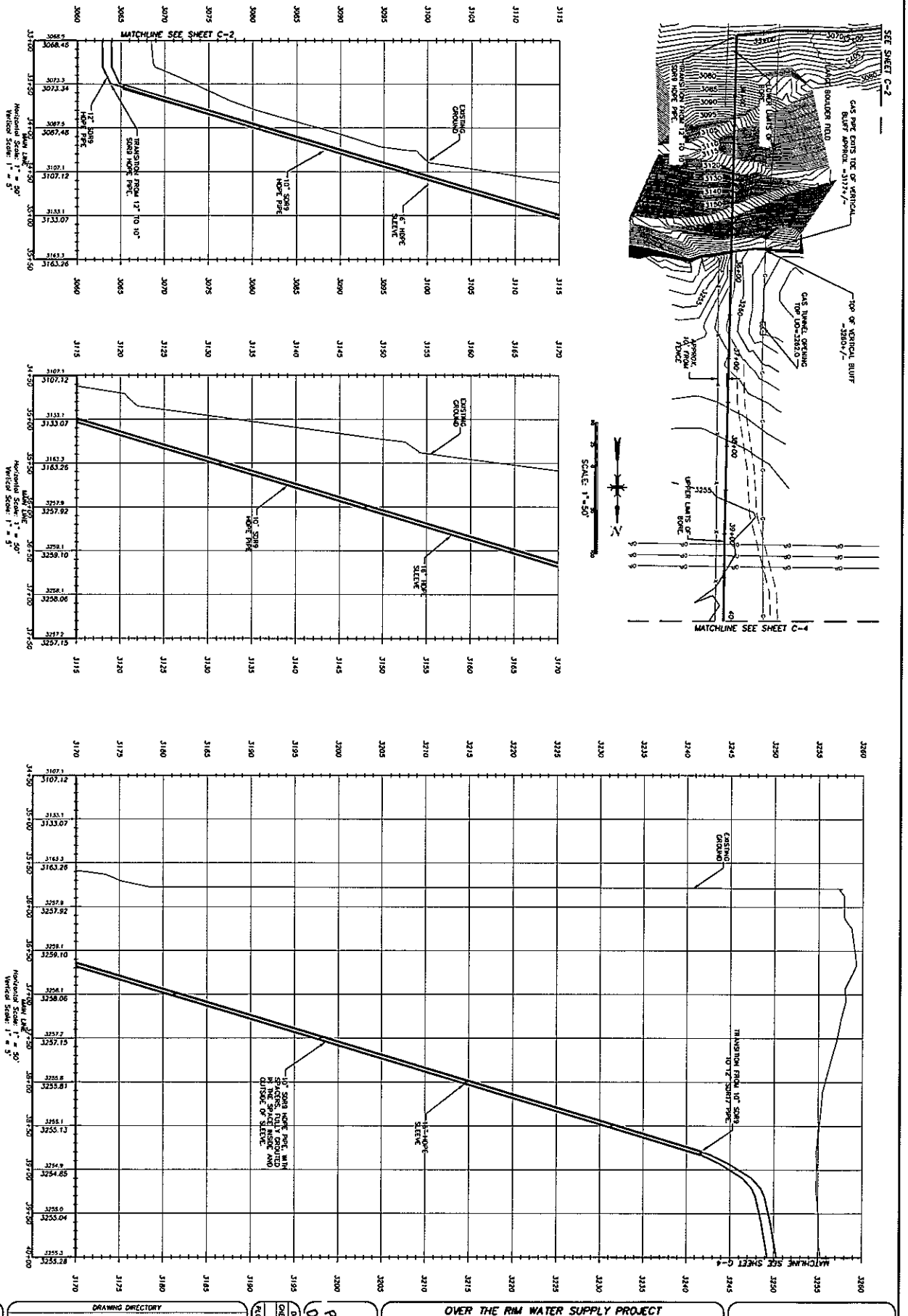
PROFESSIONAL ENGINEER
PRELIMINARY DRAFT NOT FOR CONSTRUCTION
BOB HARDGROVE

OVER THE RIM WATER SUPPLY PROJECT
SNAKE RIVER FARMS REPLACEMENT WATER
MAIN PIPELINE STA. 20+00 TO STA. 33+00

ENGINEER
BOB HARDGROVE
300 E. MALLARD DRIVE, SUITE 350
BOISE, IDAHO 83706
(208) 383-4140

NORTH SNAKE AND MAGIC VALLEY
GROUND WATER DISTRICTS, C/O LYNN CARLQUIST
152 E. MAIN STREET
JEROME, ID 83338
(208) 324-8995

SPF WATER ENGINEERING
300 East Mallard Drive, Suite 350
Boise, Idaho 83706
Tel (208) 383-4140 Fax (208) 383-4156



DRAWING DIRECTORY

REVISIONS DESCRIPTION	DATE
ITEM A 50% DESIGN SET	4/22/09

PLOT SCALE: SCALE: 1" = 50'
CHECKED BY: R. HARDGROVE
DRAWN BY: J. PORTER

PRELIMINARY DRAFT NOT FOR CONSTRUCTION

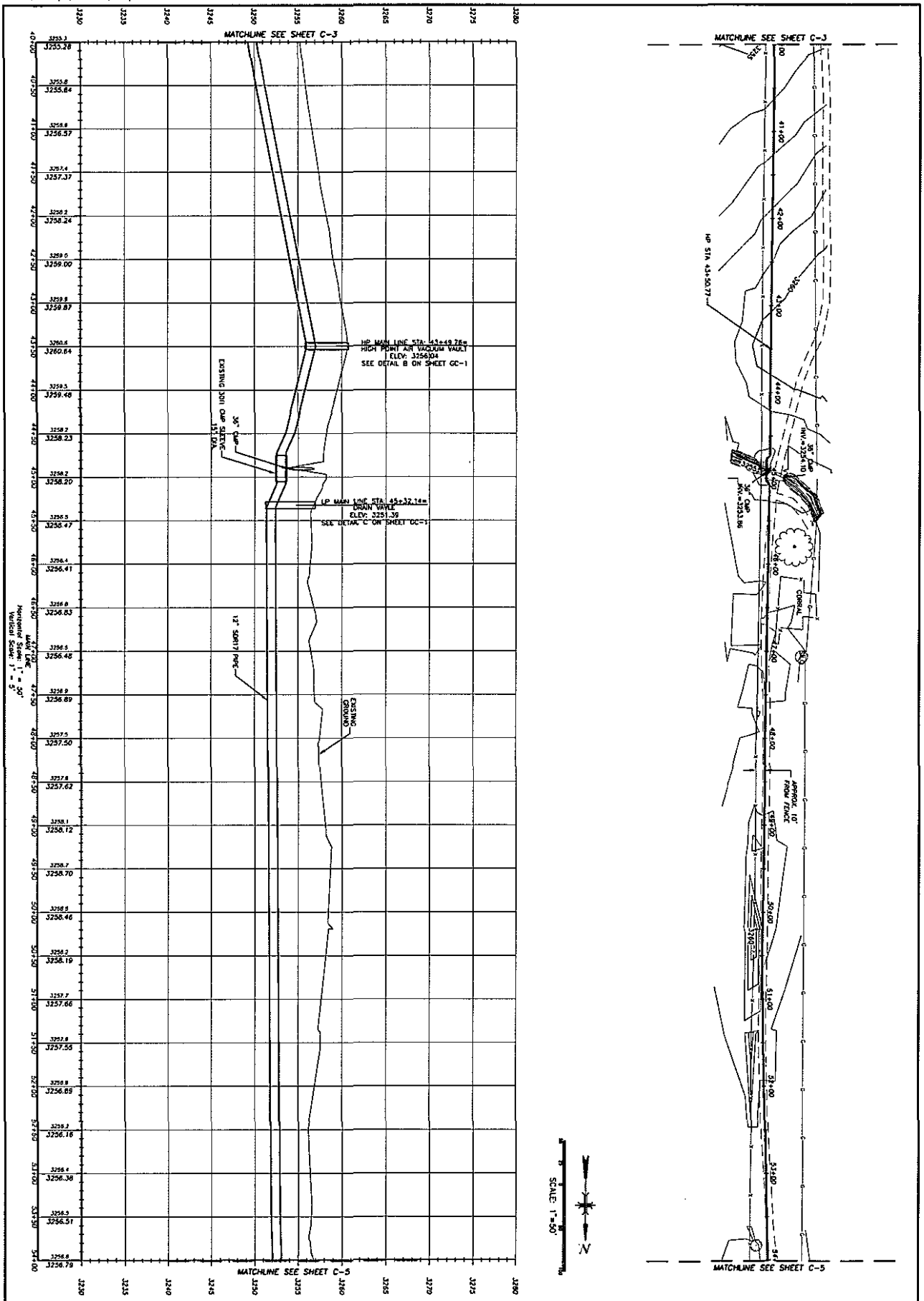
C-J
6 OF 19

OVER THE RIM WATER SUPPLY PROJECT
SNAKE RIVER FARMS REPLACEMENT WATER
MAIN PIPELINE STA. 33+00 TO STA. 40+00

ENGINEER
BOB HARDGROVE
300 E. MALLARD DRIVE, SUITE 350
BOISE, IDAHO 83706
(208) 383-4140

NORTH SNAKE AND MAGIC VALLEY
GROUND WATER DISTRICTS, C/O LYNN CARLQUIST
152 E. MAIN STREET
JEROME, ID 83338
(208) 324-8999

SPF WATER ENGINEERING
300 East Mallard Drive, Suite 350
Boise, Idaho 83706
Tel (208) 383-4140 Fax (208) 383-4156



DRAWING DIRECTORY

REVISIONS		
ITEM	DESCRIPTION	DATE
A	50% DESIGN SET	4/22/09

PLOT SCALE: 1" = 1'
SCALE: 1" = 50'
CHECKED BY: R. HARDGROVE
DRAWN BY: J. PORTER

PRELIMINARY DRAFT NOT FOR CONSTRUCTION

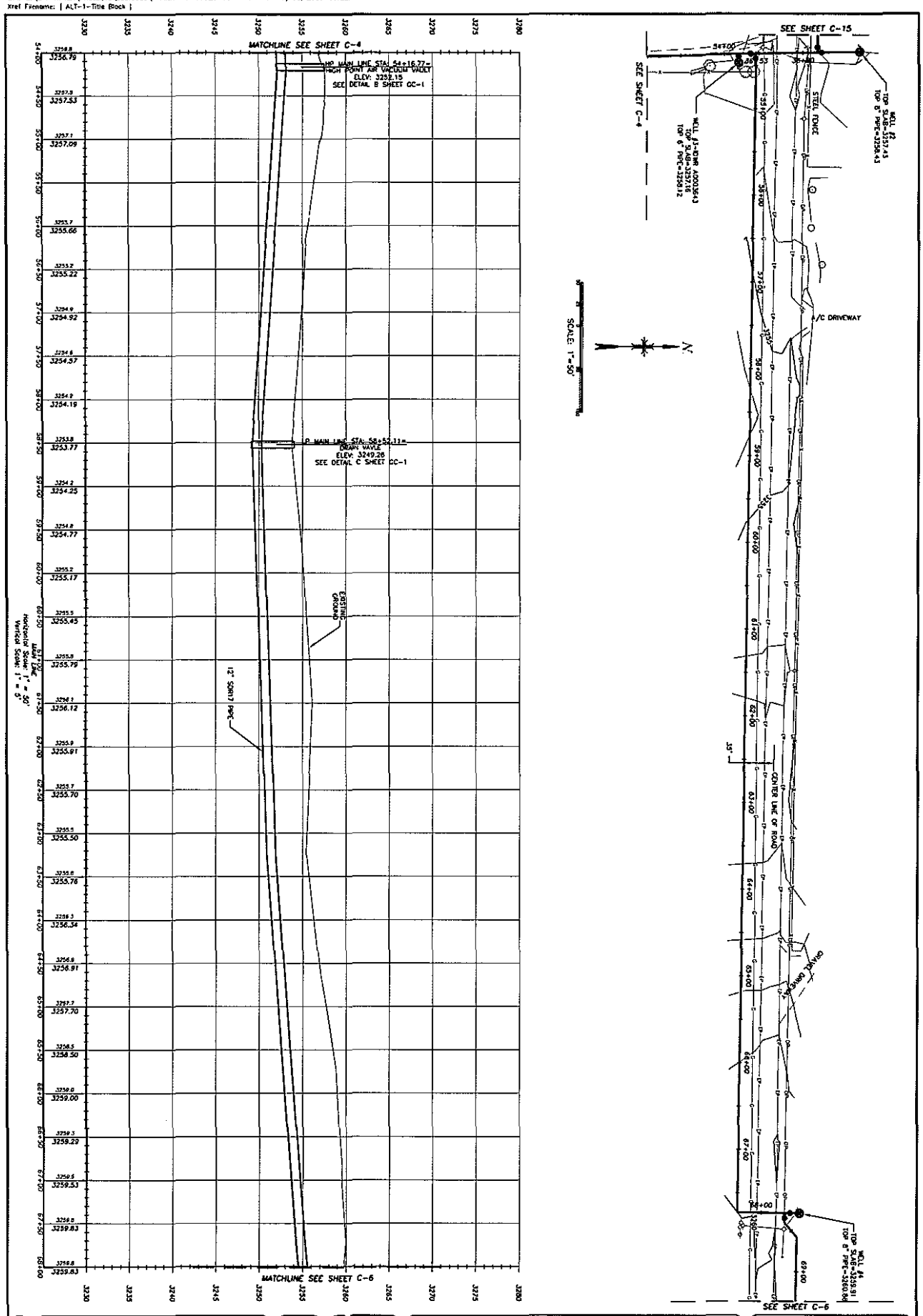
C-4
7 OF 10

OVER THE RIM WATER SUPPLY PROJECT
SNAKE RIVER FARMS REPLACEMENT WATER MAIN PIPELINE STA. 40+00 TO STA. 54+00

ENGINEER
BOB HARDGROVE
300 E. MALLARD DRIVE, SUITE 350
BOISE, IDAHO 83706
(208) 383-4140

NORTH SNAKE AND MAGIC VALLEY
GROUND WATER DISTRICTS, C/O LYNN CARLQUIST
152 E. MAIN STREET
JEROME, ID 83338
(208) 324-8995

SPF WATER ENGINEERING
300 East Mallard Drive, Suite 350
Boise, Idaho 83706
Tel (208) 383-4140 Fax (208) 383-4156



C-5
8 OF 19

DRAWING DIRECTORY

REVISIONS		
TYP	DESCRIPTION	DATE
A	50% DESIGN SET	4/22/09

PLOT SCALE: 1" = 1'
SCALE: 1" = 50'
DRAWN BY: J. PORTER
CHECKED BY: R. HARDGROVE

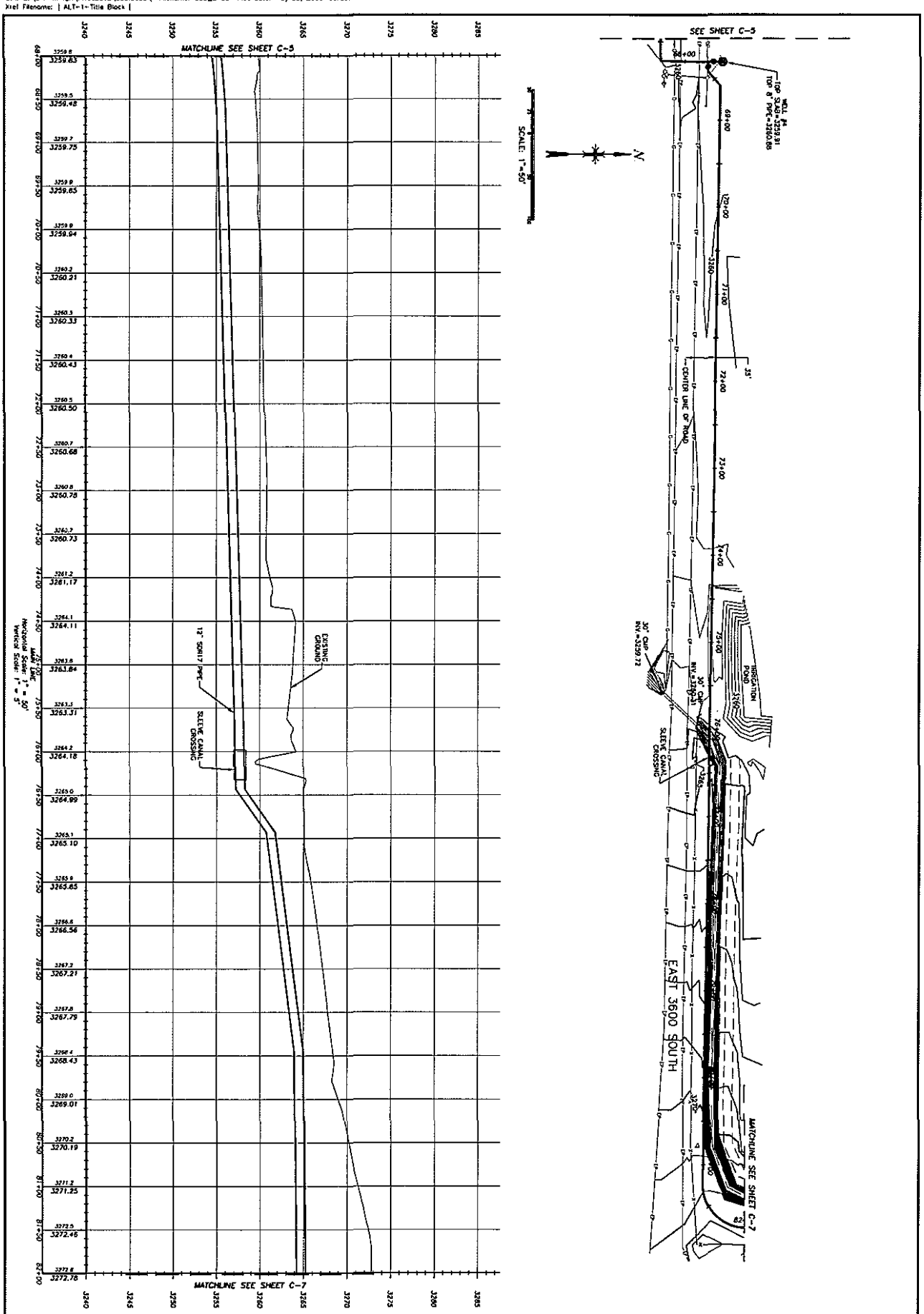
PRELIMINARY DRAFT NOT FOR CONSTRUCTION

OVER THE RIM WATER SUPPLY PROJECT
SNAKE RIVER FARMS REPLACEMENT WATER
MAIN PIPELINE STA. 54+00 TO STA. 68+00

ENGINEER
BOB HARDGROVE
300 E. MALLARD DRIVE, SUITE 350
BOISE, IDAHO 83706
(208) 383-4140

NORTH SNAKE AND MAGIC VALLEY
GROUND WATER DISTRICTS, C/O LYNN CARLQUIST
152 E. MAIN STREET
JEROME, ID 83338
(208) 324-8999

SPF WATER ENGINEERING
300 East Mallard Drive, Suite 350
Boise, Idaho 83706
Tel (208) 383-4140 Fax (208) 383-4156



DRAWING DIRECTORY	
REVISIONS	
ITEM: A	DESCRIPTION: 50% DESIGN SET
DATE: 4/22/09	
PLOT SCALE: 1 = 1	SCALE: 1" = 50'
CHECKED BY: R. HARDGROVE	DRAWN BY: J. PORTER

C-6
9 OF 19

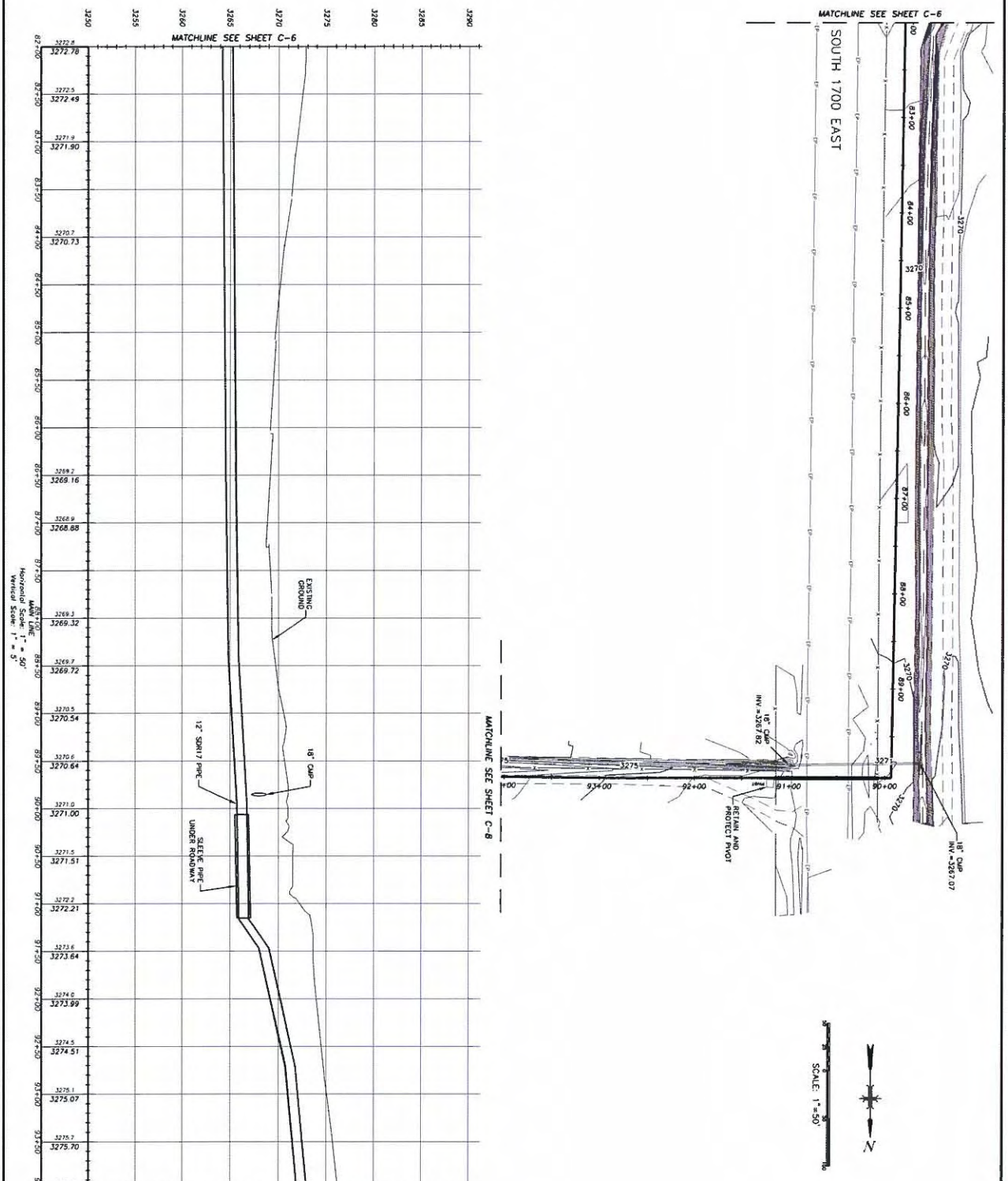
PRELIMINARY NOT FOR CONSTRUCTION
DRAFT

OVER THE RIM WATER SUPPLY PROJECT
SNAKE RIVER FARMS REPLACEMENT WATER MAIN PIPELINE STA. 68+00 TO STA. 82+00

ENGINEER
BOB HARDGROVE
300 E. MALLARD DRIVE, SUITE 350
BOISE, IDAHO 83706
(208) 383-4140

NORTH SNAKE AND MAGIC VALLEY GROUND WATER DISTRICTS, C/O LYNN CARLQUIST
152 E. MAIN STREET
JEROME, ID 83338
(208) 324-8995

SPF WATER ENGINEERING
300 East Mallard Drive, Suite 350
Boise, Idaho 83706
Tel (208) 383-4140 Fax (208) 383-4156



C-7
10 OF 19

DRAWING DIRECTORY

REVISIONS

ITEM	DESCRIPTION	DATE
A	50% DESIGN SET	4/22/09

PLOT SCALE: 1 = 1
SCALE: 1" = 50'
CHECKED BY: R. HARDGROVE
DRAWN BY: J. PORTER

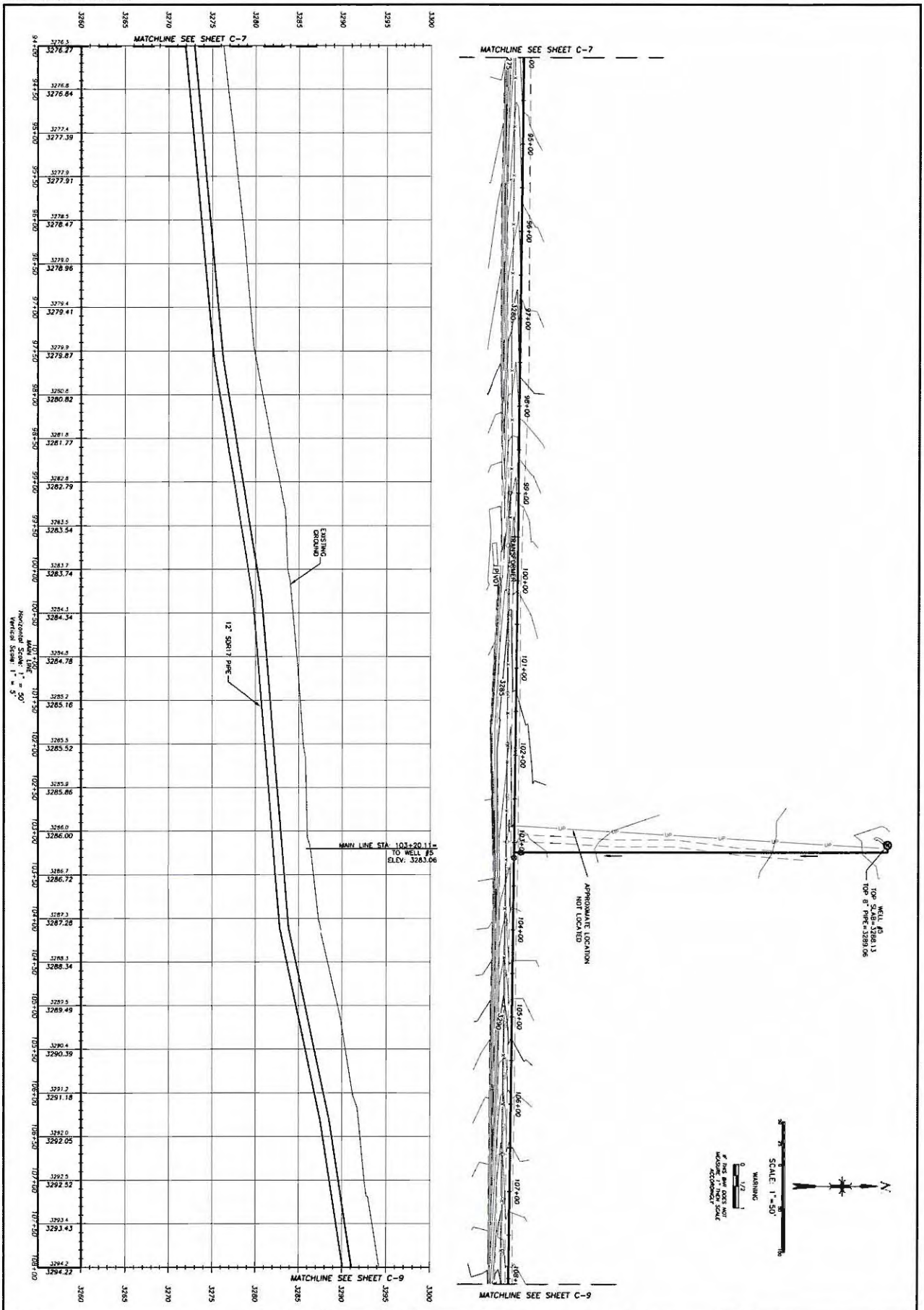
PRELIMINARY DRAFT NOT FOR CONSTRUCTION

OVER THE RIM WATER SUPPLY PROJECT
SNAKE RIVER FARMS REPLACEMENT WATER
MAIN PIPELINE STA. 82+00 TO STA. 94+00

ENGINEER
BOB HARDGROVE
300 E. MALLARD DRIVE, SUITE 350
BOISE, IDAHO 83706
(208) 383-4140

NORTH SNAKE AND MAGIC VALLEY
GROUND WATER DISTRICTS, C/O LYNN CARLQUIST
152 E. MAIN STREET
JEROME, ID 83338
(208) 324-8995

SPF WATER ENGINEERING
300 East Mallard Drive, Suite 350
Boise, Idaho 83706
Tel (208) 383-4140 Fax (208) 383-4156



C-8
11 OF 19

DRAWING DIRECTORY

REVISIONS		
ITEM	DESCRIPTION	DATE
A	50% DESIGN SET	4/22/09

PLOT SCALE: 1 = 1
SCALE: 1" = 50'
CHECKED BY: R. HARDGROVE
DRAWN BY: J. PORTER

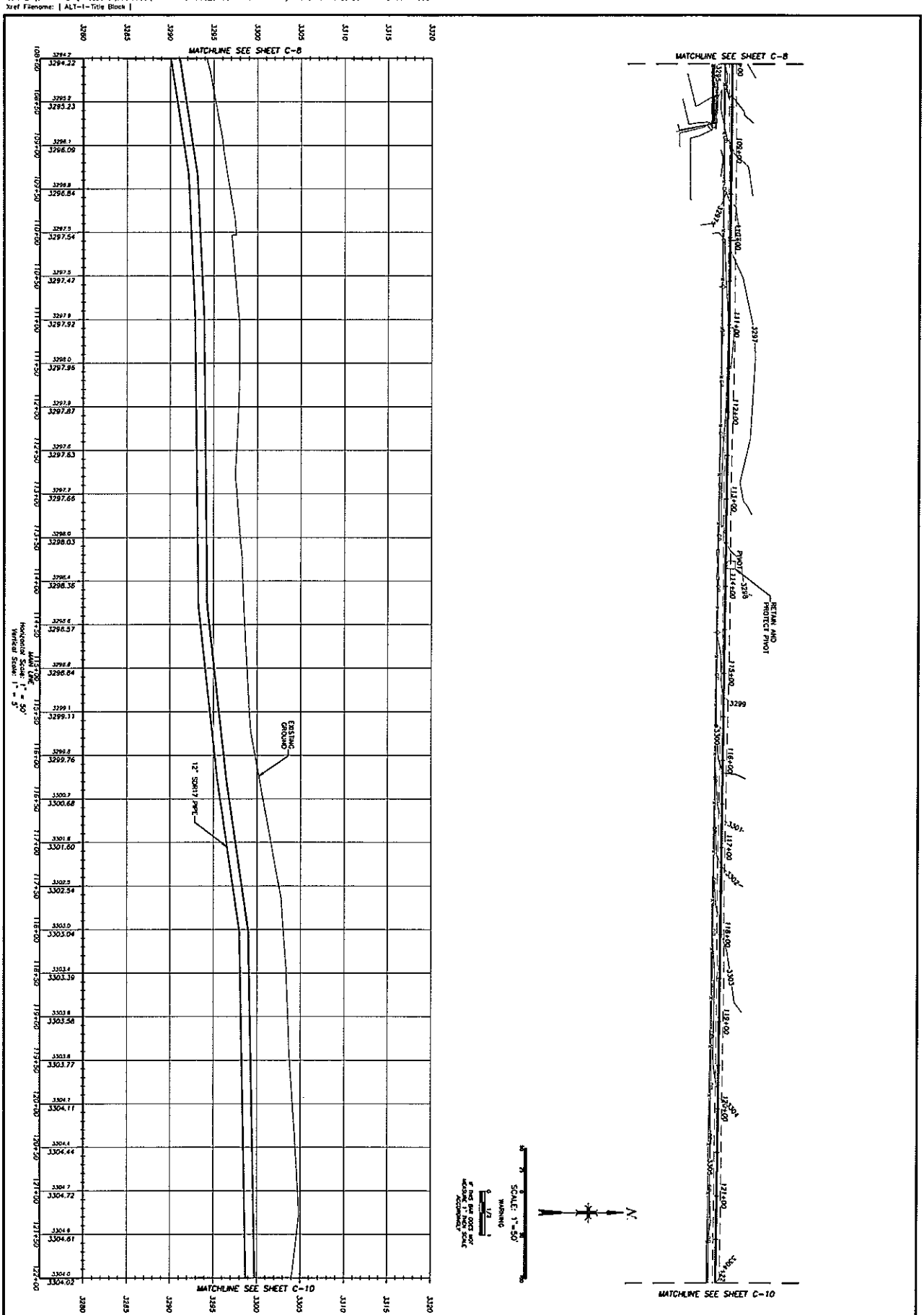
PRELIMINARY DRAFT NOT FOR CONSTRUCTION
PROFESSIONAL ENGINEER

OVER THE RIM WATER SUPPLY PROJECT
SNAKE RIVER FARMS REPLACEMENT WATER MAIN PIPELINE STA. 94+00 TO STA. 108+00

ENGINEER
BOB HARDGROVE
300 E. MALLARD DRIVE, SUITE 350
BOISE, IDAHO 83706
(208) 383-4140

NORTH SNAKE AND MAGIC VALLEY GROUND WATER DISTRICTS, C/O LYNN CARLQUIST
152 E. MAIN STREET
JEROME, ID 83338
(208) 324-8995

SPF WATER ENGINEERING
300 East Mallard Drive, Suite 350
Boise, Idaho 83706
Tel (208) 383-4140 Fax (208) 383-4156



C-9
12 OF 19

DRAWING DIRECTORY

REVISIONS		
ITEM	DESCRIPTION	DATE
A	50% DESIGN SET	4/22/09

PLOT SCALE: 1" = 50'
CHECKED BY: R. HARDGROVE
DRAWN BY: J. PORTER

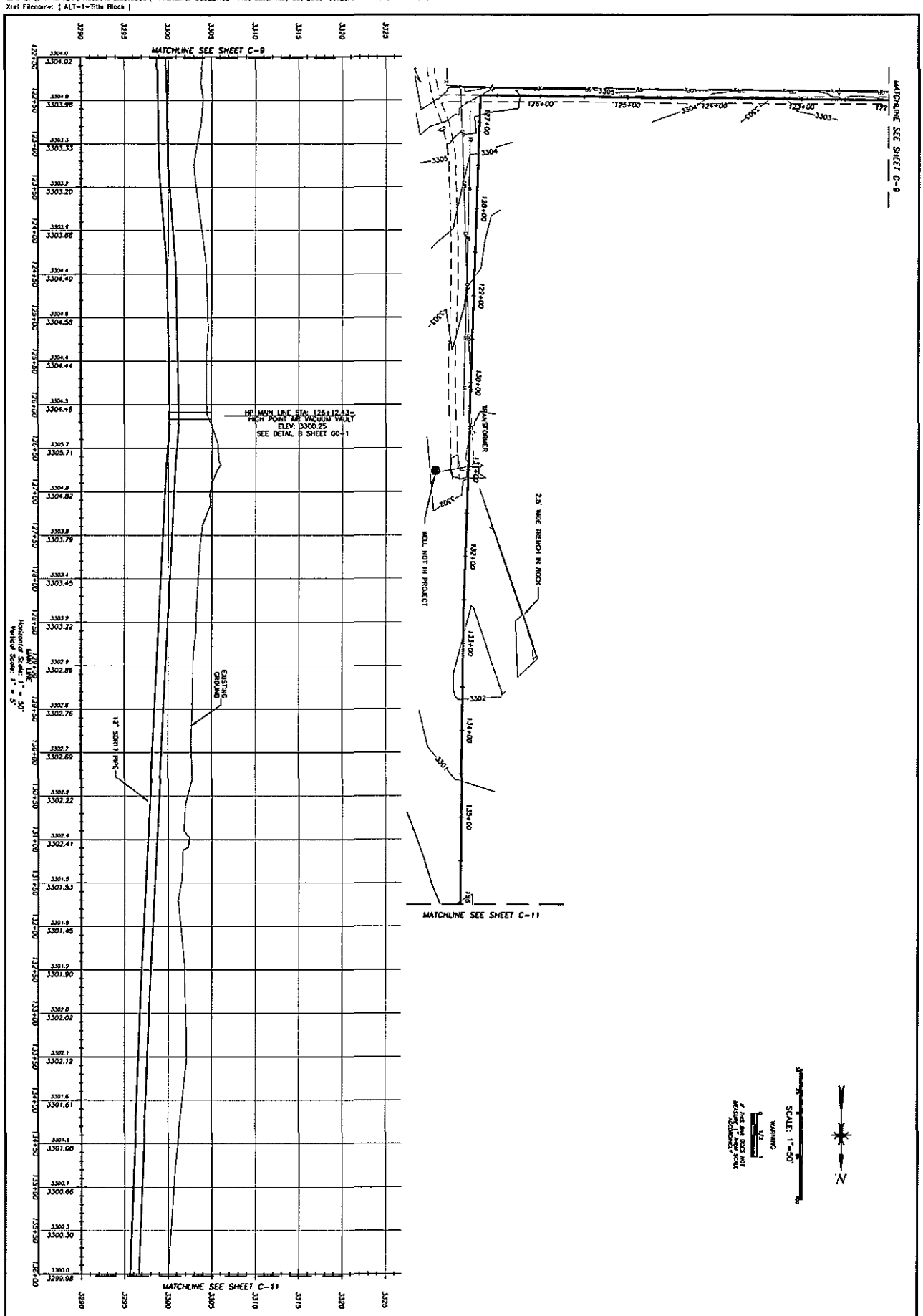
PRELIMINARY DRAFT NOT FOR CONSTRUCTION

OVER THE RIM WATER SUPPLY PROJECT
SNAKE RIVER FARMS REPLACEMENT WATER
MAIN PIPELINE STA. 108+00 TO STA. 122+00

ENGINEER
BOB HARDGROVE
300 E. MALLARD DRIVE, SUITE 350
BOISE, IDAHO 83706
(208) 383-4140

NORTH SNAKE AND MAGIC VALLEY
GROUND WATER DISTRICTS, C/O LYNN CARLQUIST
152 E. MAIN STREET
JEROME, ID 83338
(208) 324-8995

SPF WATER ENGINEERING
300 East Mallard Drive, Suite 350
Boise, Idaho 83706
Tel (208) 383-4140 Fax (208) 383-4156



C-10
13 OF 19

DRAWING DIRECTORY

REVISIONS		
ITEM	DESCRIPTION	DATE
A	50% DESIGN SET	4/27/09

PLOT SCALE: 1" = 50'

DRAWN BY: J. PORTER
CHECKED BY: R. HARDGROVE

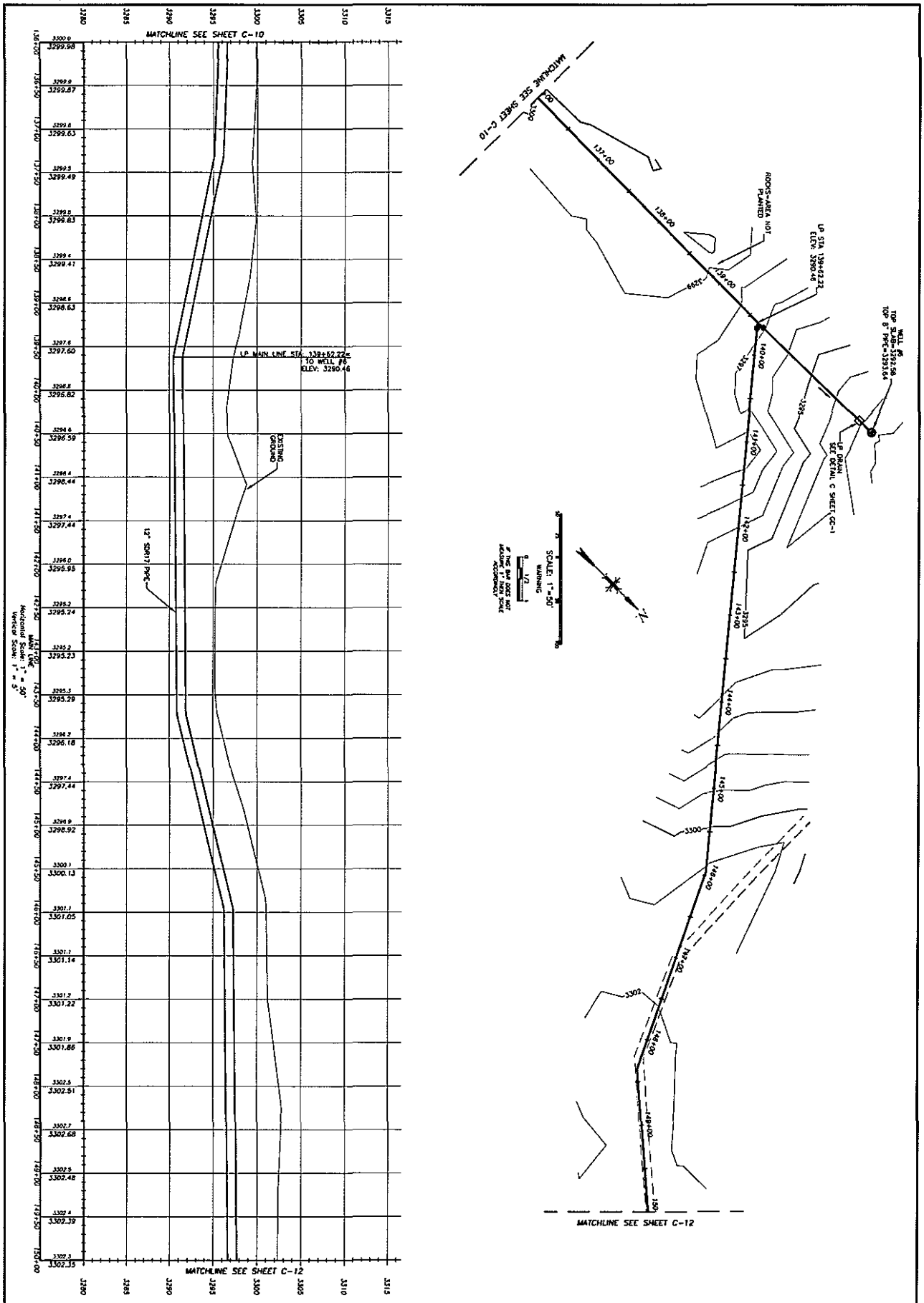
PRELIMINARY DRAFT NOT FOR CONSTRUCTION

OVER THE RIM WATER SUPPLY PROJECT
SNAKE RIVER FARMS REPLACEMENT WATER
MAIN PIPELINE STA. 122+00 TO STA. 136+00

ENGINEER
BOB HARDGROVE
300 E. MALLARD DRIVE, SUITE 350
BOISE, IDAHO 83706
(208) 383-4140

NORTH SNAKE AND MAGIC VALLEY
GROUND WATER DISTRICTS, C/O LYNN CARLQUIST
152 E. MAIN STREET
JEROME, ID 83338
(208) 324-8999

SPF WATER ENGINEERING
300 East Mallard Drive, Suite 350
Boise, Idaho 83706
Tel (208) 383-4140 Fax (208) 383-4156



DRAWING DIRECTORY

REVISIONS		
ITEM	DESCRIPTION	DATE
A	50% DESIGN SET	4/22/09

PLOT SCALE: 1 = 1
SCALE: 1" = 50'
CHECKED BY: R. HARDGROVE
DRAWN BY: J. PORTER

PRELIMINARY DRAFT NOT FOR CONSTRUCTION

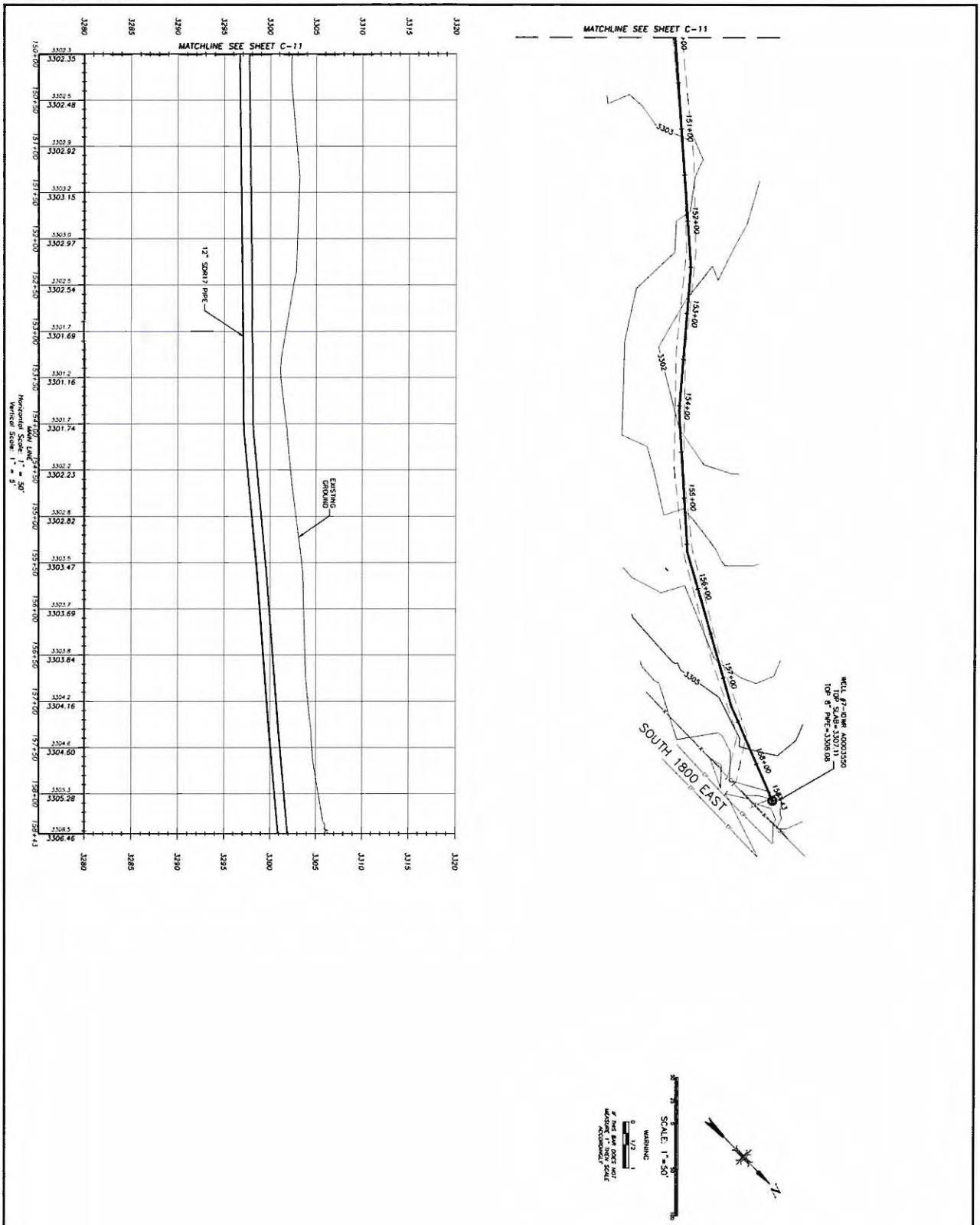
C-11 14 OF 19

OVER THE RIM WATER SUPPLY PROJECT
SNAKE RIVER FARMS REPLACEMENT WATER
MAIN PIPELINE STA. 136+00 TO STA. 150+00

ENGINEER
BOB HARDGROVE
300 E. MALLARD DRIVE, SUITE 350
BOISE, IDAHO 83706
(208) 383-4140

NORTH SNAKE AND MAGIC VALLEY
GROUND WATER DISTRICTS, C/O LYNN CARLQUIST
152 E. MAIN STREET
JEROME, ID 83338
(208) 324-8995

SPF WATER ENGINEERING
300 East Mallard Drive, Suite 350
Boise, Idaho 83706
Tel (208) 383-4140 Fax (208) 383-4156



C-12
15 OF 19

DRAWING DIRECTORY

REVISIONS		
ITEM	DESCRIPTION	DATE
A	50% DESIGN SET	4/22/09

PLOT SCALE: SCALE: 1" = 50'
CHECKED BY: R. HARDGROVE
DRAWN BY: J. PORTER

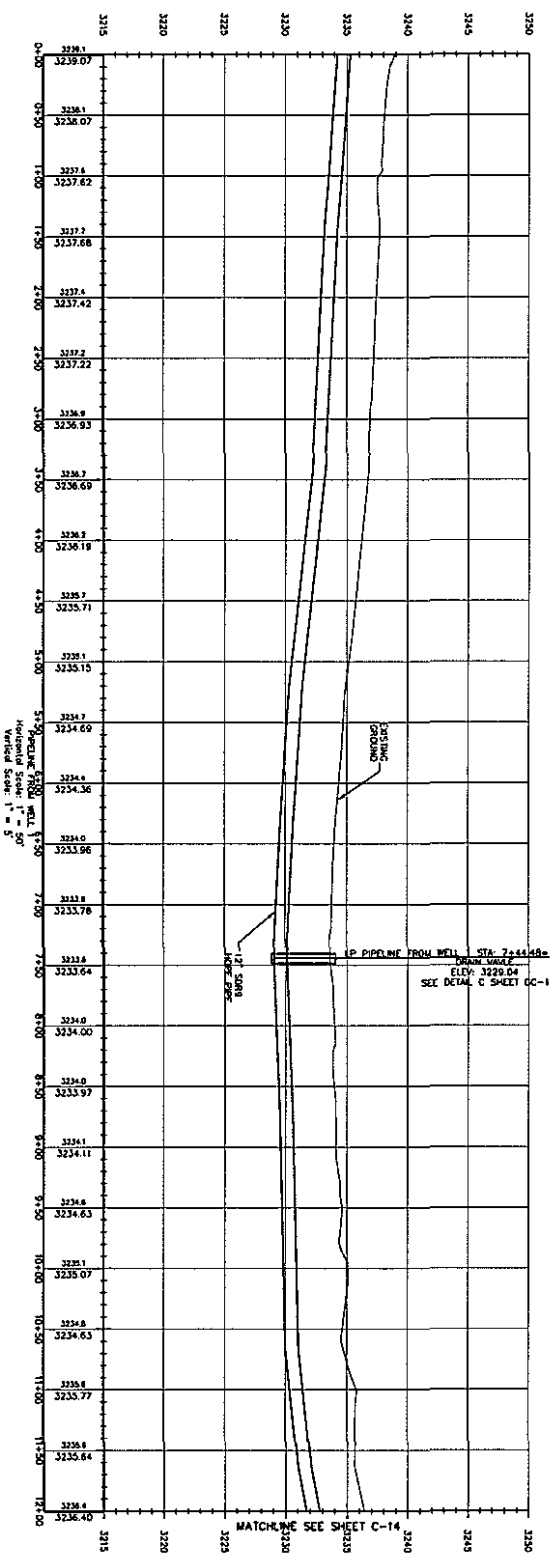
PRELIMINARY DRAFT NOT FOR CONSTRUCTION

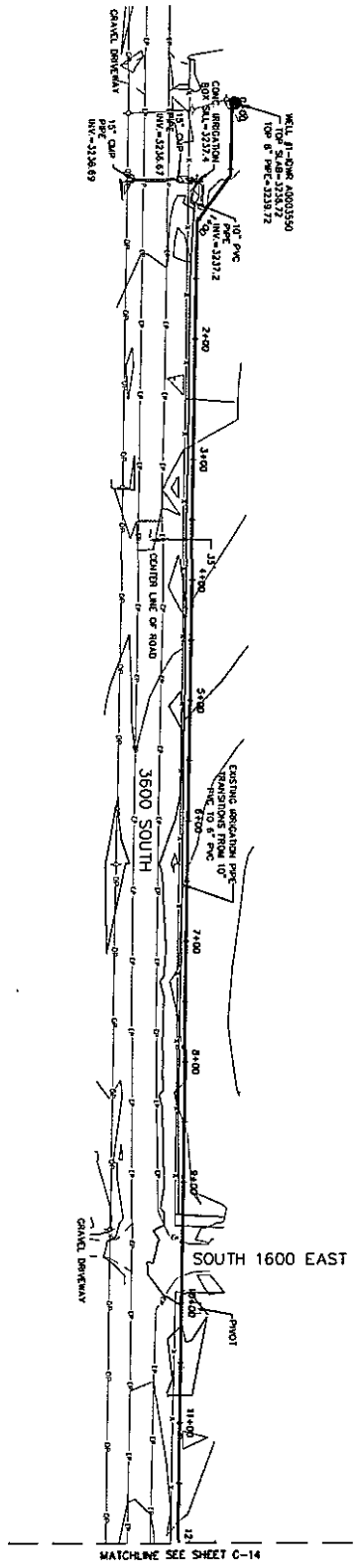
OVER THE RIM WATER SUPPLY PROJECT
SNAKE RIVER FARMS REPLACEMENT WATER
MAIN PIPELINE STA. 150+00 TO STA. 158+43

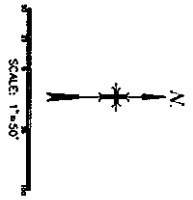
ENGINEER
BOB HARDGROVE
300 E. MALLARD DRIVE, SUITE 350
BOISE, IDAHO 83706
(208) 383-4140

NORTH SNAKE AND MAGIC VALLEY
GROUND WATER DISTRICTS, C/O LYNN CARLQUIST
152 E. MAIN STREET
JEROME, ID 83338
(208) 324-8995

SPF WATER ENGINEERING
300 East Mallard Drive, Suite 350
Boise, Idaho 83706
Tel (208) 383-4140 Fax (208) 383-4156







C-1.3
16 OF 19

DRAWING DIRECTORY

REVISIONS		
ITEM	DESCRIPTION	DATE
A	50% DESIGN SET	4/22/09

PLOT SCALE: 1 = 1
SCALE: 1" = 50'
DRAWN BY: J. PORTER
CHECKED BY: R. HARDGROVE

PRELIMINARY DRAFT NOT FOR CONSTRUCTION

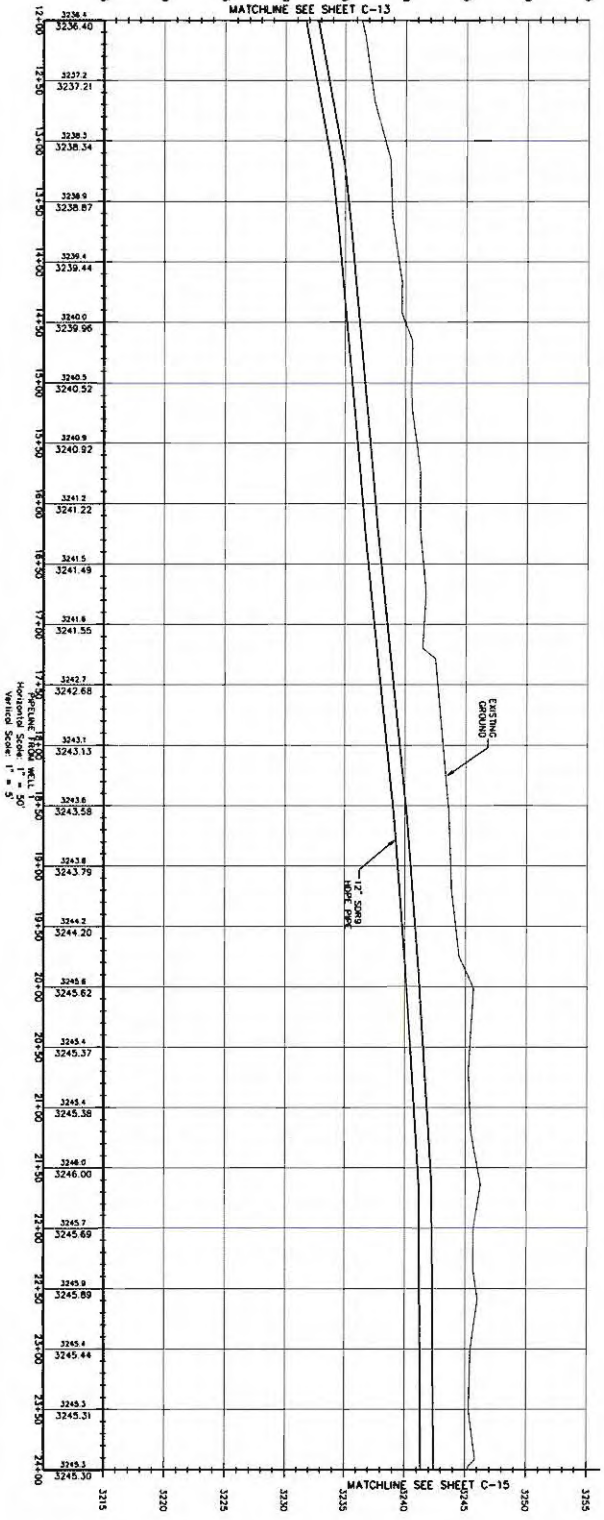
OVER THE RIM WATER SUPPLY PROJECT
SNAKE RIVER FARMS REPLACEMENT WATER PIPELINE FROM WELL #1 STA. 0+00 TO STA. 12+00

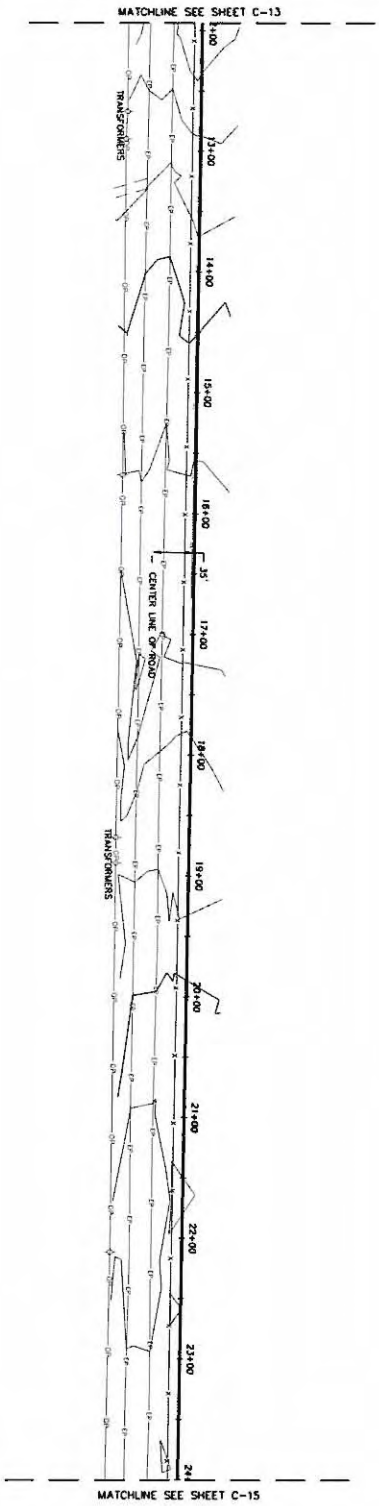
ENGINEER
BOB HARDGROVE
300 E. MALLARD DRIVE, SUITE 350
BOISE, IDAHO 83706
(208) 383-4140

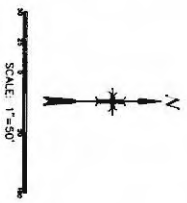
NORTH SNAKE AND MAGIC VALLEY
GROUND WATER DISTRICTS, C/O LYNN CARLQUIST
152 E. MAIN STREET
JEROME, ID 83338
(208) 324-8999

SPF WATER ENGINEERING
300 East Mallard Drive, Suite 350
Boise, Idaho 83706
Tel (208) 383-4140 Fax (208) 383-4156

Path: Z:\SPF WATER\PROJECTS\535.0030\ Filename: 535_BASE-ALN_2 Plot date: May 05, 2009-06:36:01am CAD User: SCOTT
Xref Filename: | ALT-1-Title Block | 535_BASE |







C-14
17 OF 19

DRAWING DIRECTORY

REVISIONS

ITEM	DESCRIPTION	DATE
A	50% DESIGN SET	4/22/09

PLOT SCALE: 1 = 1
SCALE: 1"=50'
CHECKED BY: R. HARDGROVE
DRAWN BY: J. PORTER

PRELIMINARY DRAFT NOT FOR CONSTRUCTION
PROFESSIONAL ENGINEER IDAHO

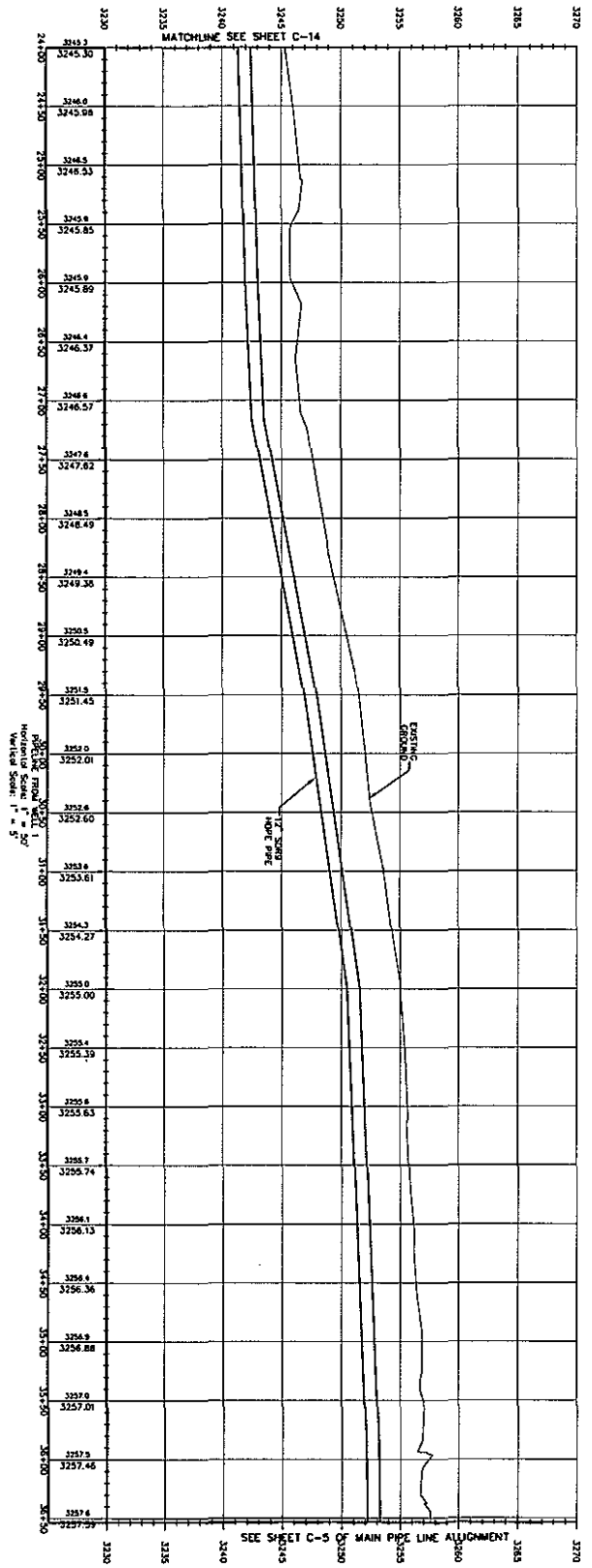
OVER THE RIM WATER SUPPLY PROJECT
SNAKE RIVER FARMS REPLACEMENT WATER
PIPELINE FROM WELL #1 STA. 12+00 TO STA. 24+00

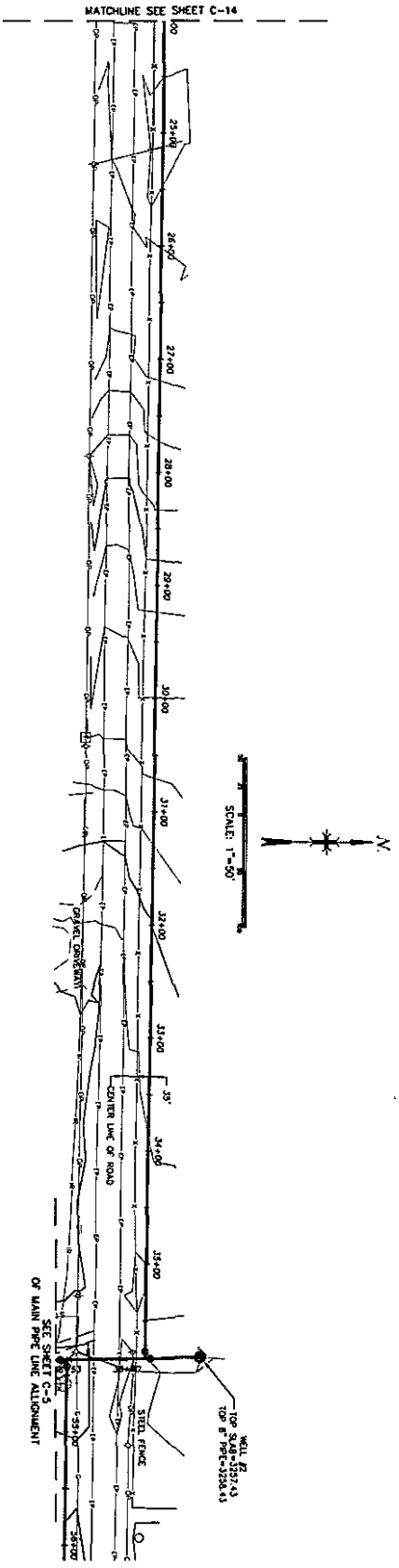
ENGINEER
BOB HARDGROVE
300 E. MALLARD DRIVE, SUITE 350
BOISE, IDAHO 83706
(208) 383-4140

NORTH SNAKE AND MAGIC VALLEY
GROUND WATER DISTRICTS, C/O LYNN CARLQUIST
152 E. MAIN STREET
JEROME, ID 83338
(208) 324-8995

SPF WATER ENGINEERING
300 East Mallard Drive, Suite 350
Boise, Idaho 83706
Tel (208) 383-4140 Fax (208) 383-4156

Path: Z:\SPF WATER\PROJECTS\535.0030\ Filename: 535_BASE-ALN_2 Plot date: May 05, 2009-06:36:52am CAD User: SCOTT.
Xref Filename: | ALT-1-Title Block | 535_BASE |





C-15
18 OF 19

DRAWING DIRECTORY

REVISIONS		
ITEM	DESCRIPTION	DATE
A	50% DESIGN SET	4/27/09

PLOT SCALE: 1" = 50'
SCALE: 1" = 50'
CHECKED BY: R. HARDGROVE
DRAWN BY: J. PORTER

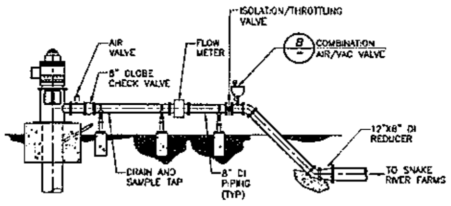
PRELIMINARY DRAFT NOT FOR CONSTRUCTION
NOT OFFICIAL UNTIL SIGNED BY ENGINEER

OVER THE RIM WATER SUPPLY PROJECT
SNAKE RIVER FARMS REPLACEMENT WATER
PIPELINE FROM WELL #1 STA. 24+00 TO STA. 36+53.49

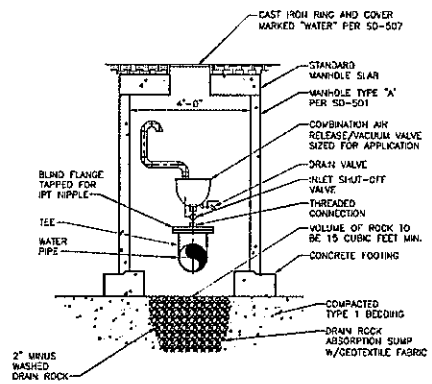
ENGINEER
BOB HARDGROVE
300 E. MALLARD DRIVE, SUITE 350
BOISE, IDAHO 83706
(208) 383-4140

NORTH SNAKE AND MAGIC VALLEY
GROUND WATER DISTRICTS, C/O LYNN CARLQUIST
152 E. MAIN STREET
JEROME, ID 83338
(208) 324-8995

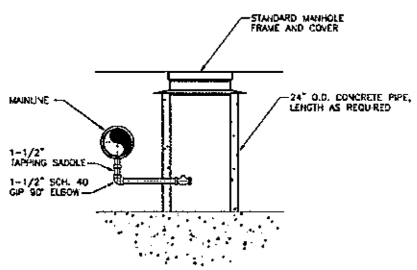
SPF WATER ENGINEERING
300 East Mallard Drive, Suite 350
Boise, Idaho 83706
Tel (208) 383-4140 Fax (208) 383-4156



A TYPICAL WELL HEAD ASSSEMBLY
NOT TO SCALE

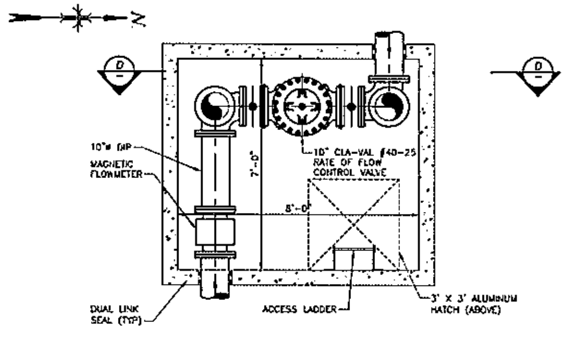


B COMBINATION AIR RELEASE/VACUUM VALVE
NOT TO SCALE

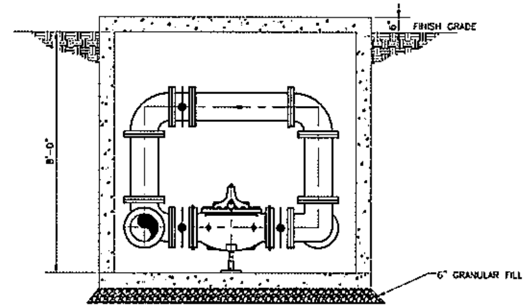


C MAINLINE DRAIN
NOT TO SCALE

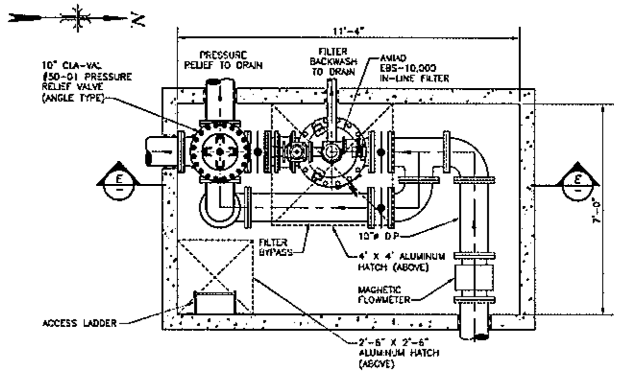
NOTE:
1. INSTALL MAINLINE DRAINS AS REQUIRED TO PROVIDE COMPLETE DRAINAGE DURING SHUT DOWN OF SYSTEM.



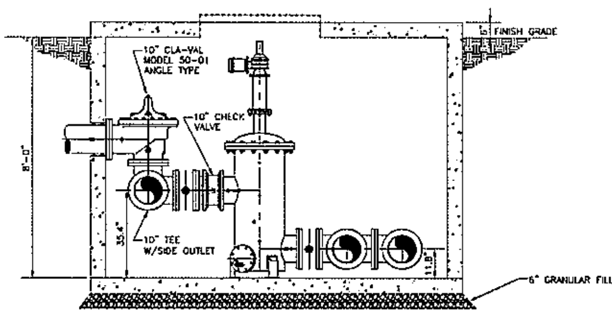
VALVE VAULT PLAN
SCALE: 1/2" = 1'-0"



D SECTION
SCALE: 1/2" = 1'-0"



FILTER VAULT PLAN
SCALE: 1/2" = 1'-0"



E SECTION
SCALE: 1/2" = 1'-0"

WARNING
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

SPF WATER ENGINEERING
300 East Mallard Drive, Suite 350
Boise, Idaho 83706
Tel (208) 383-4140 Fax (208) 383-4156

OVER THE RIM WATER SUPPLY PROJECT
SNAKE RIVER FARMS REPLACEMENT WATER
MISCELLANEOUS DETAILS

ENGINEER
BOB HARDGROVE
300 E. MALLARD DRIVE, SUITE 350
BOISE, IDAHO 83706
(208) 383-4140

NORTH SNAKE AND MAGIC VALLEY
GROUND WATER DISTRICTS, C/O LYNN CARLQUIST
152 E. MAIN STREET
JEROME, ID 83338
(208) 324-8995

PRELIMINARY DRAFT NOT FOR CONSTRUCTION

DRAWN BY:	S.BENNETT
CHECKED BY:	R. HARDGROVE
SCALE:	AS NOTED
PLOT SCALE:	1 = 1

DRAWING DIRECTORY

REVISIONS

ITEM	DESCRIPTION	DATE
A	50% DESIGN SET	4/22/09