

Keen, Shelley

From: Hersley, Chad
Sent: Wednesday, April 20, 2016 10:45 AM
To: Keen, Shelley; Newbry, Ashley
Cc: Neace, Thomas
Subject: Tammany View wells
Attachments: Engineer_report_well_specs_Tammany.pdf; D0051998.pdf; D0051999.pdf

Prior to our April 7, 2016 with Mr. Creamer and Mr. Scanlan, they provided Tammany View Estates IDEQ documents for our review. I have reviewed the Engineering report conducted by IDEQ (pages 71 through 86 of the submittal), which approved the design specifications for the wells. I have extracted the pertinent pages (attached) and highlighted the pertinent sections. It appears to me the wells were not constructed in accordance with the approved design specs.

Specifically with regard to well casing wall thickness (3rd page of the attached)

- Specs call for 0.280 wall 6 inch casing and 0.322 wall 8 inch casing
 - Drillers report indicates 0.250 and 0.188 wall casing was installed

grouting material (4th page)

- Specs call for Portland Cement based grout seal
 - Drillers report indicates a bentonite seal was installed

grouting and grout placement (page 11).

- Specs call for backfilling annular space with filter pack or seal material
- And, intermediate seal where separate aquifers are encountered

If the proponent pursues re-instatement of the water permit, we may want to ask IDEQ to again review the submittal and determine if the wells will even satisfy the requirements of a public water system.

Chad. F. Hersley, P.G.
Technical Hydrogeologist
Idaho Department of Water Resources
Ground Water Protection Section
208-287-4930

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APR 4 2007
DEQ-LRC

ENGINEERING REPORT FOR WATER SYSTEM
TAMMANY VIEW PROPERTIES SUBDIVISION PHASE III

General

This subdivision is approximately 5 miles south of the Lewiston Orchards and is situated within Sections 7.17 & 18 T.34N., R.4W., B.M. as shown on the enclosed plat. The development has been developed in phases (I thru III) with a total of 93 each 5 acre+ lots.

All lots will have on site sewage disposal systems approved by the North Central Health District. Lots within Phase-I and Phase-II will also have individual wells.

The developer desires to develop a public water system for Phase III which consists of 38 each 5 acre lots. Phase III as well as Phase-I & II have access from two county roads (Buchanan and Powell) and a road thru Phase-III (Pheasant Loop Road) has been constructed by the developer and approved by Nez Perce County.

Existing Water System

There has been over 20 wells developed within Phases-I and II which provides reliable data in projecting the Lithology and Geology expected in developing wells for Phase-III. Depending on ground elevations existing wells are from 500 ft. to over 900 ft. in depth. According to well production records existing wells are producing from 10 to 25 GPM.

Proposed Water System

Access

The access road thru Phase-III (Pheasant Loop) has been constructed to County Standards and was approved by Nez Perce County in 2004 (See enclosed plat). The majority footage of proposed water mains will be within the right of way of Pheasant Loop.

Water System

The proposed system will consist of the following:

- Water Source - 2 each Public Wells
- Storage - Concrete Reservoir (cap 59,500 gals)
- Distribution System - 4 inch and 2 inch water lines

By Tom Moore 4/26/07
Engineer Date

These plans and/or specifications have been reviewed for compliance with Idaho Dept. of Environmental Quality rules and are hereby approved. This review does not relieve the owner, engineer, or the contractor of the responsibility to design or construct these facilities in compliance with all current applicable federal, state and local laws, rules, regulations, or ordinances.

Plans and/or specifications must be resubmitted for review if construction is not completed by: 4/26/08

Refer to letter of 4/26 to BLEWETT

3220.00
3635

Required storage capacity and minimum well capacity is based on an average peak demand of 800 gpd per lot.

Therefore the minimum storage required (one day) is 30,400 gals (38 x 800). However 59,500 gals of storage is planned.

The minimum well production required is 21 GPM (800 x 38/1440). The minimum capacity specified in the enclosed technical specifications for well construction is 30 gpm.

Pressure Zones

The complete water system for Phase-III is shown on the enclosed plat. Spot elevations are listed reflecting a range from elevation 2220± ft. at the enhance (Intersection of Powell Road and Pheasant Loop) to elevation 2485± ft. near the proposed reservoir site. Well sites are located at elevation 2380± ft. Areas outside of the desired pressure zone (40 psi to 90 psi) are defined. A low pressure zone lies within the southwest sector and a high pressure zone exist near the entrance to the development (Powell Road and Pleasant Loop).

Specifications:

Water lines: Schedule 40 pvc up to 90 psi Working Pressure or C-900
 Schedule 80 pvc for 90 psi plus or C-900

Well Construction and Testing : See enclosed Specifications

Reservoir: Mtn Baker Silo from Mount Vernon, Wa. (Plans are being prepared).



WATER WELL CONSTRUCTION & TESTING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Scope:

1. The work covered by this section includes the furnishing of all plant, labor, tools, equipment and materials, and performing all operations in connection with the drilling, casing, developing, and testing of water wells, and site cleanup, all in accordance with these specifications and applicable drawings.
2. All construction methods and materials for the wells shall meet or exceed state and local requirements. The well drill rig operator shall have a valid well drillers license in the State of Idaho.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Permanent Steel Casing Pipe:

1. Steel casing shall be used as a permanent part of the well structure. Steel pipe shall conform to Federal Specifications WW-P-406d, Weight A, Class I, AWWA Standard A-100 and ASTM A or API specifications for water well construction. Pipe shall be of standard brand manufacture and have the brand name clearly printed on each length of pipe. Manufacturer rejected pipe shall not be used. Casing shall be free of oil, grease, rust or other detrimental materials.

2. Steel casing shall meet the following requirements:

Nominal Diameter (inches)	External Diameter (inches)	Internal Diameter (inches)	Nominal Wall Thickness (inches)	Minimum Weight (lbs/lineal ft.)
6	6.625	6.065	0.280	18.97
8	8.625	7.981	0.322	28.55
10	10.75	10.020	0.365	40.48
12	12.75	12.000	0.375	49.56

3. Lengths of casing shall be connected with either screwed couplings or approved welds. Welded joints shall be made in accordance with the provisions of Section 3.1.C.

B. Drive Shoes:

1. If permanent steel casing is to be installed by driving methods, the use of drive shoes is required. The type and weight of drive shoes shall be determined by the CONTRACTOR, and approved by the ENGINEER. Couplings will not be considered as drive shoes.

C. Grouting Material:

1. The grout shall be proportioned of Portland Cement and the least quantity of water (not over six gallons per cubic foot of cement) required to give a mixture of such consistency that it can be forced through the grout pipes. Three percent to five percent (by weight) of bentonite clay may be added to the grout mixture in order to improve its flow properties. The mixture, method of mixing, and consistency shall be approved by the ENGINEER before grouting of the wells.

2.2 TRANSPORTATION AND HANDLING

- A. Factory packaged products shall be delivered in the manufacturer's original containers.
- B. Products shall be transported and handled in such a manner as to prevent their damage.

2.3 STORAGE AND PROTECTION

- A. Neatly pile, store and protect products in suitable locations.
- B. Protect products subject to damage by temperature or other weather conditions.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Drilling:

1. The well shall be constructed as follows (see drawing on attached sheet 2 of 2):
 - a. Drill 12-inch diameter hole to a depth of 60 feet. Install 14" steel casing to ensure that drilled hole remains open.
 - b. Set 8-inch steel casing to bottom of 12-inch drill hole. Use centralizers every 20 feet, or as required, to ensure 8-inch casing remains centered in 12-inch steel casing during grouting and removal of 12-inch steel casing.
 - c. Grout annular space between 8-inch and 12-inch steel casings. Grout shall be placed by pumping under pressure from bottom of space.

- d. Remove 12-inch steel casing as grout is placed.
 - e. Let grout set for minimum of 48 hours
 - f. Drill 8-inch hole to total depth of well. (Estimated to be 800 feet).
 - g. Install 6-inch steel casing to bottom of hole.
 - h. Insert 20' well screen and pull casing back to top of screen.
 - i. Develop well.
 - j. Cut 8-inch steel casing off 6-feet below ground surface.
 - k. Install pitless adaptor in 8" steel casing approx. 4-feet below ground level. Install 20 lineal feet of 4" C-900 PVC and 1" PVC electrical conduit pipe as directed by Engineer in field..
 - l. Place 14-inch diameter Sona tube around top of 6-inch steel lining. Top of Sona tube to be located approx. 18-inches above ground level.
 - m. Backfill area around Sona tube.
 - n. Place grout in annular space between 6-inch steel lining and 12-inch Sona tube.
 - o. Pump test completed well.
- 2. The drilling may be accomplished by cable tool, or air rotary drilling equipment. The equipment shall be in good repair and be capable of drilling, as specified herein, up to a depth of 800 feet. When sufficient yield is indicated from a water bearing stratum the CONTRACTOR shall, after obtaining the ENGINEER'S approval, develop the well according to the provisions of Section 3.1.E of these specifications.
 - 3. All drilling equipment placed down the hole shall be thoroughly disinfected with 500 ppm chlorine solution as per Section 3.1.L.1. of these specifications prior to each use.
 - 4. A minimum yield of fifty (30) gallons per minute is being sought.
 - 5. The drilling fluid used in conventional mud rotary drilling shall conform to standard accepted well drilling practice for water wells and shall be "Revert" or a similar type of substance as approved by the ENGINEER. Mixing of the additive shall be performed with a standard jet type mixer or as approved by the ENGINEER. All drilling water shall be disinfected with chlorine which shall be added to the water tank before each refilling in a quantity such that a

concentration of 50-100 ppm of chlorine is obtained in all of the water. When a self destroying additive such as "Revert" is used in the drilling fluid, the driller shall follow the recommendations of the manufacturer in achieving removal of this additive from the well during the development phase.

B. Permanent Steel Casing:

1. Casings shall be installed in well as shown on the drawing to a depth specified by the ENGINEER, and grouted in place. The length of casing required will depend on the formation and the overlying materials. The top of the casing which is cut by torch shall have all rough surfaces ground smooth.

C. Welding:

1. Surfaces to be welded shall be free from local scale, rust, grease, paint and other foreign material, except for mill scale which withstands vigorous wire brushing. Ends to be welded shall be factory cut and beveled.
2. All welds shall penetrate the full thickness of the casing wall.
3. The technique of welding employed, the appearance and quality of the welds made, and the methods of correcting defective work shall conform to normally accepted standards of workmanship.
4. No welding shall be done when the temperature of the base metal is lower than 0° Fahrenheit. At temperatures between 0° and 32° Fahrenheit, the surface of all areas within three inches of the edges to be welded shall be heated until they are too hot to touch before welding is started.
5. Sections of casing after welding shall be true to line and free from twists, bends, offsets, and openings. All welded joints shall be watertight.

D. Sampling of Formation:

1. Sampling is considered an essential part of this contract. Samples of the formation shall be taken as described in the following paragraphs. Samples shall be kept in cloth bags. These samples shall be furnished to the ENGINEER as drilling progresses.
2. The CONTRACTOR shall keep an accurate record of the location of the top and bottom of each stratum penetrated, and the elevation to which the water level stabilizes, as each water bearing stratum is encountered. The CONTRACTOR shall place and save in cloth bags samples taken from each five (5) feet of drilling and at every change in formation. If so directed by the ENGINEER, the driller may be required to take samples at one foot intervals in a potential aquifer.

3. **Well Logs and Records:** The CONTRACTOR shall keep an accurate and detailed log of the well, recording the following information:
 - A. Location of well by ¼ section, range and township.
 - B. Depth, thickness, type, general characteristics, and drilling characteristics of each material encountered.
 - C. Size, type and length of the well casing installed.
 - D. Type, size, number and locations of perforations.
 - E. Test pumping data.
 - F. Pitless adapter, type and brand name.
 - G. Method and date of bacteriological sampling.
4. Each log shall be kept carefully and accurately on a standard well drillers log form with entries made in sequence so that each can be correlated with the depth of hole at the time. It shall be brought up to date at the end of each working day and shall be furnished to the ENGINEER within one week after the performance of all work on the well.
5. The driller shall also file an official well log with the State agency designated to handle them in the particular state in which the well is located and provide the ENGINEER with a copy of the log and evidence of submittal.

The CONTRACTOR shall, upon the completion of each well, collect and submit a bacteriological sample to the state health department laboratory for analysis. If a positive sample is analyzed the CONTRACTOR will be required to chlorinate the well until a negative sample is obtained and analyzed.

E. **Well Screen:**

1. The well screen shall be designed to produce a minimum loss of head between the water bearing stratum and the well. It shall be of the continuous slot design, fabricated of special shaped cold drawn bars. The outer winding that forms the screen surface and the internal longitudinal bars shall be joined at each intersection by welding. Both members shall be of type 304 stainless steel conforming to AISI requirements.
2. The screen and all accessories required for installation shall be commercial products of a manufacturer regularly engaged in the production of such equipment.

3. The well screen openings shall be of the proper width to permit the maximum practical sand free yield after development. The size of the slot shall be that recommended by the manufacturer. A sieve analysis of a representative sample of the water bearing formation shall be submitted by the driller. The openings shall be of geometric shape to permit maximum transmitting capacity without clogging or jamming. The sieve analysis must be verified by the Project Engineer prior to installation of the well screen.
4. If it is necessary to join several screens together, the joints connecting the screen sections shall be butt-type couplings of the same materials as the screens.
5. Well Screen Dimensions: The length and/or diameter of the well screen shall be determined by the Project Engineer., based on the thickness of the water bearing formation and the method of installation.
6. The well screen shall be installed by the pull back method provided the formations in the hole are not subject to collapse and bind around the pipe. A different method shall be used subject to the approval of the Project Engineer if the formation has a tendency to collapse.
7. If the screen is not welded securely to the casing, the screen shall be provided with a five (5) foot section of riser pipe and a neoprene type packet, which shall be securely installed in the casing.
8. A washdown fitting, bottom, or other suitable closure shall be securely attached at the bottom of the screen. If the hole is drilled deeper than the area to be screened the open hole shall be filled with approved materials. The screen shall set on solid material.

F. Gravel and Sand Pack:

1. Gravel pack material, where required, shall be placed in the annulus surrounding the well screen by a method approved by the Project Engineer which will not allow hydraulic separation to occur. Any method used must include a provision for disinfecting the gravel pack with 50-100 ppm of chlorine based on the weight of gravel or sand used. Free dropping of the gravel pack material into the drill hole from the ground surface will not be allowed. The gravel pack material shall be composed of well rounded uniform grains of water washed quartz or approved gravel. The gradation of the gravel pack and the weight loss by the acid test (required weight loss less than 20%) must be submitted to the Project Engineer for approval. The gravel shall be sized and graded by the manufacturer of the well screen based on the gradation of the material composing the aquifer unless a size is specified in the Bid Schedule.
2. The Contractor shall submit his proposed method of screen installation and gravel packing for approval by the Project Engineer prior to authorization to proceed with construction.

3. Sampling for Preliminary Chemical Analysis: When a potential aquifer has been screened but before the decision is made to develop or test pump the well, the contractor shall, if so directed, obtain a water sample for preliminary chemical analysis by the Project Engineer. The well shall be pumped or bailed until a suitably clear sample can be obtained. No payment shall be made for wells completed without the prior approval of the Project Engineer. No payment shall be made for obtaining the water sample but shall be included in the price for drilling.

G. Well Development:

1. The CONTRACTOR shall develop the well by such methods as will effectively extract from the water bearing formation the maximum practical quantity of drilling mud, fine sand, silt, or other fine materials. Development shall bring the well to a maximum yield per foot of drawdown, and the water shall be sand free at the maximum pumping rate.
2. One of the following methods of development shall be used: Surge plungers, compressed air, or high velocity jetting. Neither bailing nor pumping shall be considered to be adequate development methods under this contract. The ENGINEER shall approve the development method used by the CONTRACTOR prior to initiation of the work. If compressed air is used, the compressor shall deliver a minimum of 75 cubic feet of air per minute at a minimum pressure of 100 psi. If the compressor used does not meet the requirements specified above, use of compressed air shall not be considered as development.
3. The development work must be done in a manner that does not cause undue settlement of the stratum above the water bearing formation.
4. Development of the well shall be continued until water pumped from the well at the rate determined by the ENGINEER is clear and free of sand. The water shall be considered sand free when all samples taken at the determined pumping rate contain less than two parts per million (by weight) of sand. Development shall not be considered as test pumping. Checking an aquifer for yield as described in Section 3.1.F shall not be considered to be development time.
5. During the course of the development of the well, the CONTRACTOR shall conduct a preliminary production test using the "blow-down" method to estimate the production capacity of the well.

H. Testing for Yield and Drawdown:

1. The CONTRACTOR shall furnish all labor, equipment materials and power required for test pumping, to the satisfaction of the ENGINEER. This shall include all necessary equipment for measuring the water level in the well and the rate of pump discharge. Equipment considered suitable are electrical probes, or

air line for well level measurements; and an orifice meter, weir or a calibrated water meter for flow measurement.

2. The CONTRACTOR shall notify the ENGINEER three (3) working days prior to the start of the test pumping. The ENGINEER must be present at the well site during the testing.
3. The CONTRACTOR shall test pump the wells by furnishing temporary pumping facilities to be removed from the well at the end of the test pumping operation. The wells shall be test pumped at a rate of 100% of the design flow (50gpm) unless otherwise directed by the ENGINEER. New pump to be installed in the well will not be used for test pumping.
4. CONTRACTOR shall be responsible for furnishing all necessary piping for conducting the water away from the test site to a suitable location as determined by the ENGINEER.
5. The duration of the test pumping shall be a minimum of twenty four (24) hours. The ENGINEER may require more or less test pumping time. After completion of the test pumping and before grouting, the CONTRACTOR shall provide a water sample so the ENGINEER can run a field chemical analysis.
6. Flow, time and depth to water during drawdown shall be measured and recorded at five (5) minute intervals during the first half hour and then every 15 minutes for the remainder of the pumping period. Time and depth to water shall be measured and recorded every 10 minutes during the recovery period after the test has been completed until the water level has stabilized.

I. Sand Content:

1. The CONTRACTOR shall furnish the ENGINEER with a sand content of the water produced from the well. The sand content shall be measured by a centrifugal sand sampler, or equivalent, fifteen (15) minutes after the start of the test pumping of the well.

J. Chemical Analysis:

1. The CONTRACTOR shall furnish to the ENGINEER a chemical analysis of the water produced from the well. The CONTRACTOR shall be responsible for furnishing the required size and number of containers, collecting the water sample, arranging for the chemical analysis to be performed at a laboratory approved by the ENGINEER and furnishing the results to the ENGINEER. The following is a list of the parameters to be analyzed for the well:

- | | |
|---------------------------|-----------------|
| 1. Total Dissolved Solids | 5. Alkalinity |
| 2. Total Hardness | 6. Conductivity |
| 3. Total Iron | 7. pH |
| 4. Manganese | 8. Fluoride |

- 9. Sodium
- 10. Nitrate
- 11. Chromium

- 12. Lead
- 13. Sulfates

K. Grouting:

1. The well shall have the annular space between the outer casing and the drill hole and the annular spaces between the inner and outer casing filled with cement grout as shown on the drawings. At the direction of the ENGINEER the depth of grouting may be increased where necessary to provide increased protection of the water supply. Where a bore hole larger than the outside diameter of the casing has been drilled below the depth to which the casing is to be grouted, the lower part of the hole shall either be backfilled with sand, cement, grout, or other material approved by the ENGINEER. No payment shall be made for cement grout or backfill used for this purpose.

L. Grout Placement:

1. Before proceeding with placing the grout the CONTRACTOR shall secure the ENGINEER'S approval of the method he proposes to use. No method will be approved that does not specify the forcing of the grout under pressure from the bottom of the space to be grouted towards the surface. The grouting shall be done continuously and in a manner that will insure the filling of the entire annular space with grout in a single operation.
2. The volume of grout placed shall be recorded and checked against the volume calculations provided by the ENGINEER every 10 feet of well depth being grouted. Top of seal will be tagged (sounded) by ENGINEER every 10 feet as grout is placed to compare actual volume placed against volume calculations.
3. The CONTRACTOR shall provide a minimum of 50% more grout material than the volume calculations, provided by the ENGINEER, indicate will be required.
4. Both the temporary 12-inch steel casing and tremie pipe used to place the grout shall be withdrawn as the grout is placed.
5. CONTRACTOR shall notify ENGINEER a minimum of 7 hours prior to placement of grout seal. ENGINEER must be present when grout seal is placed.
6. If separate aquifers of unequal quality or pressure are encountered during drilling operations, intermediate seals may be required.
7. No drilling, test pumping or other work in the well will be permitted within 72 hours after completion of grouting. If quick set cement is used this period may be reduced to 24 hours, upon approval by the ENGINEER.

M. Precautions During Construction:

1. The CONTRACTOR shall take such precautions as are necessary or as may be required to prevent contaminated water or water having undesirable physical or chemical characteristics from entering the well. He shall also take precautions during construction to prevent contamination of pollution from the ground surface.

N. Plumbness and Alignment:

1. The well shall not deviate from the vertical by more than $\frac{1}{4}^{\circ}$ to $\frac{3}{4}^{\circ}$.
2. A straightness and alignment test shall be run by the CONTRACTOR after the well is cased. This shall consist of running a pipe of 40 foot length and whose outside diameter is between $\frac{1}{2}$ inch and $\frac{3}{4}$ inch smaller than the inside diameter of the casing to the bottom of the well.
3. If the test pipe binds, does not pass through the well casing freely, or is bent as a result of testing procedure, the ENGINEER shall have the authority to reject the well as drilled and cased, with no payment to the CONTRACTOR, until the deficiency is corrected to the ENGINEER'S satisfaction. No payment will be made to the CONTRACTOR for the testing procedure or materials.

O. Disinfection:

1. All downhole materials and equipment used for drilling and test pumping shall be cleaned and disinfected with a 500 ppm chlorine solution as per IDWR rules.
2. Upon completion of construction and test pumping, the well shall be thoroughly cleaned of foreign substances including but not limited to cement, oil, grease, joint dope, and scum. The well shall then be disinfected with a chlorine solution. The CONTRACTOR shall obtain approval from the ENGINEER of his disinfection procedures based on his submittals.
3. The chlorine solution used for disinfecting the well shall be prepared prior to injection into the well and shall be of such volume and strength and so applied that a minimum concentration of 50 ppm of free residual chlorine shall be obtained in all parts of the well for at least 24 hours after injection. The top of the casing above the static water level shall be flushed with the chlorine solution.
4. The chlorine may be added to the well by the following method:
 - i. A stock solution of chlorine will be added through a pipe discharging a different levels in the well. The well will then be agitated with a bit or bailer to mix the solution.

5. Following the final disinfection of the well, the CONTACTOR shall flush the well to remove all of the chlorine from the well.

P. Pitless Adaptor:

1. The pitless adaptor shall be Midwest Dicken Manufacturing Model No. S-20, or approved equal. The pitless adaptor shall be approved by NSF, Water Systems Council or equivalent.
2. The pitless adaptor shall be field tested as per the requirements of the "Manual of Individual Water Supply Systems" (see appendix B).

Q. Well Cap:

1. The well shall be temporarily capped with a welded cover plate or similar device approved by the ENGINEER until the pitless adapter is installed. The cap shall be attached to the top of the casing to protect the well from the entrance of foreign objects until the well is completed. At no time shall the hole be unattended without a cap in place.
2. When the pitless adaptor is installed, a Midwest Dickens Manufacturing Model No. WTCC-6 watertight, vented well cap, or approved equal, shall be installed on the well top.

R. Abandonment of Well:

1. In the event the well shall not be accepted for completion due to insufficient capacity; unsatisfactory chemical or bacteriological quality; or should it be abandoned because of poor alignment, loss of tools, or for any other cause, the CONTRACTOR shall as directed by the ENGINEER, fill the abandoned hole with puddle clay or clay and concrete. No well shall be abandoned without the approval of the ENGINEER. Provision for payment for drilling and materials used for abandoned well shall be made as specified in Section 3.2.

S. Site Control:

1. Construction wastewater or stormwater runoff from the construction site shall not contain any sediment, well drilling chemicals or sealant materials.
2. CONTRACTOR shall dispose of all well construction waste and debris, including drilling fluid waste, off site in a legal manner. On-site disposal of any waste materials will not be permitted.
3. The CONTRACTOR shall maintain an active program for the control of dust and noise throughout the duration of the project. The program for dust control shall include all areas disturbed by the CONTRACTOR'S operations.

4. All holes, pits, equipment and chemicals shall be safely stored and/or fenced as per OSHA standards.
5. The construction site shall be restored as nearly as possible to its original condition as soon as the construction of the well and the test pumping has been completed. All cleanup work shall be completed prior to the final inspection of the well and the site.

3.2 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

- A. All drilling shall be paid for on a footage basis for the actual drilling required to complete the well. The top of the well requires drilling of a large diameter hole and the installation of a larger diameter outer casing to allow for grouting. This portion of the drilling shall be paid for at the unit price bid for the larger diameter outer casing. The remainder of the drill hole shall be paid for at the unit price bid for drilling of the diameter specified. In cases where abandonment of the well is due to causes which are determined not to be the fault of the CONTRACTOR, casing and other materials furnished by the CONTRACTOR, but not installed, shall remain his property and no payment will be made for such materials. He shall be paid only the unit cost for drilling plus the unit cost for developing, if applicable.
- B. No additional payment will be made for drilling in rock, (inclusive of boulders). Payment will be made on a per foot basis regardless of materials encountered. It shall be the CONTRACTOR's responsibility to familiarize himself with the particular area and bid accordingly.
- C. Any well hole abandoned due to fault of the CONTRACTOR before completion and acceptance shall be the responsibility of the Contractor and no payment shall be made for such work.
 - a. Casing shall be paid for based on the actual footage installed in the completed well.
 - b. Well screen shall be paid for based on the actual footage installed in the completed well.
 - c. Development of the well shall be considered a part of this overall contract and no separate payment shall be made.
 - d. Test pumping shall be paid for based on the actual hours of test pumping completed.
 - e. A complete chemical analysis as called for in Section 3.1.G is considered a part of this overall contract and no separate payment shall be made.
 - f. Grouting shall be paid for the lineal feet required by these specifications as sanitary protection in the annular space between the outer casing and the drilled hole and in the annular space between the inner casing and the outer casing.
 - g. Disinfection of the well shall be considered a part of this overall contract.

- h. Site cleanup shall be considered a part of this overall contract and no separate payment shall be made for site cleanup.
- i. Bacteriological sampling will be considered an essential part of this contract and will not be considered as a pay item.

3.3 SUBMITTALS

- A. Submittals will be required for the materials or methods of construction shown below. The CONTRACTOR shall submit five copies of brochures, samples, manufacturer's name, model number, pressure rating, and any other pertinent information as may be necessary to completely describe the particular piece of equipment, material, and method of installation for the items listed. Items furnished by the CONTRACTOR must be approved by the ENGINEER prior to installation, and all approvals will be in writing.

- 1. Well casing
- 2. Well Screen
- 3. Method of disinfection
- 4. Method of grouting
- 5. Method of development
- 6. Lab to perform chemical analysis
- 7. Type of drilling equipment.

END OF SECTION

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

RECEIVED

DEC 13 2007

IDWR/North

Office Use Only			
Well ID No.			
Inspected by			
Twp	Rge	Sec	
1/4	1/4	1/4	
Lat: : :	Long: : :		

1. WELL TAG NO. D D00 51998

DRILLING PERMIT NO. **846771**

Water Right or Injection Well No. **85-15690**

2. OWNER

Name **TAMMANY VIEW, LLC**

Address **PO BOX 356**

City **GRANGEVILLE** State **ID** Zip **83530**

3. LOCATION OF WELL by legal description:

You must provide address or Lot, Blk, Sub. or Directions to well.

Twp. **34** North ☒ or South ☐

Rge. **04** East ☐ or West ☒

Sec. **7** 1/4 **SE** 1/4 **SE** 1/4

Gov't Lot -- County **NEZPERCE**

Lat: : : Long: : :

Address of Well Site **TAMMANY VIEW SUBDIVISION PHASE III #1**

City **LEWISTON**

(Show at least name of road - Distance to Road or Landmark)

Lt. **1** Blk. -- Sub. Name **TAMMANY VIEW**

4. USE:

☐ Domestic ☒ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

5. TYPE OF WORK check all that apply

(Replacement etc.)

☒ New Well ☐ Modify ☐ Abandonment ☐ Other

6. DRILL METHOD:

☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
BENTONITE	0	-96	400 400	TOP POUR

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) **-98**

Was drive shoe seal tested? ☒ Y ☐ N How? **AIR**

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+2	-98	.250	Steel	☒	☐	☒	☐
6"	-30	900	.188	Steel	☐	☒	☐	☐

Length of Headpipe **N/A** Length of Tailpipe **N/A**

Packer ☐ Y ☒ N Type

9. PERFORATIONS/SCREENS PACKER TYPE

Perforation Method **SAW**

Screen Type & Method of Installation **N/A**

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
890	930	1/8X4	42	6"	STEEL	☐	☒

10. FILTER PACK

Filter Material	From	To	Weight/Volume	Placement Method
N/A				

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:

800 ft. below ground Artesian pressure -- lb.

Depth flow encountered -- ft. Describe access port or control devices: --

TOP OF CASING

12. WELL TESTS:

☐ Pump ☐ Bailor ☒ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
60			1.5

Water Temp. **55**

Bottom hole temp.

Water Quality test or comments: **GOOD**

Depth first Water Encounter **860**

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Water

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Y	N
12	0	18	CLAY		X
12	18	56	BLACK BASALT		X
12	56	96	HARD BLACK BASALT		X
12	96	130	SOFT BROWN GREEN BASALT		X
12	130	145	HARD BLACK BASALT		X
8	145	185	HARD GRAY BASALT		X
8	185	198	SOFT RED BASALT		X
8	198	205	SOFT BLACK BASALT		X
8	205	250	SOFT RED BROWN BASALT		X
8	250	280	SOFT RED BASALT		X
8	280	305	MEDIUM BLACK BASALT		X
8	305	344	SOFT BROWN RED BASALT		X
8	344	390	SOFTER BROWN RED BASALT		X
8	390	415	MEDIUM RED BASALT		X
8	415	440	MEDIUM BLACK BASALT		X
8	440	505	SOFT BROWN BASALT		X
8	505	529	HARD GRAY BASALT		X
8	529	540	SOFT RED BASALT (AIR LOSS)		X
8	540	605	SOFT RED BASALT - YELLOW SHALE MIX		X
8	605	620	SOFT RED & BALCK BASALT		X
8	620	680	HARD BLACK BASALT		X
8	680	690	MEDIUM BLACK BASALT		X
8	690	715	HARD BLACK BASALT		X
8	715	746	SOFT RED BASALT		X
8	746	783	SOFT RED BASALT		X
8	783	789	MEDIUM RED BASALT		X
8	789	860	HARD BLACK BASALT		X
8	860	930	SOFT BLACK & GREEN GASALT	X	

Completed Depth **930**

(Measurable)

Date: Started **5-16-07**

Completed **5/21/07**

14. DRILLER'S CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name **TWO U DRILLING, LLC**

Firm No. **125**

Principal Driller **TU** Date **12-11-07**

and Driller or Operator II **BU** Date **12-11-07**

Operator I Date

Principal Driller and Rig Operator Required.
Operator I must have signature of Driller/Operator II.

34N 4W 7

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DEC 19 2007

IDWR/North

Office Use Only			
Well ID No.			
Inspected by			
Twp	Rge	Sec	
1/4	1/4	1/4	
Lat	:	:	Long

1. WELL TAG NO. D D00 51999

DRILLING PERMIT NO. 846772

Water Right or Injection Well No. 85-15690

2. OWNER

Name TAMMANY VIEW, LLC

Address PO BOX 356

City GRANGEVILLE

State ID

Zip 83530

3. LOCATION OF WELL by legal description:

You must provide address or Lot, Blk, Sub. or Directions to well.

Twp. 34 North ☒ or South ☐
Rge. 04 East ☐ or West ☒
Sec. 7 1/4 SE 1/4 SE 1/4
10 acres 40 acres 160 acres

Gov't Lot -- County NEZPERCE

Lat: : : Long: : :

Address of Well Site TAMMANY VIEW SUBDIVISION PHASE III #2

City LEWISTON

Drive at least name of road + Distance to Road or Landmark

Lt. 1 Blk. -- Sub. Name TAMMANY VIEW

4. USE:

☐ Domestic ☒ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other

5. TYPE OF WORK check all that apply

(Replacement etc.)

☒ New Well ☐ Modify ☐ Abandonment ☐ Other

6. DRILL METHOD:

☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
BENTONITE	0	-96	400 400	TOP POUR

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) -98Was drive shoe seal tested? ☒ Y ☐ N How? AIR

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
6"	+2	-98	.250	Steel	☒	☐	☒	☐
6"	-30	900	.188	Steel	☐	☒	☐	☐

Length of Headpipe N/A Length of Tailpipe N/A

Packer ☐ Y ☒ N Type

9. PERFORATIONS/SCREENS PACKER TYPE

Perforation Method SAW

Screen Type & Method of Installation N/A

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
890	930	1/8X4	42	6"	STEEL	☐	☒

10. FILTER PACK

Filter Material	From	To	Weight/Volume	Placement Method
N/A				

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:

800 ft. below ground

Artesian pressure -- lb.

Depth flow encountered -- ft. Describe access port or control devices: --

TOP OF CASING

12. WELL TESTS:

☐ Pump ☐ Bailor ☒ Air ☐ Flowing Artesian

Yield gal./min.	Drawdown	Pumping Level	Time
60			1.5

Water Temp. 55

Bottom hole temp.

Water Quality test or comments: GOOD

Depth first Water Encounter 860

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Water
12	0	18	CLAY	X
12	18	56	BLACK BASALT	X
12	56	96	HARD BLACK BASALT	X
12	96	130	SOFT BROWN GREEN BASALT	X
12	130	145	HARD BLACK BASALT	X
8	145	185	HARD GRAY BASALT	X
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8	280	305	MEDIUM BLACK BASALT	X
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8	344	390	SOFTER BROWN RED BASALT	X
8	390	415	MEDIUM RED BASALT	X
8	415	440	MEDIUM BLACK BASALT	X
8	440	505	SOFT BROWN BASALT	X
8	505	529	HARD GRAY BASALT	X
8	529	540	SOFT RED BASALT (AIR LOSS)	X
8	540	605	SOFT RED BASALT - YELLOW SHALE MIX	X
8	605	620	SOFT RED & BALCK BASALT	X
8	620	680	HARD BLACK BASALT	X
8	680	690	MEDIUM BLACK BASALT	X
8	690	715	HARD BLACK BASALT	X
8	715	746	SOFT RED BASALT	X
8	746	783	SOFT RED BASALT	X
8	783	789	MEDIUM RED BASALT	X
8	789	860	HARD BLACK BASALT	X
8	860	930	SOFT BLACK & GREEN GASALT	X

Completed Depth 930

(Measurable)

Date: Started 5-16-07

Completed 5/21/07

14. DRILLER'S CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name TWO U DRILLING, LLC

Firm No. 125

Principal Driller TU

Date 12-11-07

and

Driller or Operator II BU

Date 12-11-07

Operator I

Date

Principal Driller and Rig Operator Required.
Operator I must have signature of Driller/Operator II.

FORWARD COPY TO WATER RESOURCES

Form provided by Forms On-A-Disk (214) 340-9429 www.FormsOnADisk.com

34N 4W 7

Tammany View Wells

