

# Ranney Well Improvement Project

## Redevelopment and New Lateral Installation

### Report



*Prepared for:*

**City of Woodland,  
Washington**

**&**

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*Prepared By:*



**Columbus, Ohio  
September 29, 2014**

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## 1 INTRODUCTION

Layne, d/b/a Ranney Collector Wells (Ranney), has recently completed the redevelopment of three (3) existing laterals and the installation of three (3) new laterals in a horizontal collector well for the City of Woodland, Washington as part of the Ranney Well Improvement Project. The maintenance work was conducted in accordance with Sections 01010, 15100 and 15200 of the contract specifications. The following document details the maintenance procedures and performance testing results, along with recommendations regarding future operation of the well.

### 1.1 PROJECT BACKGROUND

The City of Woodland currently utilizes a Ranney Collector Well as its sole source of raw water. The well is situated on the west bank of the Lewis River along Highway 503 (Lewis River Road) between Millard Avenue and North Goerig Street (Figure 1).

Initial hydrogeologic testing of the site was conducted in 1967. The aquifer at the well site reportedly has a transmissivity of 170,000 gallons per day per foot (gpd/ft) at a groundwater temperature 52° F. The aquifer is comprised of a 12.5-foot thick layer of sand and gravel between the elevations of approximately -2 feet and -14.5 feet (NAVD88), which is overlain and underlain by silty sand (Ranney Method Western Corp., 1967). Using these parameters, it was estimated that a collector well could yield up to 4.2 million gallons per day (MGD) with 10 feet of drawdown (Ranney Method Western Corp., 1967).

Construction of the Ranney Collector Well was completed in September 1968. A summary of the design details of the collector well is presented in Table 1. A plan view showing the orientation of the laterals is presented in Figure 2. Originally there were a total of eight 10¾-inch outside diameter (OD) horizontal laterals installed (see Figure 2, attached). Laterals 1, 2 and 3 were originally intended to be the potable water producing laterals, but they, and Lateral 2B deflected downward during installation and the resulting water quality (elevated iron concentrations) essentially required them to be blanked off and taken out of service. Laterals 4 and 5 were projected away from the river to serve as interceptor wells in an attempt to draw in groundwater with the elevated iron concentrations, to allow Laterals 3B and 4B (projected higher in the formation and toward the river) to be used to develop the drinking water supply (Ranney Method Western Corp., 1968). Performance testing results (utilizing Laterals 3B and 4B, and landward Laterals 4 and 5) indicated that with 10 feet of drawdown the well could yield up to 4 MGD (Ranney Method Western Corp., 1968).

Because of continuing problems with iron content in the water, an attempt was made to use Laterals 4 and 5, and later also Lateral 2, to recharge water to the aquifer in 1987. Unfortunately, recharging water into Laterals 4 and 5 created problems with surface subsidence, and the practice was discontinued (Ranney Method Western Corp., 1987). Plugging with precipitated iron has necessitated repeated redevelopment of the laterals.



A summary of the maintenance history of the Ranney Collector Well is as follows:

- 1969 – Well was placed in to operation
- 1973 – Laterals 4 and 5 were redeveloped
- 1984 – Laterals 4, 5, 3B and 4B were redeveloped
- 1987 – Laterals 4 and 5 were redeveloped
- 1987 – Recharge system was installed, initially utilizing Laterals 4 and 5, later Lateral 2 was added to the recharge system
- 1994 – Laterals 2, 4, 5, 3B and 4B were redeveloped
- 1997 – Laterals 2, 3B and 4B were redeveloped, and the recharge system was dismantled
- 2007 – Laterals 1, 2, 3, 3B and 4B were redeveloped, Lateral 1 was closed due to poor water quality and Lateral 3 was closed due to a break

During the redevelopment in 2007, Laterals 1, 2, 3, 3B and 4B were cleaned and evaluated in an attempt to optimize the number of laterals that could be used to develop the raw water. Lateral 1 was found to produce poor quality (black) water and was subsequently closed. Lateral 3 appeared to have a break at a distance from the well (about 95 feet out) and was producing sand. This lateral was also closed to prevent sand migration into the well and pumps.

Following the 2007 redevelopment, only Laterals 2, 3B and 4B were being used to produce water and they include only 143 lineal feet of screen (total) since the first 49-56 feet of each line is blank pipe. At design entrance velocities of 1-2 feet per minute, this means that the mechanical capacity of the well should be fall between 550 - 1100 gallons per minute (gpm). Testing following the maintenance work in 2007 indicated that yields up to 3.3 MGD or about 2300 gpm under average conditions, should be possible, indicating that additional well screen would be needed to match the mechanical capacity to the projected yields (Ranney, 2007).

Water level and pumping rate data collected by the City indicated that the specific capacity of the well had declined from 211 gallons per minute per foot of drawdown (gpm/ft) following the 2007 redevelopment to about 40 gpm/ft in 2013. Given the recent issues with the Ranney Well, the City elected to evaluate the feasibility of installing new laterals to increase the capacity of the well. The City desires that the Ranney Well to be capable of producing a raw water supply of at least 3 MGD, which is the maximum design rate of the water treatment plant.

Layne - Ranney Collector Wells was contracted by the City to assist with a test drilling program to determine the potential for installing new laterals in the Ranney Well. The drilling program was completed in December 2012, with the detailed findings being presented in the February 1, 2013 report. In summary, two (2) test borings were drilled (designated TB1-12 and TB2-12) at the site with hydraulic interval testing being completed on both borings. Following testing, TB2-12 was converted to a 2-inch PVC observation well. The logs for these borings along the existing 6-inch observation well (AAI-523) are included in Appendix A for reference. Based upon the drilling and testing results, it was recommended that three (3) new 12-inch diameter



150 feet laterals be installed at a centerline elevation of approximately -10 feet NAVD88 (Layne, 2013). The final locations of any new laterals would be determined once the caisson was dewatered and be dependent on the actual locations of the existing laterals.

## **1.2 REPORT ORGANIZATION**

The material in the report is presented in the following sections:

Section 1.0 – Introduction

Section 2.0 – Maintenance Procedures: presents procedures used to redevelop the existing laterals and during installation of the new laterals.

Section 3.0 – Testing Results: presents the performance testing results,

Section 4.0 – Estimated Yield: presents projected yields under varying conditions,

Section 5.0 – Summary and Recommendations: presents a summary report and recommendations,

Section 6.0 – References: presents a list of references cited in the report.

## **1.3 LIMITATIONS**

This report was prepared for the exclusive use of the City of Woodland for the specific application and purposes as specified in the report. Conclusions reached in this report are based upon the objective data available to us at the time of forming our opinions and the accuracy of the report depends upon the accuracy of these data. Every effort is made to evaluate the information by the methods generally recognized to constitute accepted standard practices for groundwater investigations at the time of rendering the report and the conclusions reached therein to represent our opinions. Ranney cannot be responsible for actual conditions proved to be materially at variance with the data collected or supplied to us, upon which our opinions are based.



## 2 MAINTENANCE PROCEDURES

The Ranney Well maintenance was conducted by Ranney from March 17<sup>th</sup> through early July 2014, with post-maintenance performance testing being completed in early August 2014.

Work accomplished included the following:

- Task 1: Mobilization and set up.
- Task 2: Redevelopment of existing laterals using a high pressure rotating water jet.
- Task 3: New lateral installation
- Task 4: Site clean-up and demobilization.
- Task 5: Conduct post-maintenance evaluation.
- Task 6: Document redevelopment procedure and results in a report.

### **TASK 1 – MOBILIZATION/SET-UP**

Prior to mobilization, one (1) of the turbine pump assemblies were removed by Triangle Pump and Equipment, Inc. of Ridgefield, Washington. Equipment and personnel were then mobilized to the site and the Site was secured for work on March 17<sup>th</sup>. Once onsite, Ranney assisted Triangle Pump and Equipment with the removal of the two (2) remaining turbine pump assemblies. A temporary construction pump was set in the well to dewater the well and remove materials during the redevelopment and lateral installation processes. The Ranney Well is the City's sole source of water and could not be taken out of service during the maintenance activities. In order to provide water the WTP during maintenance, two settling tanks were setup to remove solids before pumping the water to the WTP. The primary settling tank was about 30 cubic yards and provided most of the detention time for settling solids from the construction and development water. The second tank (clean water tank) was divided by a baffle wall. The first bay provided additional settling time from solids, while the second bay served as the suction reservoir for the high service pump (HSP).

### **TASK 2 – EXISTING LATERAL REDEVELOPMENT**

In order to avoid confusion, the existing lowest tier lateral (Lateral 2) has been re-designated as Lateral 2A. Following setup, existing Laterals 2A, 3B and 4B were mechanically redeveloped using a high pressure rotating water jet equipped with a flushing wye under the controlled conditions of a fully dewatered caisson. The high pressure jet system was projected the attainable length of each lateral. The jetting assembly was hydraulically projected at a controlled rate to insure thorough cleaning. Redevelopment was continued until sand production from each isolated section of screen had reached stability and could not be improved further. Following redevelopment, these laterals were manifolded together and connected to a 20 HP submersible clean water pump. This pump was piped directly into the high service pump (HSP) inlet to provide water to the WTP during non-maintenance hours. The valves on the existing unused laterals were removed and blind flanges were placed on the ports.



### **TASK 3 – NEW LATERAL INSTALLATION**

Ranney examined the caisson, existing lateral layout and adjacent boring logs to determine the locations for the new laterals. The centerline of the new laterals was selected to be at an elevation of -9.0 feet NAVD88.

Three (3) stainless steel port assemblies were installed for the projection of the new laterals. These assemblies installed in circular openings cut in the caisson wall at the selected locations and bonded to the caisson by grouting. During this process, projection equipment, pipe and tools were lowered into the well and set up.

The laterals were constructed by initially projecting 16-inch OD drive pipe to the desired length and sampling the aquifer materials as the pipe was projected. Next sieve analyses of the selected samples were performed and recommendations for screen slot size were made. The 12-inch ID stainless steel (type 304) wire-wrapped screen assemblage was installed within the projection pipe and the pipe was hydraulically extracted, exposing the screened lateral to the aquifer. The screen slot sizes varied depending on the coarseness of the material encountered. Sieve analyses of samples collected during the drive pipe projection are included in Appendix B. The screens were installed using 10-foot long sections, with each section having 9.5 feet of its length screened. In addition to the screen, each lateral was installed with a 10-foot long section of blank stainless steel pipe extending from the caisson wall. Following installation, each of the new laterals were thoroughly developed utilizing the BoreBlast II® system. The development equipment was systematically projected throughout the entire length of each lateral.

### **TASK 4 – SITE CLEAN UP AND DEMOBILIZATION**

Following installation and development of the new laterals, the interior of the caisson was power washed from the top slab to the caisson floor. Once completed, all sediment/debris was removed from the bottom of the well. Triangle Pump and Equipment, Inc. reinstalled Pump No. 3 on July 1<sup>st</sup> and the well was placed back into normal operation. Pump Nos. 1 and 2 were reinstalled in the following days. Photographs taken to illustrate the layout of the new and existing laterals in the bottom of the well are presented in Appendix C.

With the well in normal operation, a centrifugal sand-separating device manufactured by the Roscoe Moss Company of Los Angeles was installed on the discharge line to measure sand production per Section 15100 of the contract specifications. For development to be considered successful, the sand production from all screen lines combined was to be less than 2 parts per million (ppm). The sand tester was allowed to run for a period of about 2 days with just a trace amount of sand (few grains) being collected, confirming that sand production was well below the 2 ppm limit. All equipment was then removed from the well site and the site returned to original state.

### **TASK 5 – POST-MAINTENANCE EVALUATION**

On July 3, 2014, a diver entered the well to conduct lateral flow analysis while the well was in normal operation. Post-maintenance testing was conducted to evaluate the effectiveness of the work performed. A hydrogeologist experienced in testing horizontal collector wells



supervised the testing and collected water and pumping rate data. All measurements of water level and drawdown were made to within 0.01 foot.

**TASK 6 – DOCUMENTATION REPORT**

All data/information collected was evaluated, with the findings organized into this report. This report details the lateral installation and redevelopment procedures and results, with recommendations for the continued operation of the collector well.





## 3 RESULTS

### 3.1 NEW LATERAL INSTALLATION

The centerline of the new 12-inch laterals (designated Laterals 1, 2 and 3) in the caisson is at an elevation of -9.0 feet NAVD88. The new laterals are slightly lower than existing Lateral Nos. 3B (-7.8 feet) and 4B (-6.7 feet) and above existing Lateral 2A (-11.5 feet).

Initially, it was planned to install three (3) 150-foot laterals for a total lineal footage of 450 feet. However, fine materials encountered during the installation of Lateral 1 resulted in the lateral only being installed to a length of 120 feet. In order to achieve a total lineal footage of 450 feet, Lateral 2 and 3 were extended to 160 and 170 feet, respectively. Table 1 summarizes pertinent information on collector and screen design for each lateral, with plan and section views of the well depicted on Figure 2. A map of the site illustrating the lateral layout is presented in Figure 3.

Screen slot size openings were based upon samples collected during lateral projection, with the sieve analyses being included in Appendix B. The screen slot openings for the new laterals varied between 0.020 inches and 0.125 inches. The total screen open area of the new screen, adjusting for couplings and blank sections, is 424 square feet. At the target maximum yield of 3.0 MGD, this equates to an average entrance velocity of 1.3 feet per minute (ft/min) assuming 50% blockage of the screen slots. Adjusting the 420 feet of new lateral screen for couplings the average approach velocity at the outside of the natural pack would be approximately 0.20 ft/min at 3.0 MGD. Average in-line velocity with just the new laterals would be 2.0 feet per second (ft/sec) at the target yield.

Existing Laterals 2A, 3B and 4B include only 143 lineal feet of screen (total) since the first 49 to 56 feet of each lateral is blank pipe. The screen openings for these older laterals are  $\frac{3}{8}$ -inch by 2-inch long punched slots. The open area for the three (3) older laterals is estimated to be about 73 square feet, which brings the total open area for the well to 497 square feet.

### 3.2 LATERAL FLOW ANALYSES RESULTS

The results of the post-maintenance lateral flow analyses are included in Table 2. The lateral flow meter unit that is operated by the diver was damaged preventing a determination of the flow velocity from each lateral. The diver was able to determine the relative flow from each lateral through feel and visual observations. The diver ranked the flow velocity from each lateral on a 1 to 5 scale, with 1 being the weakest flow. Using these results, new Laterals 2 and 3 accounted for about 61% of the total flow. The three (3) older laterals (2A, 3B & 4B) accounted for about 32% of the total flow. New Lateral 1 was the weakest producer accounting for about 7% of the total flow. This is consistent with the finer deposits encountered in Lateral 1, which resulted in its reduced length.

### 3.3 PERFORMANCE TESTING RESULTS

To evaluate the effectiveness of the maintenance, water level recorders were installed in the Ranney Well and adjacent observation wells (TB2-12 and AAI-523) on August 4, 2014. The stage of the Lewis River was monitored by obtaining information from the National Weather Service gaging station located about 0.3 miles downstream at the CC Street bridge (NWS, 2014). The post-maintenance testing was conducted using the permanent installed pumping equipment. The discharge from the well was directed to the WTP through the permanent installed transmission main. The discharge rates were determined using the permanent meters installed on the three (3) filters at the WTP.

It is understood that the Ranney Well had generally been continuously operated following the completion of maintenance activities. Background monitoring of water levels under normal operation of the Ranney Well was begun on August 4<sup>th</sup>. During this period the well was operating at a rate of 1200 gpm. Figure 4 presents hydrographs at the collector well site during the background period and complete testing period.

Water levels for the Lewis River at the CC Street Bridge ranged from 7.45 to 9.69 feet, for an average of 8.1 feet during testing. Based upon data obtained for the period from January 2000 through August 2014, a water level of 8.1 feet is equaled or exceeded 87% of the time (USACE, 2014). As shown in Figure 4, the water levels in the wells rose and fell along with the stage of the Lewis River, which is influenced by tidal fluctuations and hydroelectric power plant discharges. This indicates that a good hydraulic connection exists between the river and underlying alluvial aquifer. A river efficiency of 59% was calculated, i.e. for every 1 foot of river level change the water level in the Ranney Well would change 0.59 feet. This river efficiency value was based on the comparison of the water level changes observed in the Ranney Well and river during the background monitoring under normal operation. A time lag of between 15 and 30 minutes was also noted.

The well was taken offline August 5<sup>th</sup> at 8:48 AM to allow water levels to recover prior to testing, which began at 11:00 AM. It was planned to conduct a modified step-drawdown test consisting of three (3) steps at rates and durations listed below:

<u>Step</u>	<u>Pumping Rate</u>	<u>Duration, hours</u>
1	700 gpm	1
2	1400 gpm	1
3	2100 gpm	10

During the last step, the turbidity and sediment content of the water being delivered to the WTP was too high preventing treatment of the water. The higher velocities at 2100 gpm were dislodging the buildup within the transmission pipeline to the WTP resulting in the highly turbid water. The last step was cut short after 2 hours of pumping to let things settle down at the WTP. After about 30 minutes the well was placed back into service at 1200 gpm and water levels were monitored until the morning of August 6<sup>th</sup>. Water level data collected throughout the testing period are included in Appendix D.



A summary of the step-drawdown test results is given in Table 3. Hydrographs of the observed water levels in the Ranney Well and observation wells during the step-drawdown testing period are shown on Figure 5. A semi-logarithmic plot showing the time-drawdown relationship in the collector well is presented in Figure 6.

With the pumping rates reportedly varying from 700 gpm to 2100 gpm, the observed specific capacity values at the end of each step ranged from 352 to 479 gpm/ft at 56° F. The lowest specific capacity value coincided with the lowest pumping rate bringing into question the accuracy of the flow meter at the lowest rate. The specific capacity values for the 2<sup>nd</sup> and 3<sup>rd</sup> steps were similar indicating that the pumping rates for these steps were more accurate. Additionally, the observation wells drawdown differential values determined at the end of the first step were considerably higher than those determined for the later steps. The drawdown differential values at the end of the 3<sup>rd</sup> step at AAI-523 and TB2-12 were 1.2 and 1.7 feet of drawdown per 1000 gpm (feet/1000 gpm), respectively. These drawdown differential values indicate that the Ranney Well is operating efficiently and is delivering most of the water available in the aquifer.

Water levels were monitored for an additional 17 hours once the well was back in normal operation at a rate of 1200 gpm (Figure 4). Figure 7 presents a semi-logarithmic plot of the drawdown values adjusted for river level changes. To make the adjustments, the river efficiency value of 59% and a time lag of 30 minutes were used. As shown, the adjusted drawdown values exhibited very little change over the last 12 hours of pumping. This indicates that water levels had reached or nearly reached stability. The adjusted drawdown value at the end the monitoring period was 2.9 feet, equating to a specific capacity of 413 gpm/ft at 56° F.



#### 4 ESTIMATED COLLECTOR WELL YIELDS

The results from the performance test were analyzed to determine the potential yield of the collector well under test conditions and assumed conditions. The yield from the collector well is dependent upon its efficiency, available drawdown and aquifer hydraulics. Available drawdown is directly related to the static groundwater level, which is affected by the stage of the Lewis River. Aquifer hydraulics are related to saturated thickness, hydraulic conductivity, boundary conditions and recharge (including temperature of the recharging water). Taking these variables into consideration, it is possible to project the yield of the collector for varying conditions using the following equation:

$$Q_2 = \frac{Q_1 \times m_2 \times s_2 \times v_1}{m_1 \times s_1 \times v_2}$$

Where:

- Q = yield (gpm) of collector well under test (Q<sub>1</sub>) and design (Q<sub>2</sub>) conditions;
- s = drawdown (ft) in collector well under test (s<sub>1</sub>) and design (s<sub>2</sub>) conditions;
- m = aquifer thickness (ft) corrected for dewatering under test (m<sub>1</sub>) and design (m<sub>2</sub>) conditions; and
- v = viscosity coefficient under test (v<sub>1</sub>) and design (v<sub>2</sub>) temperature conditions.

Substituting the observed data from the post-maintenance evaluation (test conditions) into the above equation and using the information presented below, it is possible to estimate the maximum yield of the collector well under varying conditions.

#### Yield Conditions

Top of Aquifer	Assumed to be at River Elevation	
Base of Aquifer	-15	Feet
Static Groundwater Level (assumed to be river level)		
Test conditions (average during test)	8.1	Feet
Average Conditions	9.5	Feet
Low Condition	7.7	Feet
Pumping Level		
Test Conditions (1200 gpm)	5.2	Feet
Design Minimum Pumping Level	-1.7	Feet
	(5 feet above Center Line of uppermost Lateral 4B)	
Water Temperature / Viscosity Coefficient		
Test Conditions	56 ° F / 1.00	
Average Conditions	55 ° F / 1.08	
Winter Conditions	45 ° F / 1.26	



The average and low river level values were based on data obtained for Lewis River Gage at the CC Street bridge for the period of record from January 2000 through August 2014 (USACE, 2014). The average river level was based on a river stage at the gage that was equaled or exceeded 50% of the time. The low river value was based on a stage that was equaled or exceeded 95% of the time. The minimum recommended pumping level was selected to keep the water level in the well at least 5 feet above the centerline elevation of Lateral 4B, the uppermost lateral in the well.

Figure 8 presents the projected yields and estimated drawdown values for the various conditions and are based upon calculations using the above equation. As shown, the well in its current condition is more than capable of yielding in excess of the target yield of 2100 gpm (3 MGD), even under low winter conditions. The accuracy of the yield predictions will depend on how well the assumed conditions match the actual conditions. The long-term yield of the collector well will ultimately be dependent on the recharge available to the aquifer and aquifer boundary conditions. Yields will also tend to decrease with time due to mineral/bacterial plugging of the well screen slots and formation materials adjacent to the well screens.

## 5 SUMMARY AND RECOMMENDATIONS

Ranney has completed maintenance on the City of Woodland's horizontal collector well as part of the Ranney Well Improvement Project. The maintenance activities completed included the redevelopment of three (3) existing 10¾-inch laterals and the installation of three (3) new 12-inch diameter laterals. The centerline of the laterals in the caisson is at an elevation of -9.0 feet. The installed laterals have lengths that vary from 120 feet to 170 feet long, for a total lineal footage of 450 feet. The total screen open area for the new 12-inch laterals is 424 square feet, with the existing 10¾-inch laterals adding another 73 square feet.

Ranney conducted performance testing of the well following the installation of the new laterals and redevelopment of the older existing laterals. Results of the testing were very favorable, increasing the specific capacity of the well from about 40 gpm/ft to over 400 gpm/ft. Additionally, the drawdown differential data showed the Ranney Well to be very efficient in delivering the available water.

Analyses of the testing results were very favorable, indicating that the collector well is capable of yielding in excess of the target yield of 3 MGD, even under the assumed winter low river flow conditions. The refurbished Ranney Well should provide the City with an efficient, dependable source of water.

It is recommended that a well monitoring program should be initiated that includes collection of such essential data as: 1) Pumping Rates, 2) Pumping levels in the Ranney Well and the adjacent observation wells, 3) Static water levels in the collector and adjacent observation wells, and 4) Water temperature of the pumped water. Initially these data should be collected on at least a monthly basis. This program will provide a current and accurate determination of the operating trend of the collector well enabling the tracking of the efficiency and yield potential of the well and impact upon surrounding wells under varying recharge conditions. This will allow future maintenance requirements to be easily assessed and scheduled at opportune times.



## 6 REFERENCES

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<http://www.nwd-wc.usace.army.mil/cgi-bin/dataquery.pl?k=lewis+river+at+woodland>



## **FIGURES**





BASE SOURCE: USGS DIGITAL ORTHOPHOTO  
 DOQQ FILENAME: 04512203.SWS  
 FLIGHT DATE: JULY 15, 1990



6360 HUNTLEY RD  
 COLUMBUS, OHIO 43229  
 (614) 888-6263 / FAX (614) 888-9208

**GENERAL LOCATION MAP**  
**RANNEY COLLECTOR WELL HYDROELOGICAL INVESTIGATION**  
 CITY OF WOODLAND, WASHINGTON

FIGURE

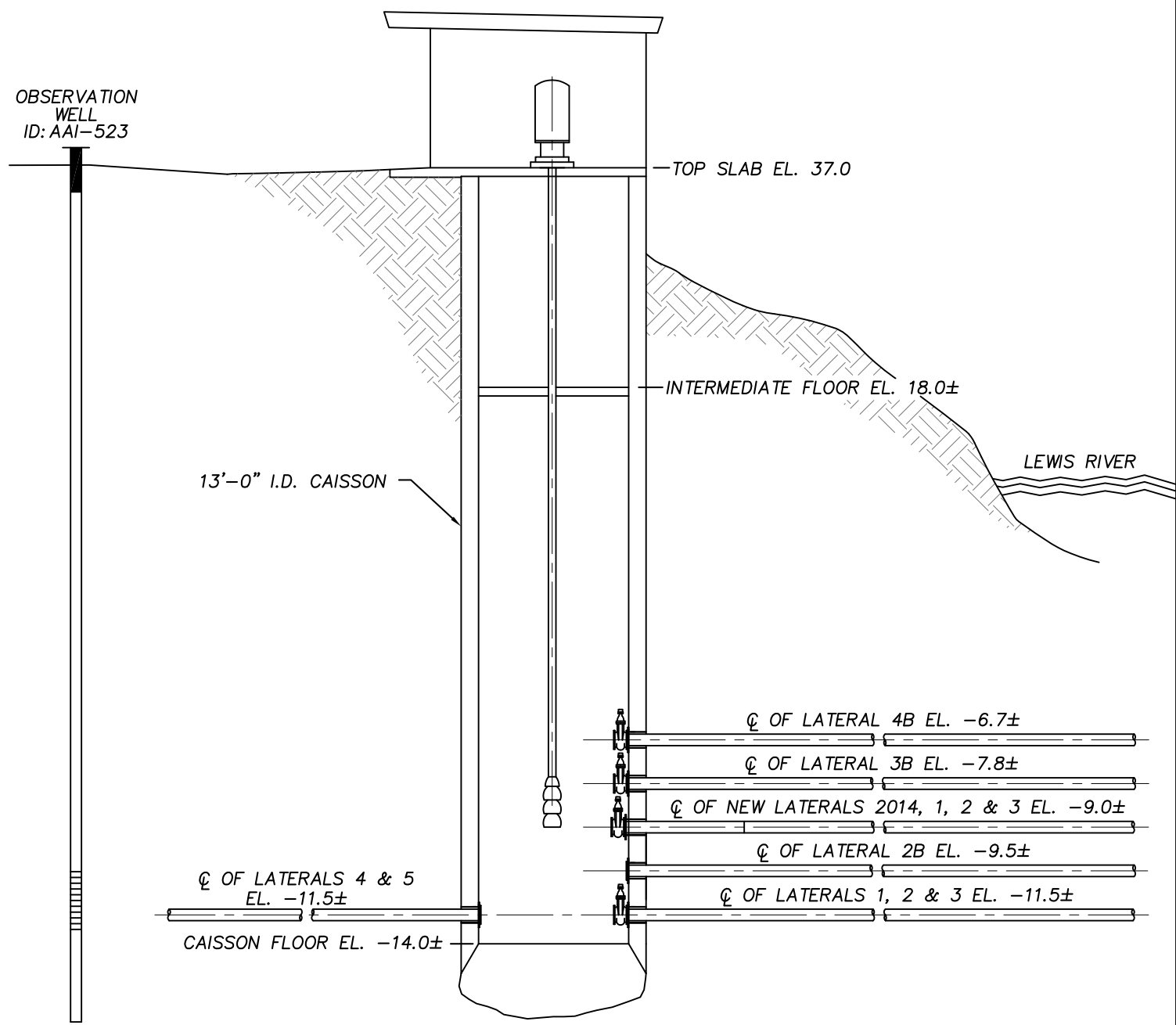
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PROJECT NUMBER  
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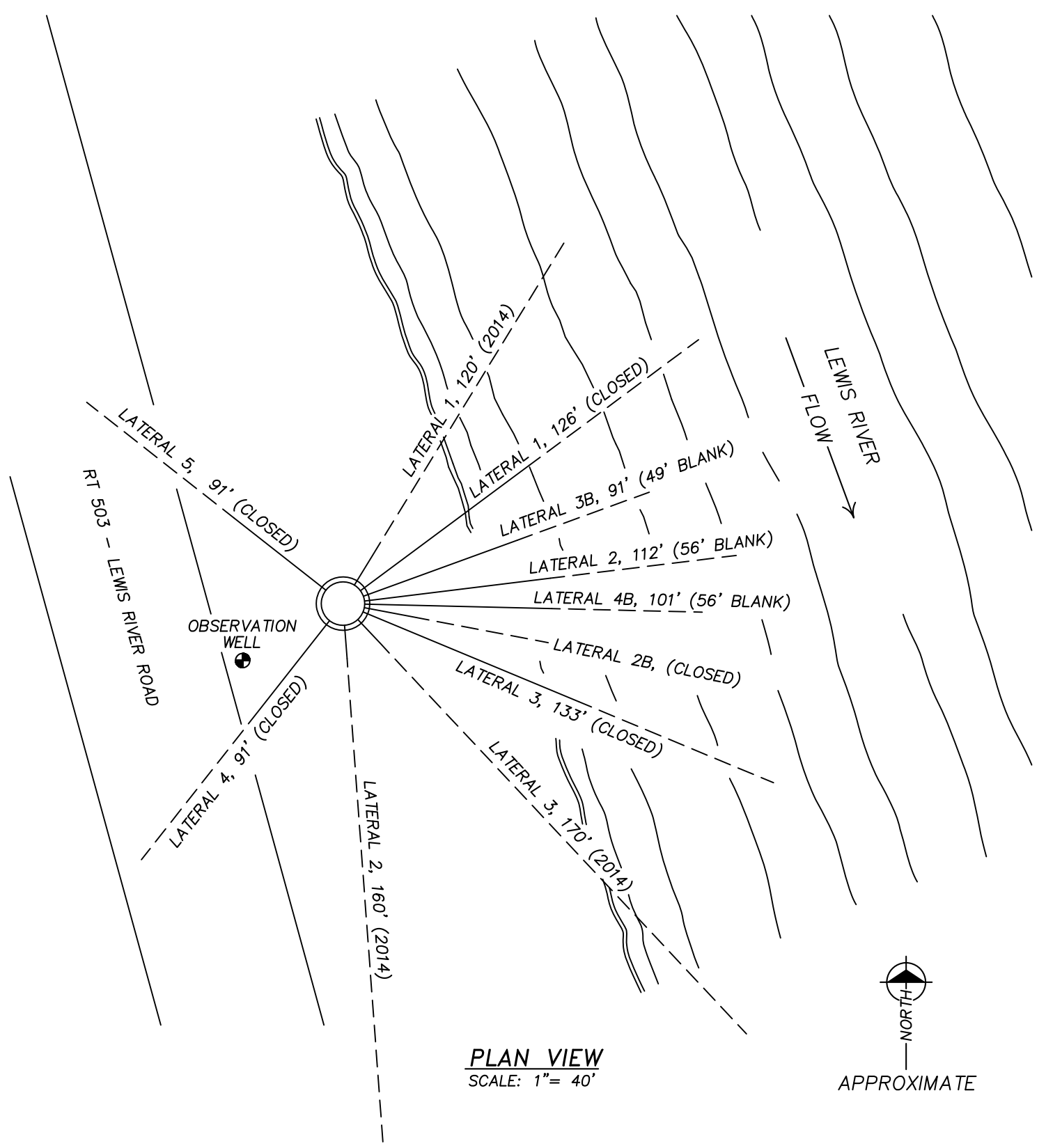
DATE  
1/18/13

FILE NAME  
20234-04

SCALE  
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**VERTICAL SECTION THRU CAISSON**  
SCALE: N.T.S.



**PLAN VIEW**  
SCALE: 1" = 40'

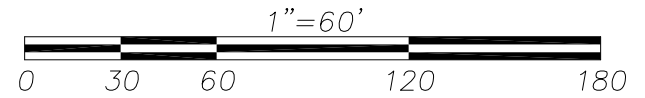
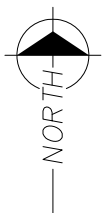
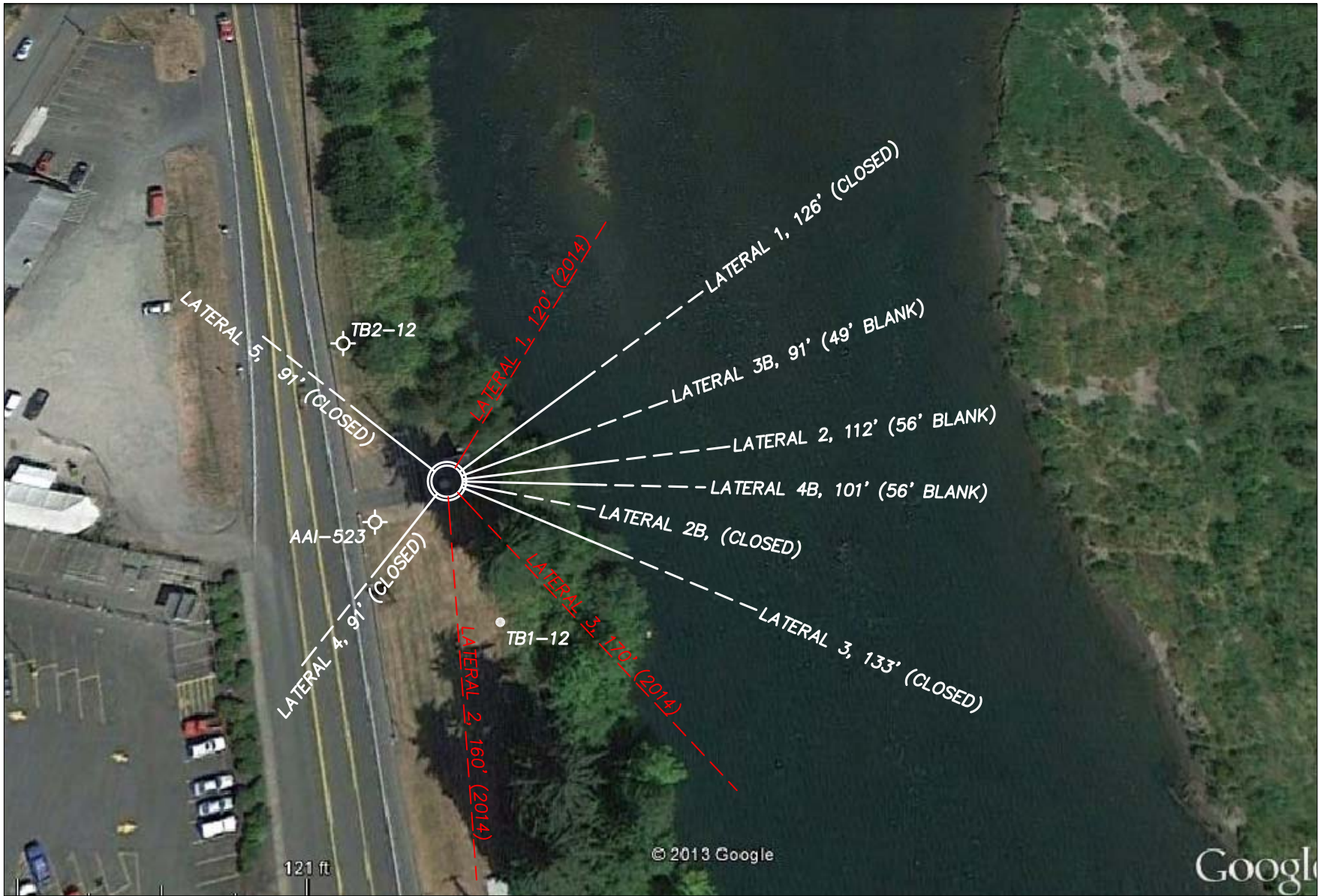


PLAN VIEW BASED ON FIGURE SW-111-01,  
DATED OCT. 1987  
FROM REPORT ON RANNEY COLLECTOR  
PUMPING TESTS  
FOR CITY OF WOODLAND, WASHINGTON  
PREPARED BY RANNEY METHOD WESTERN  
CORPORATION

**Layne**  
Ranney Collector Wells

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PLAN AND SECTION RANNEY COLLECTOR WELL CITY OF WOODLAND, WASHINGTON		
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PROJECT #: 29174	SCALE: AS NOTED	



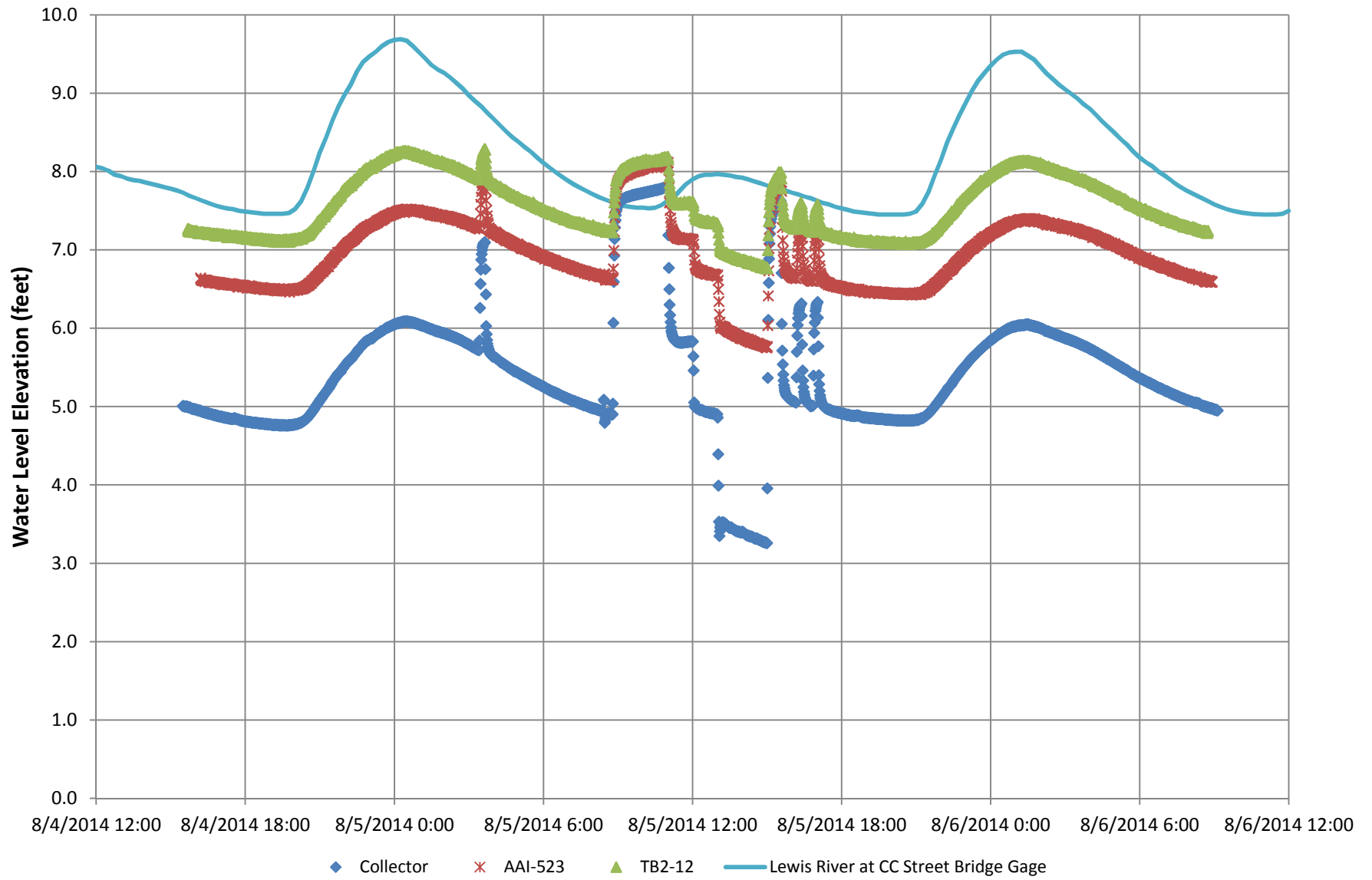
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 COLUMBUS, OHIO 43229  
 (614) 888-6263 / FAX (614) 888-9208

**SITE MAP**  
 CITY OF WOODLAND, WASHINGTON

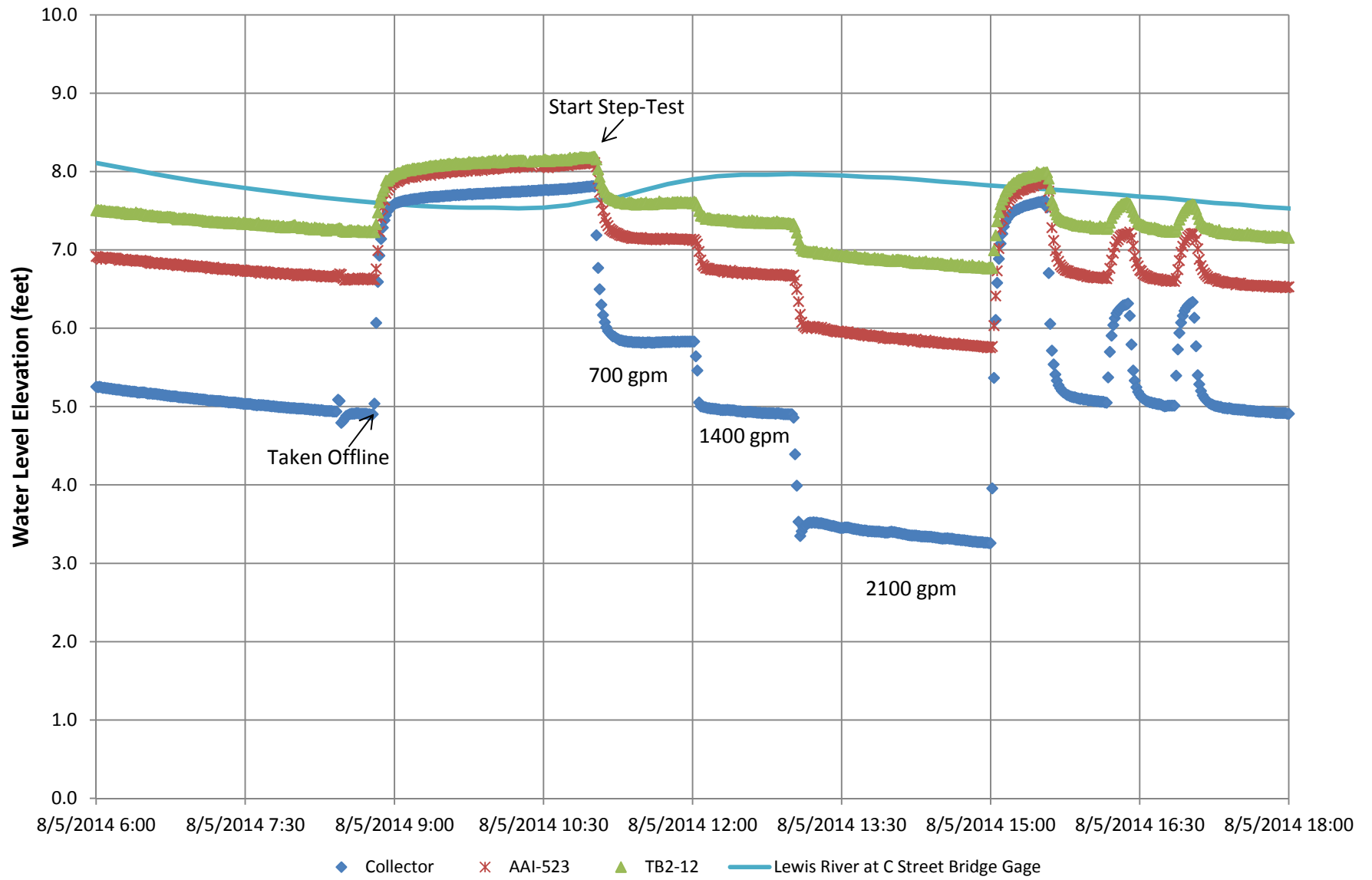
PROJECT NUMBER 29174	DATE 9/29/14	FILE NAME 29174-03	SCALE 1"=60'
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FIGURE  
 3

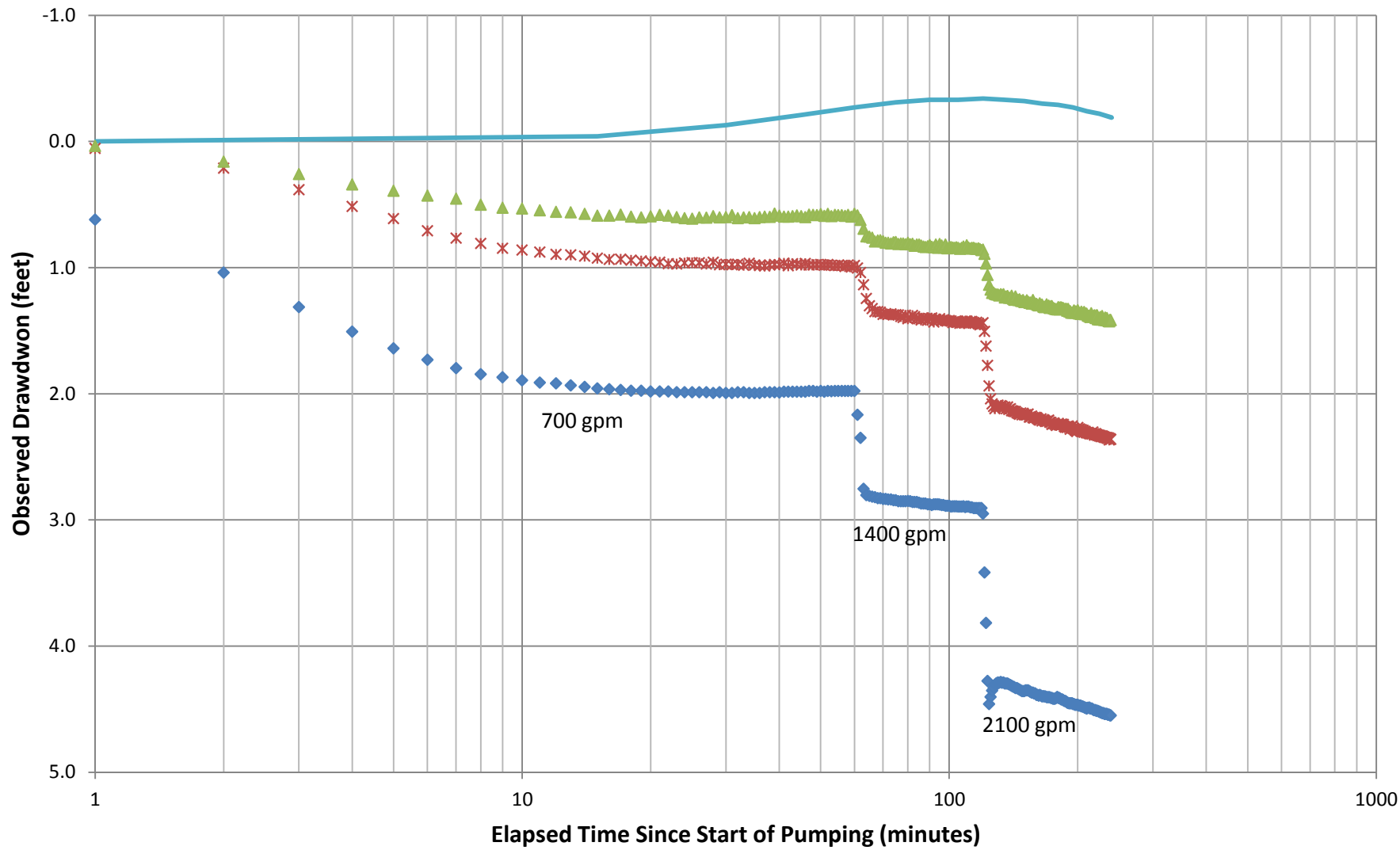
**Figure 4**  
**Complete Testing Period Hydrographs**  
City of Woodland, WA



**Figure 5**  
**Step-Drawdown Test Hydrographs**  
City of Woodland, WA

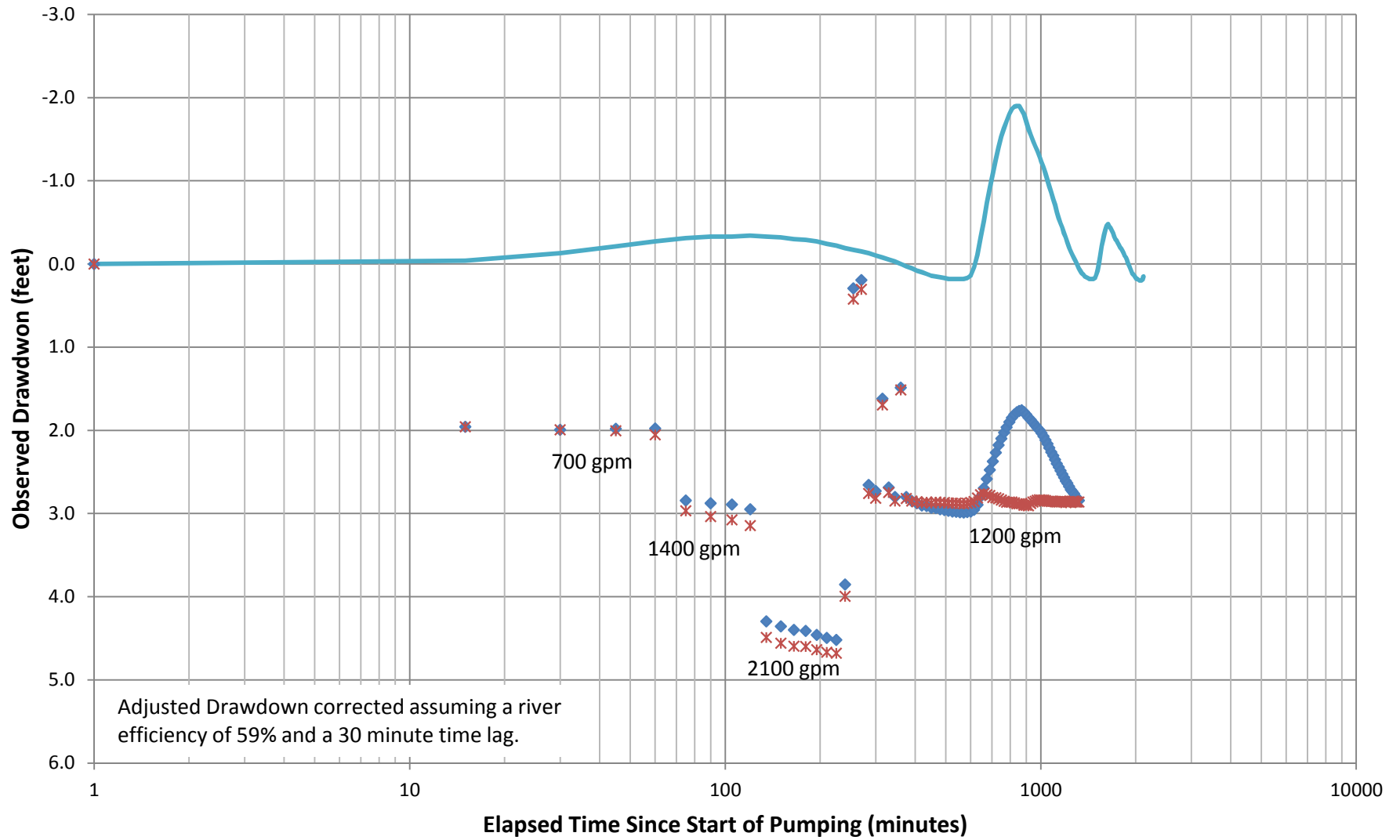


**FIGURE 6**  
**Step-Drawdown Semi-Log Plot**  
City of Woodland, WA



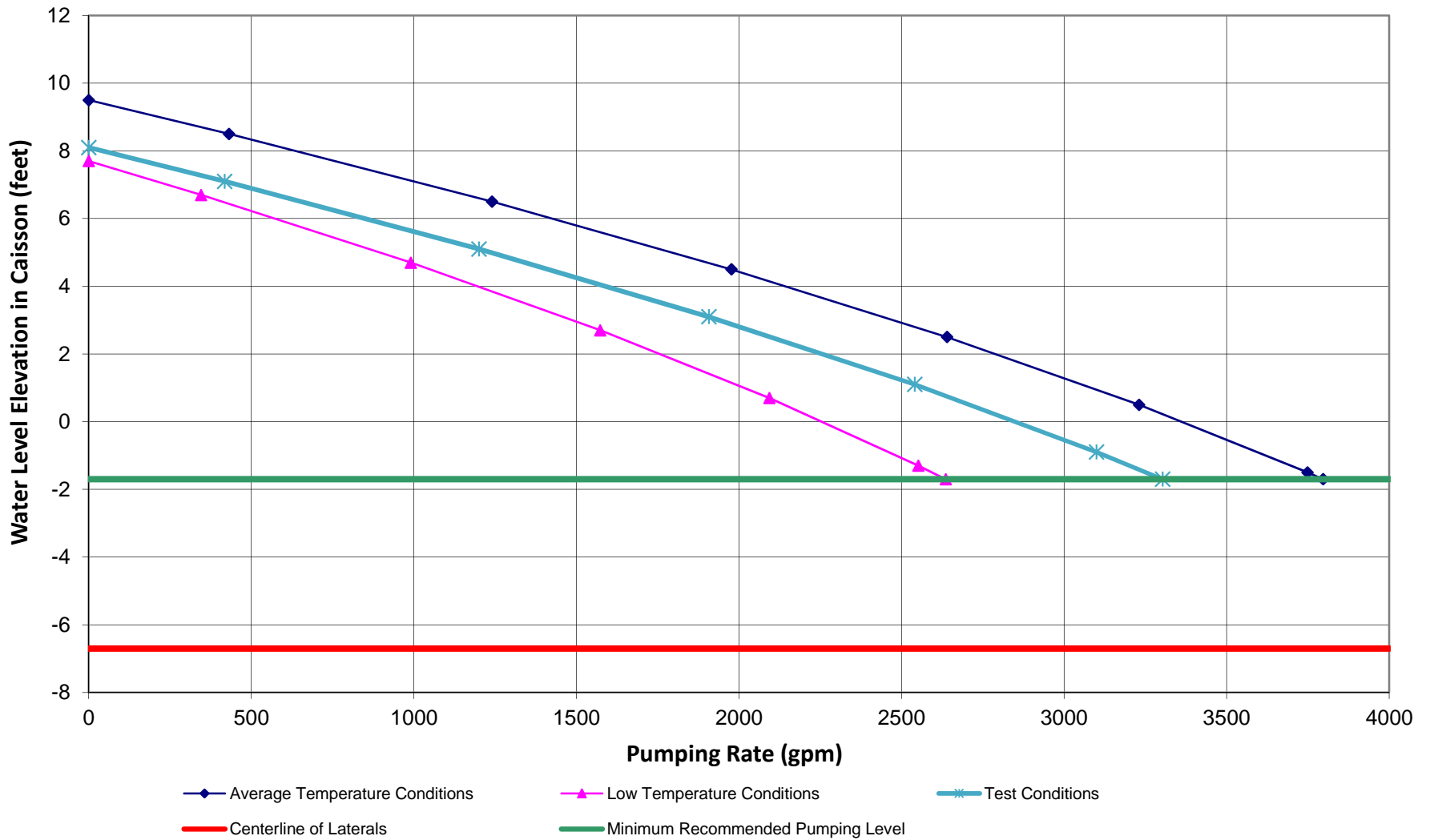
◆ Collector    × AAI-523    ▲ TB2-12    — Lewis River Change

**FIGURE 7**  
**Adjusted Drawdown Semi-Log Plot**  
 City of Woodland, WA



◆ Collector    — Lewis River Change    × Collector Well River Adjusted

**FIGURE 8**  
**Collector Well Yield Projections**  
**City of Woodland, WA**





## **TABLES**

**TABLE 1**  
**Ranney Well Design**  
**City of Woodland, Washington**

**AQUIFER**

Top of Aquifer .....	River Level
Base of Aquifer.....	-15 feet

**CAISSON DESIGN**

Grade Elevation.....	36.5 feet
Inside Diameter Caisson.....	13 feet
Outside Diameter Caisson.....	16 feet
Elevation Pump Floor .....	37 feet
Caisson Floor .....	-14 feet
Caisson Depth (from top of slab to top of plug) .....	51 feet
Elevation Centerline of Lateral 2A (lowest) .....	-11.5 feet
Elevation Centerline of Lateral 3B .....	-7.8 feet
Elevation Centerline of Lateral 4B (upper) .....	-6.7 feet
Elevation Centerline of New 12" Laterals (2014) .....	-9 feet
Minimum Recommended Pumping Level.....	-1.7 feet

**LATERAL SCREEN DESIGN**

**EXISTING LATERALS** – 10¾-inch OD, 10-inch ID, Punched Slot Pipe Screen

LATERAL NUMBER	LATERAL LENGTH (FEET)	SCREEN LENGTH (FEET)	BLANK LENGTH (FEET)	SLOT OPENINGS	OPEN AREA (FT <sup>2</sup> )
2A	112	56	56	⅜" by 2"	29
2B	91	42	49	⅜" by 2"	21
3B	101	45	56	⅜" by 2"	23
<b>TOTAL</b>	1304	143	161		73

**NEW 12-INCH LATERALS (Lower Tier)** – 12¾-inch OD, 12-inch ID, Type 304 Wire-Wound Stainless Steel (wire width 0.13-inch)

LATERAL NUMBER	LATERAL LENGTH (FEET)	SCREEN LENGTH (FEET)	BLANK LENGTH (FEET)	OPEN AREA (FT <sup>2</sup> )
1	120	110	10	81
2	160	150	10	169
3	170	160	10	174
<b>TOTAL</b>	450	430	30	424

**TABLE 1 (continued)**  
**Ranney Well Design**  
**City of Woodland, Washington**

**NEW 12-INCH SCREEN SLOT SIZE PLACEMENT (feet from inside caisson wall)**

LATERAL NUMBER	SCREEN SLOT SIZE (INCHES)						
	0.020	0.030	0.040	0.060	0.080	0.100	0.125
1	100-120	60-70, 90-100	20-30, 50-60, 70-90	10-20, 30-50			
2		10-20	20-30, 40-60	30-40, 60-70	70-80 110-120 150-160	80-110, 120-130, 140-150	130-140
3			10-30, 160-170	30-50, 100-120, 150-160	50-60, 80-100, 120-130, 140-150	60-80, 130-140	
<b>TOTAL LENGTH</b>	20 FEET	30 FEET	100 FEET	100 FEET	80 FEET	80 FEET	10 FEET

**Table 2**  
**Lateral Flow Summary**  
 City of Woodland, Washington

**Pumping Rate: 1200 gpm**

Lateral No.	Tier	Total As-Built Lateral Length, feet from inside wall	Lateral Screen Length (feet)	Lateral Blank Length (feet)	Lateral Diameter (inches)	Flow Velocity Ranking <sup>1</sup>	Estimated Percent of Total Flow <sup>2</sup>	Average Flow, per length of screen (gpm per foot)
2A	Lower	112	56	56	10	2	9.9%	2.1
3B	Upper	91	42	49	10	2	9.9%	2.8
4B	Upper	101	45	56	10	2.5	12.4%	3.3
1	Middle (new)	120	110	10	12	1	7.1%	0.8
2	Middle (new)	160	150	10	12	3.5	25.0%	2.0
3	Middle (new)	170	160	10	12	5	35.7%	2.7

(1) The diver ranked flow velocity from each lateral on a scale from 1 to 5, with 1 being the weakest flow.

(2) Percent of total flow adjusted for varying lateral diameters.

**Table 3**  
**Collector Well Step-Drawdown Test Summary**  
 City of Woodland, Washington

Step-Drawdown Test - 8/5/2014

Step	Step Duration (minutes)	Pumping Rate (gpm)	Ranney Water Elevation (feet)	AAI-523 Water Elevation (feet)	TB2-12 Water Elevation (feet)	NWS Lewis River Elevation (feet)	Ranney Observed Drawdown (feet)	AAI-523 Observed Drawdown (feet)	TB2-12 Observed Drawdown (feet)	Specific Capacity at 56°F (gpm/ft)	AAI-523 Drawdown Differential (ft/1000 gpm)	TB2-12 Drawdown Differential (ft/1000 gpm)
	Static	0	7.82	8.11	8.19	7.63	---	---	---	---	---	---
1	60	700	5.83	7.12	7.59	7.90	1.99	0.99	0.52	352	1.84	2.51
2	60	1400	4.90	6.67	7.33	7.97	2.92	1.44	0.78	479	1.26	1.74
3	120	2100	3.26	5.75	6.77	7.82	4.56	2.36	1.34	461	1.19	1.67

Notes: Pumping period started on 8/5/14 at 11:00 AM.

Lewis River elevation obtained from National Weather Service gage station located 0.3 miles downstream at the CC Street bridge.

## **APPENDIX A**

### **Test Borings and Observation Well Logs**

**CLIENT:** City of Woodland, WA  
**SITE LOCATION:** About 75 feet SE of the existing collector well building SW corner. Boring along top of riverbank.  
**COORDINATES:** N 5.084,073 m E 520,163 m UTM NAD 83  
**TOP OF CASING ELEVATION:**  
**GRADE ELEVATION:** 35.2 Feet NAVD88

**JOB NO.:** 20234  
**DATE DRILLED:** 12/10/2012  
**GEOLOGIST:** Jay Bell, Layne  
**DRILLER:** Josh P., Boartlongyear  
**BORING DIAMETER:** 6 inches  
**DRILLING METHOD:** Rotasonic - spider

**NOTES:** Coordinates Not Surveyed, approximately determined with Google earth.  
 Grade Elevation referenced from collector well top slab just outside door.  
 Water level 21.2 feet below ground surface at 08:27 on 12/11/12.

DEPTH (feet)	ELEVATION (feet)	LITHOLOGY	RECOVERY	WELL CONSTRUCTION	WELL DESCRIPTION
0	35	Brown, Topsoil.	0 to 5 feet, 5 feet recovery		Boring abandoned with bentonite.
		Brown, SAND, fine to medium sand, mostly fine, loose, uniform, clean.			
		Light Brown, SILTY SAND, fine sand.			
5	30	Gray, SAND, fine to medium sand, thin layers of coarse material (medium/coarse sand) with pumice material.	5 to 10 feet, 5 feet recovery		
10	25	As Above, larger pieces of pumice at 14 feet, medium gravel size, rounded pumice.	10 to 15 feet, 5 feet recovery		
15	20	Gray/Brown, SAND, fine to medium sand, 50/50 mix, thin coarser layers approx. 1-inch thick with pumice pieces, loose. At 19 feet, 2-inch thick brown silty sand lens, very fine to fine sand in lens, dense.	15 to 20 feet, 5 feet recovery		
20	15	Gray (darker), SAND, fine to medium sand, uniform, loose, less coarser layers with pumice than above material, damp to wet.	20 to 25 feet, 5 feet recovery	∇	
25	10	Gray/Brown, As Above, wet.	25 to 30 feet, 5 feet recovery		
30	5		30 to 35 feet, 5 feet recovery		



**RANNEY COLLECTOR WELLS**  
 6360 HUNTLEY ROAD  
 COLUMBUS, OHIO 43229  
 614-888-6263

**FIELD BOREHOLE LOG**

BOREHOLE NO.: TB1-12

TOTAL DEPTH: **55 feet**

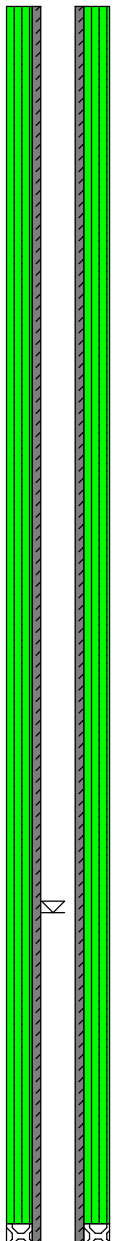
DEPTH (feet)	ELEVATION (feet)	LITHOLOGY	RECOVERY	WELL CONSTRUCTION	WELL DESCRIPTION
35	0	As Above, slightly finer, mostly fine sand in upper portion.	35 to 40 feet, 5 feet recovery		
40	-5	Brown, SILTY SAND and GRAVEL, 50/50 mix of sand and gravel, sand medium to coarse, mostly medium, gravel fine to coarse, subangular to subrounded.	40 to 45 feet, 5 feet recovery		
45	-10	As Above, cleaner (less silt) with depth. Brown, SAND and GRAVEL, 50-70% medium to coarse sand, mostly medium, 30-50% fine to coarse gravel, mostly fine, subangular to subrounded, loose, clean.	45 to 50 feet, 5 feet recovery		
50	-15	Gray (abrupt color change), SAND, fine to medium sand, mostly medium, < 10% coarse sand/fine gravel, uniform.	50 to 55 feet, 5 feet recovery		
55		Gray, SAND, fine sand, trace silt, dense.			

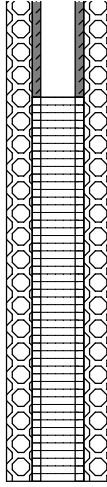


**CLIENT:** City of Woodland, WA  
**SITE LOCATION:** About 82 feet NW of the existing collector well building corner. Boring along concrete barrier near 35 mph sign.  
**COORDINATES:** N 5,084,119 m E 520,134 m UTM NAD 83  
**TOP OF CASING ELEVATION:** 36.7 Feet NAVD88  
**GRADE ELEVATION:** 37.0 Feet

**JOB NO.:** 20234  
**DATE DRILLED:** 12/11/2012  
**GEOLOGIST:** Jay Bell, Layne  
**DRILLER:** Josh P., Boartlongyear  
**BORING DIAMETER:** 6 inches  
**DRILLING METHOD:** Rotasonic - spider

**NOTES:** Coordinates Not Surveyed, approximately determined with Google earth.  
 Grade Elevation referenced from collector well top slab just outside door.  
 Water level 23.9 feet below ground surface at 10:12 on 12/12/12. Well Tag # BHN-885

DEPTH (feet)	ELEVATION (feet)	LITHOLOGY	RECOVERY	WELL CONSTRUCTION	WELL DESCRIPTION
0		Brown, Topsoil, overbank deposits.	0 to 5 feet, 5 feet recovery		8" flush mount manhole cover
5	35	Brown, SILT with Sand (fine) layers, possible fill material, dense.	5 to 10 feet, 5 feet recovery		6" borehole
10	30	Brown, SILTY SAND, with thin lenses of clean fine sand.	10 to 15 feet, 5 feet recovery		2" PVC Casing, threaded joints
15	25	Brown, SILTY SAND to SANDY SILT, sand fine to medium grained, orange mottling present.	15 to 20 feet, 5 feet recovery		
20	20	As Above, less silt.	20 to 25 feet, 5 feet recovery		
25	15	Gray to Gray/Brown, SAND, sand fine to medium, with thin < 1-inch thick silt lens.	25 to 30 feet, 5 feet recovery		
30	10	Gray/Brown, SILTY SAND to SAND, mostly fine sand, dense, holds shape.	30 to 35 feet, 5 feet recovery		Bentonite seal placed in annulus
35	5	Gray (Darker), SILTY SAND, sand fine to medium grained, mostly fine, uniform, trace scattered pumice pieces (rounded).			
5	0	As Above, less silt, uniform. Small black wood fragments.			

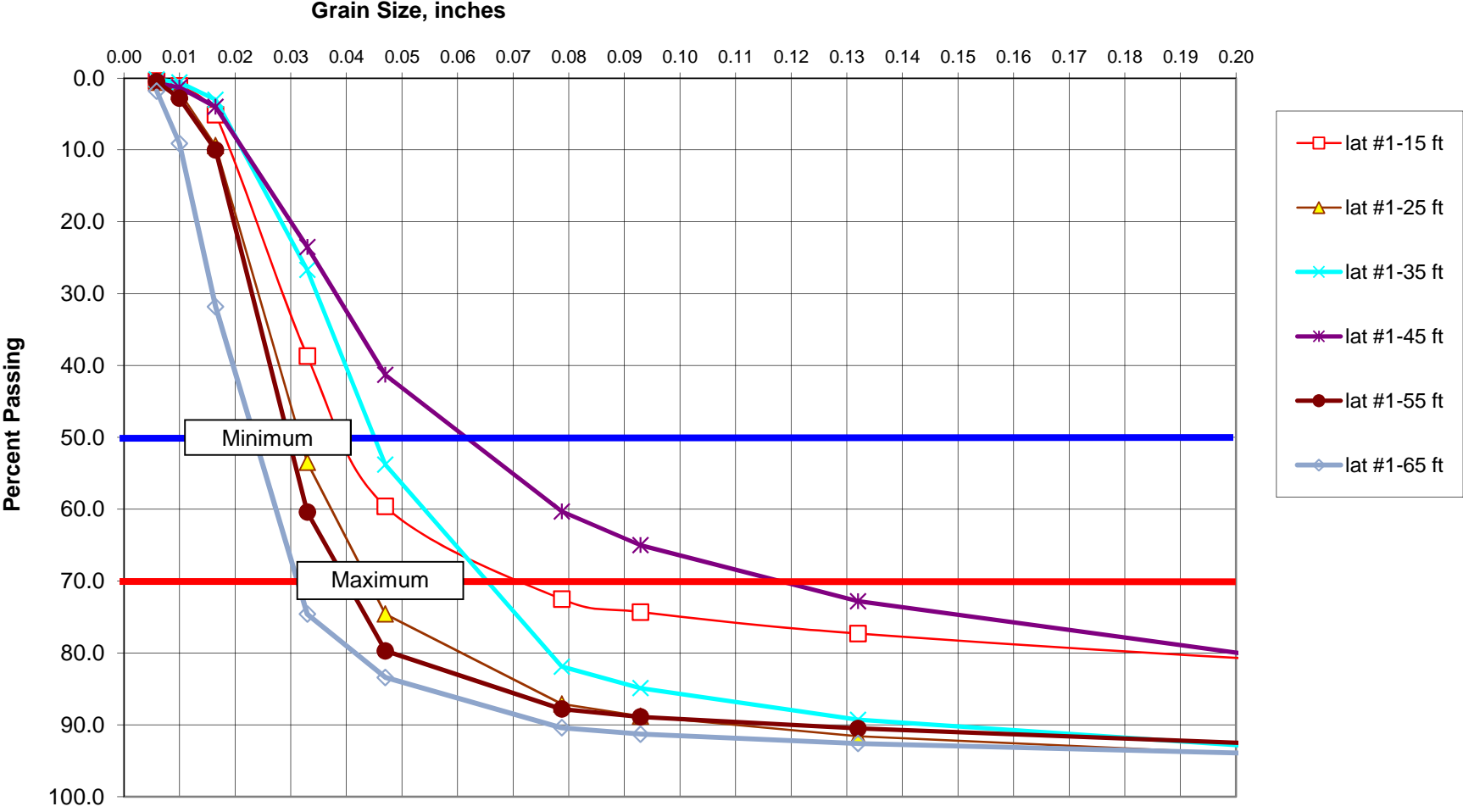
DEPTH (feet)	ELEVATION (feet)	LITHOLOGY	RECOVERY	WELL CONSTRUCTION	WELL DESCRIPTION
35	0	Gray/Brown, SILTY SAND and GRAVEL, only 1-foot recovery, cobble stuck in core bit, material drilled like gravel. Material above cobble silty sand with little gravel.	35 to 40 feet, 1 foot recovery		Filter pack 8 x 12 sand set from 32 to 45 feet
40	-5	Brown, SAND and GRAVEL, 50 to 70% fine to medium sand, mostly medium, little coarse sand, 30-50% fine to medium gravel, mostly fine, cobbles.	40 to 45 feet, 4 feet recovery		2" PVC, 0.020-inch slot set at 35-45 feet
45	-10	Gray, SAND, fine to medium, mostly medium, uniform, loose, clean.	45 to 50 feet, 5 feet recovery		
50	-15	Gray (olive gray), CLAYEY, SILTY SAND, easily molded, holds shape, some clean thin < 1-inch thick sand lenses.	50 to 55 feet, 5 feet recovery		
55	-15	Gray (dark), SAND, fine to medium, mostly medium, trace silt.			



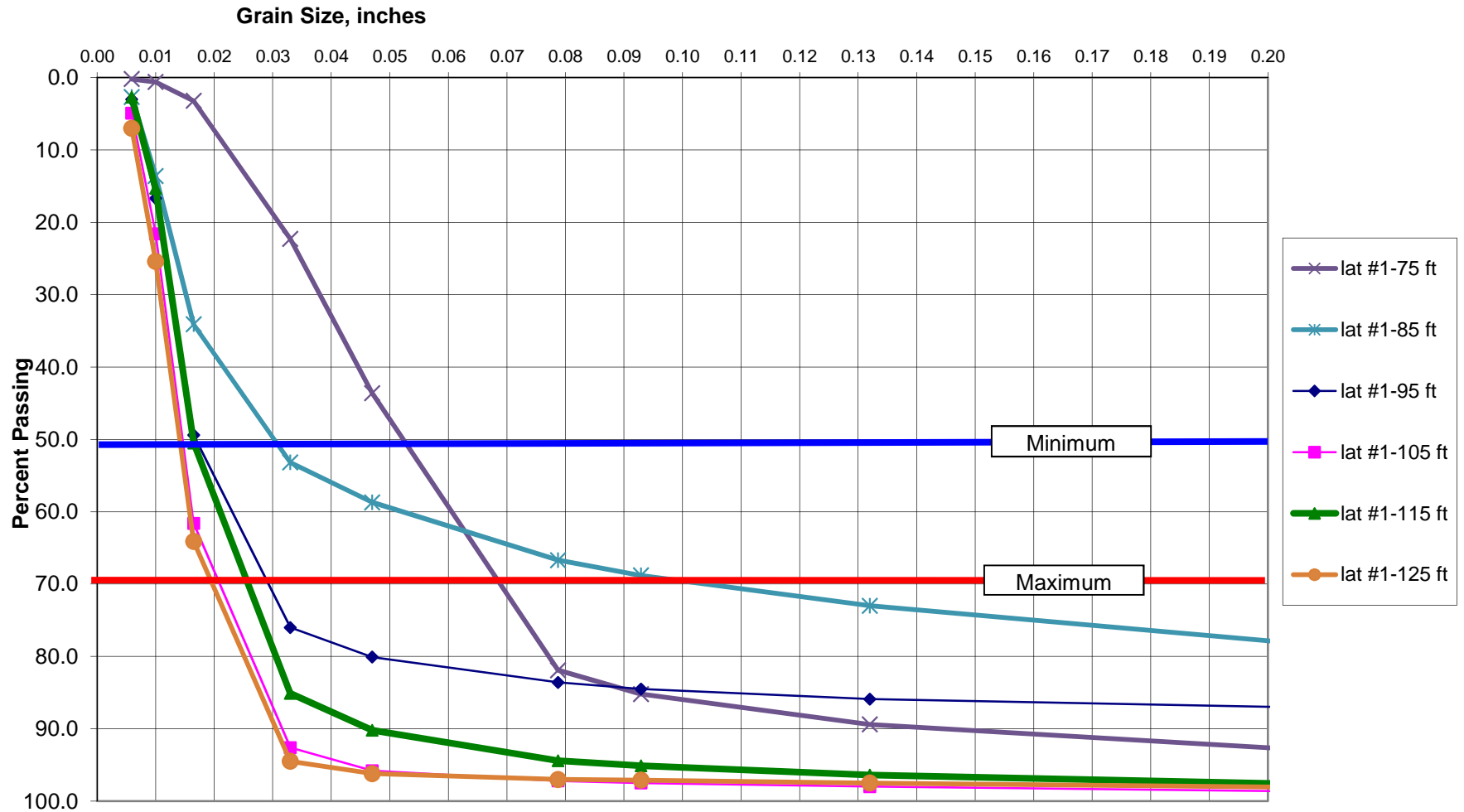
## **APPENDIX B**

### **Lateral Projection Sieve Analyses**

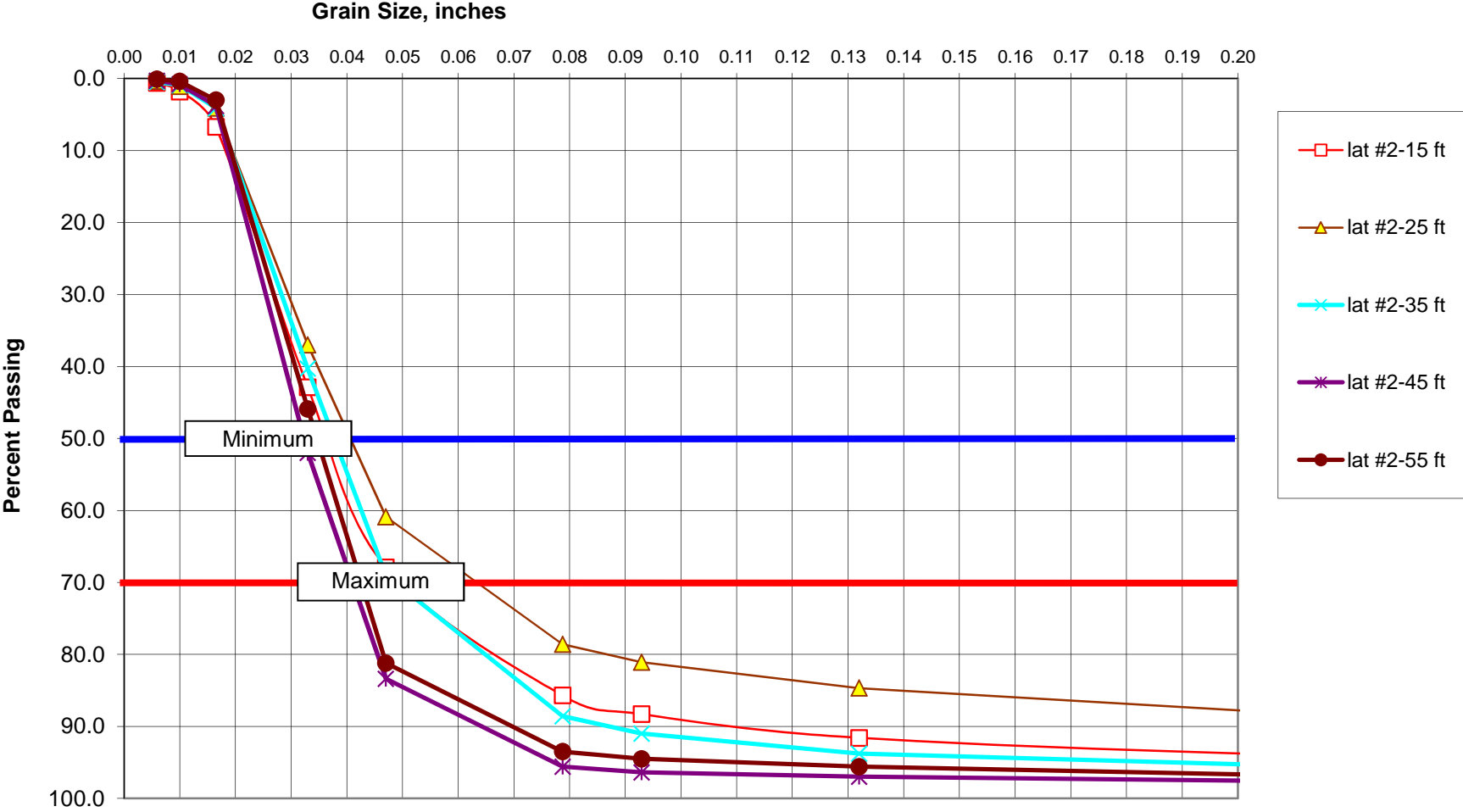
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City of Woodland, Washington  
Raney Well Improvement Project  
Lateral #1**



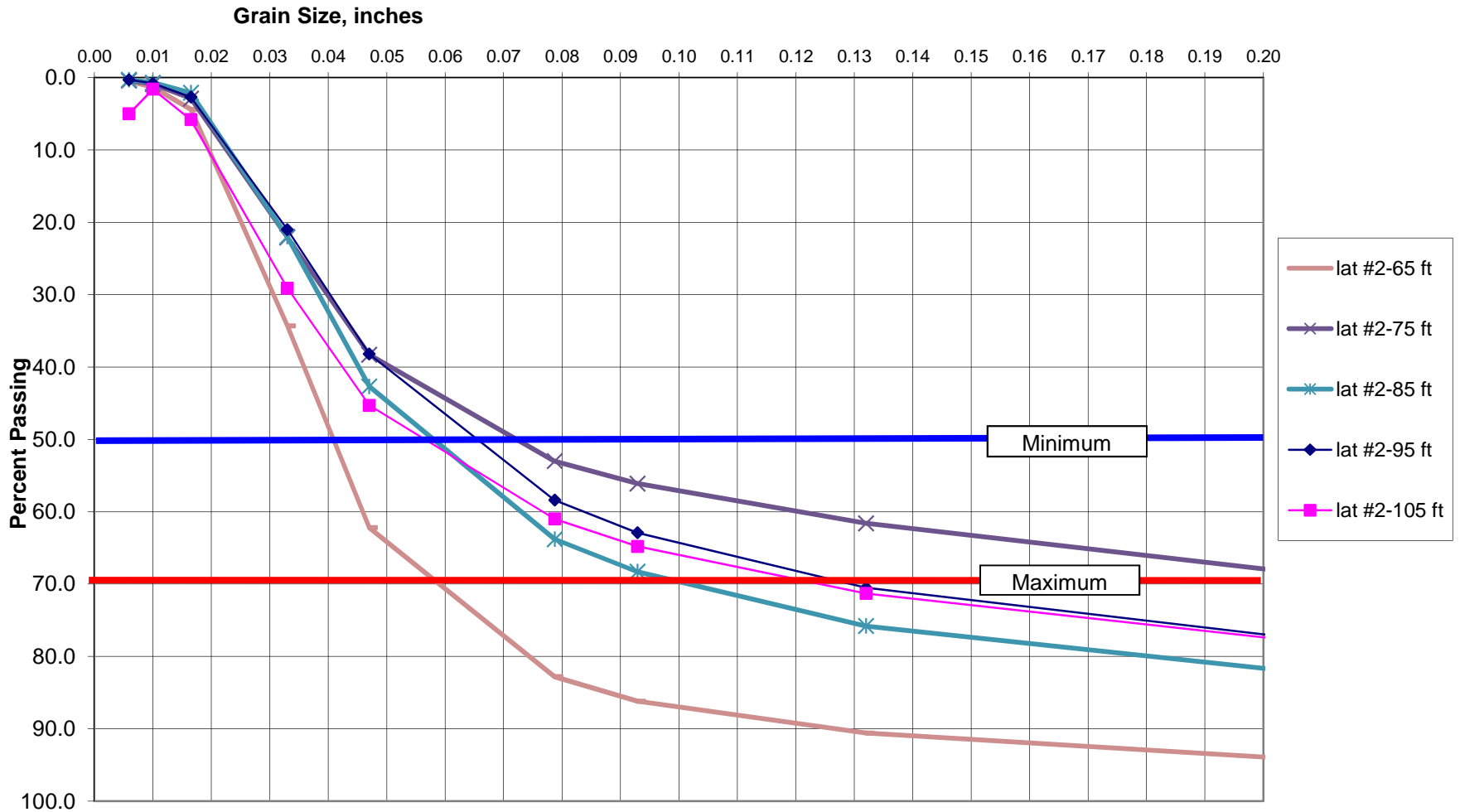
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City of Woodland, Washington  
Ranney Well Improvement Project  
Lateral #1**



**Sieve Analyses-Collector Well  
City of Woodland, Washington  
Ranney Well Improvement Project  
Lateral #2**

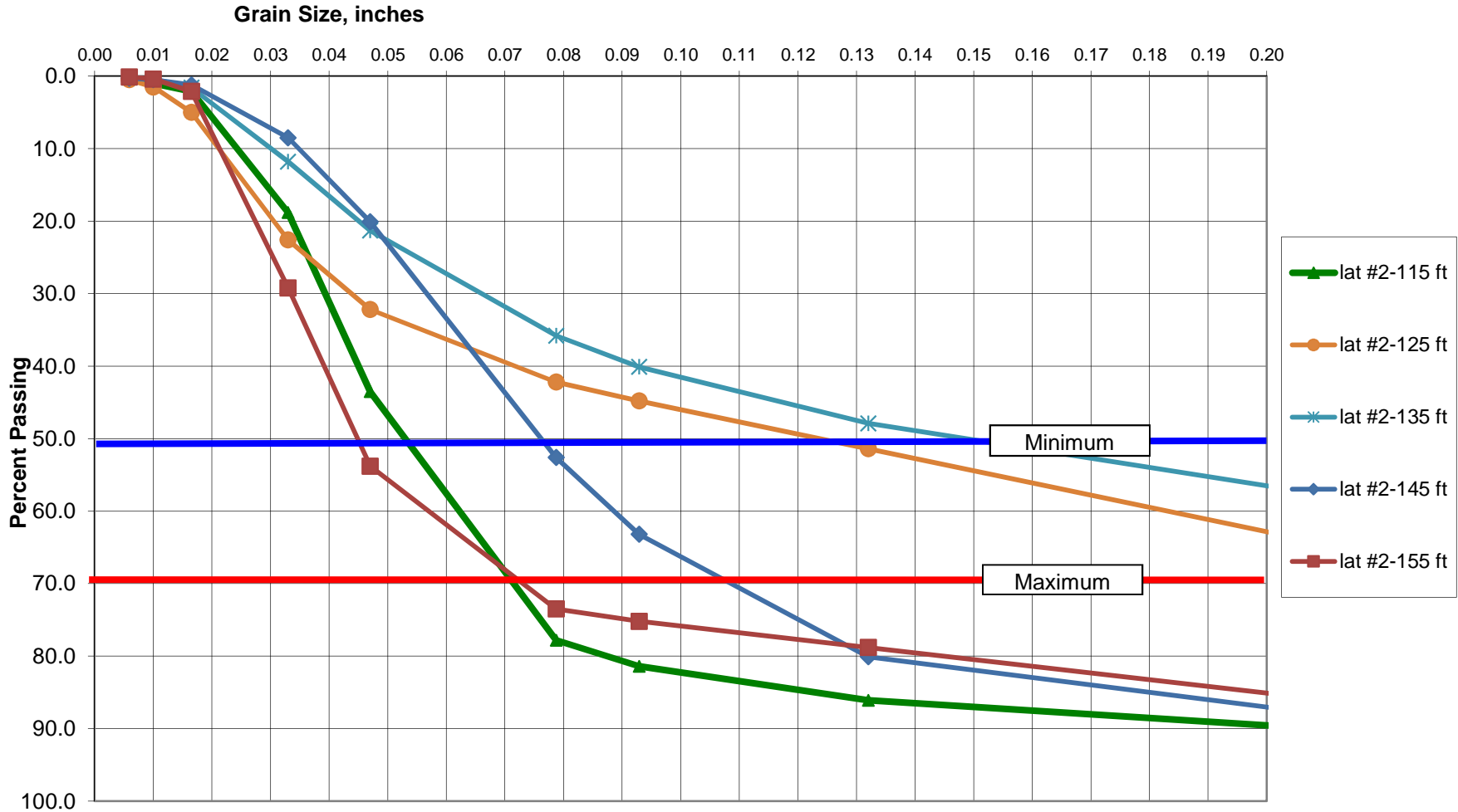


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City of Woodland, Washington  
Ranney Well Improvement Project  
Lateral #2**

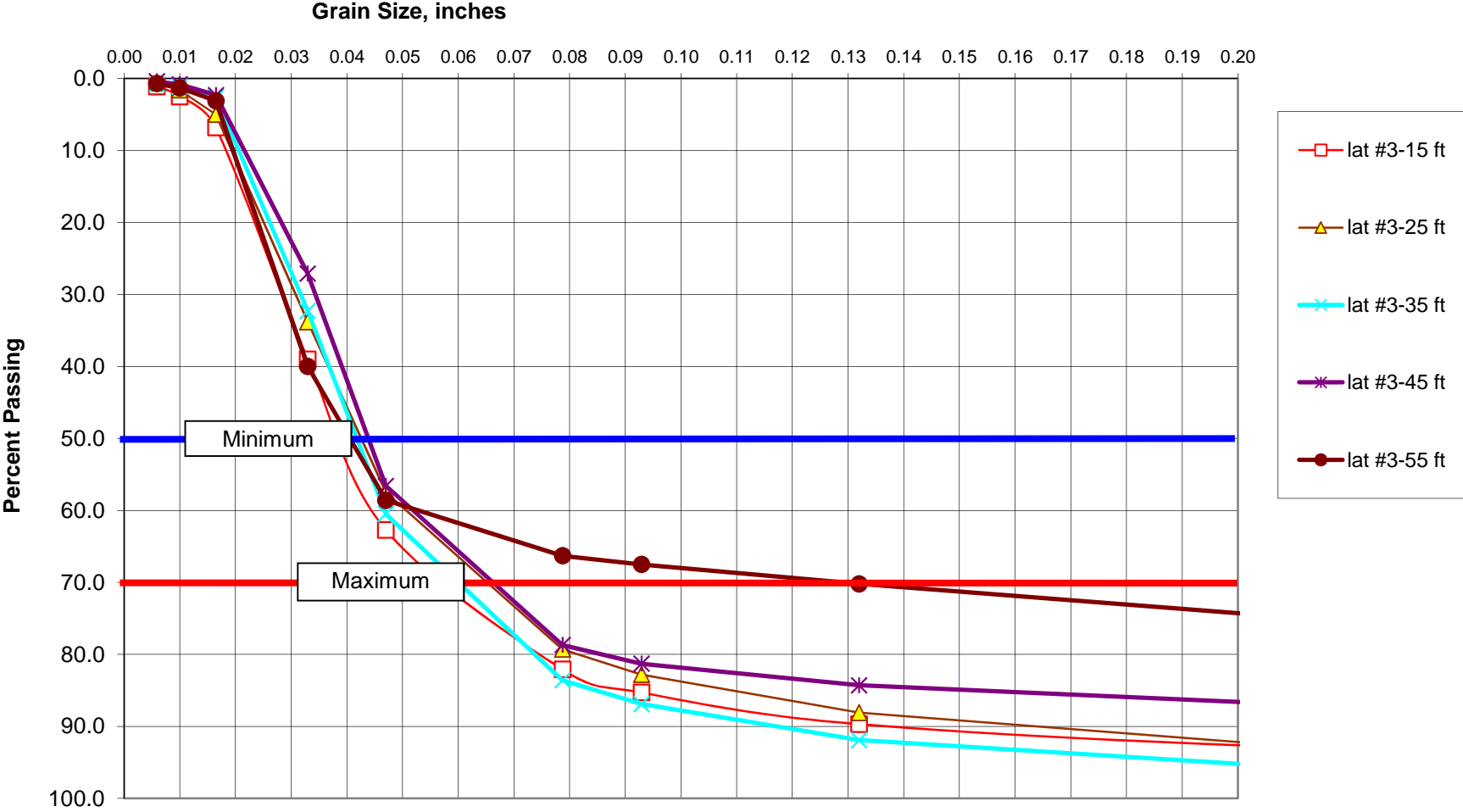




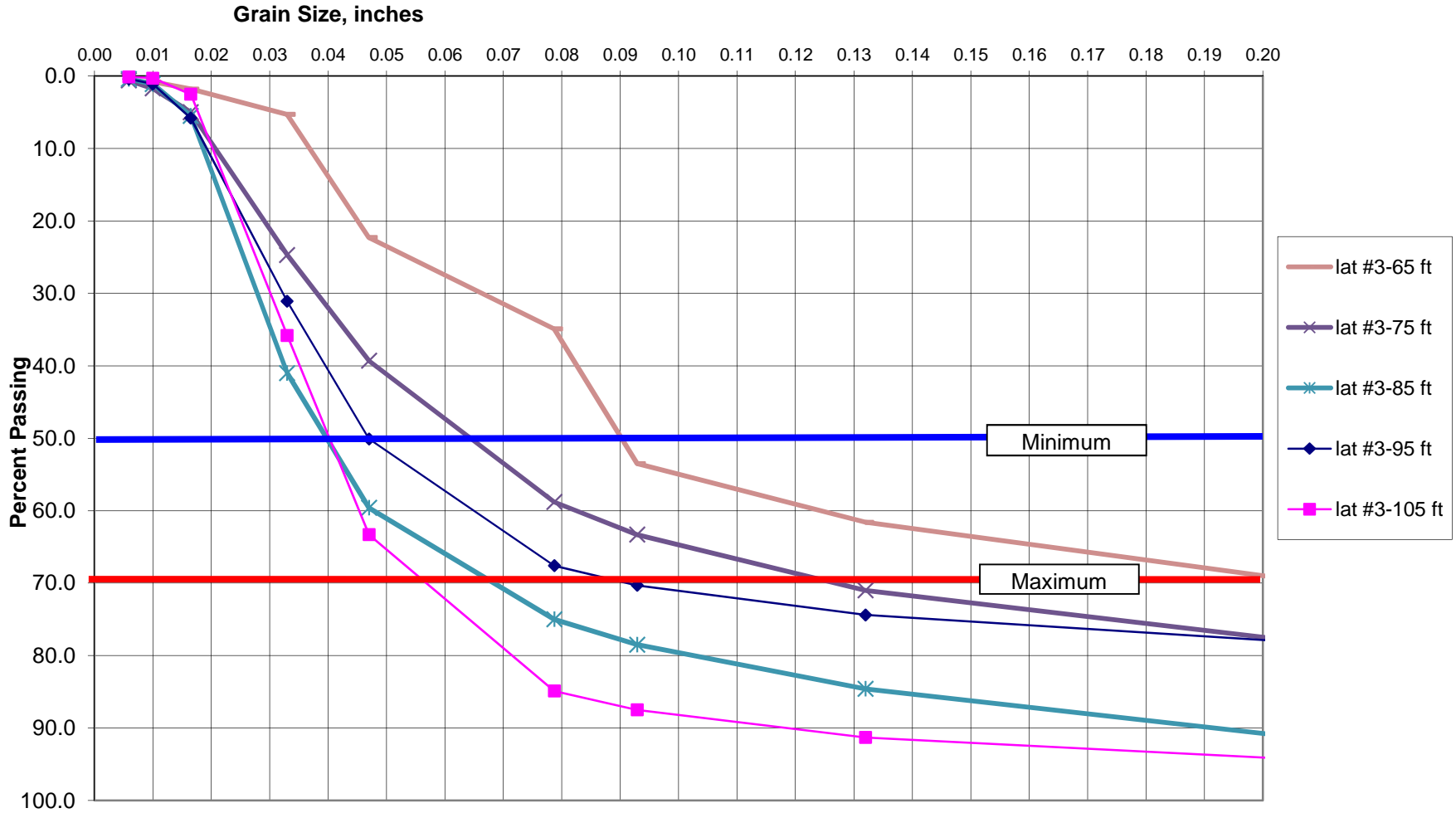
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City of Woodland, Washington  
Ranney Well Improvement Project  
Lateral #2**



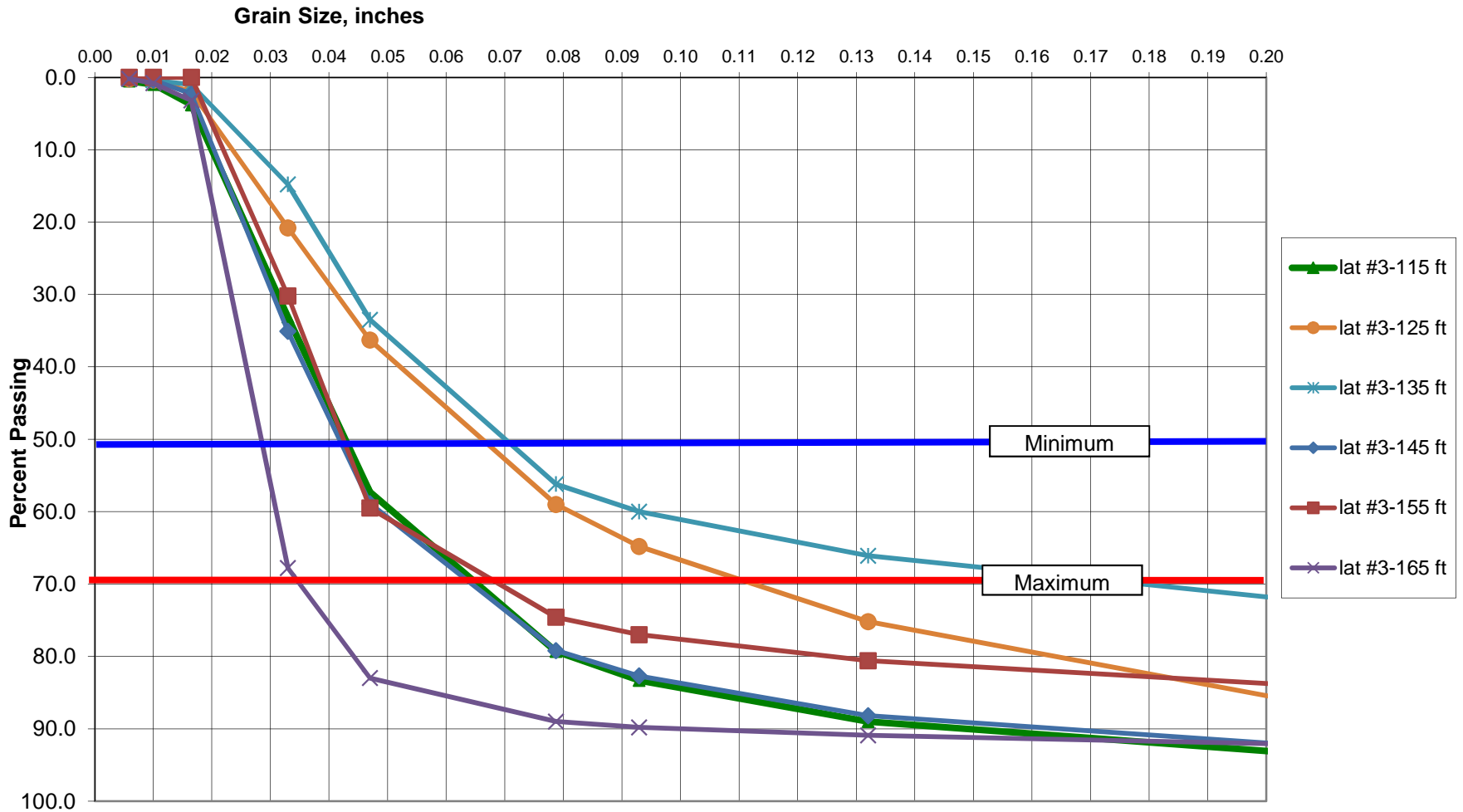
**Sieve Analyses-Collector Well  
City of Woodland, Washington  
Ranney Well Improvement Project  
Lateral #3**



**Sieve Analyses-Collector Well  
City of Woodland, Washington  
Ranney Well Improvement Project  
Lateral #3**



**Sieve Analyses-Collector Well  
City of Woodland, Washington  
Ranney Well Improvement Project  
Lateral #3**



**APPENDIX C**

**Lateral Layout Photographs**

# Ranney Well Lateral Layout Photographs

City of Woodland, Washington



# Ranney Well Lateral Layout Photographs

City of Woodland, Washington



**APPENDIX D**  
**Water Level Data**



#29174 Woodland, WA

Date	Time	ET (min)	Ranney Well			AAI-523			TB2-12		
			Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)
8/4/2014	15:30		55.87	31.99	5.01						
8/4/2014	15:35		55.89	32.00	5.00						
8/4/2014	15:40		55.87	32.01	5.00						
8/4/2014	15:45		55.87	32.01	4.99				56.84	29.44	7.24
8/4/2014	15:50		55.89	32.02	4.98				55.62	29.44	7.23
8/4/2014	15:55		55.87	32.03	4.97				55.27	29.43	7.24
8/4/2014	16:00		55.87	32.04	4.96				55.16	29.44	7.24
8/4/2014	16:05		55.87	32.05	4.95				55.13	29.45	7.22
8/4/2014	16:10		55.85	32.05	4.95				55.12	29.45	7.22
8/4/2014	16:15		55.83	32.06	4.94	59.96	32.09	6.61	55.10	29.44	7.23
8/4/2014	16:20		55.83	32.07	4.93	56.53	32.09	6.61	55.09	29.44	7.23
8/4/2014	16:25		55.83	32.08	4.92	55.87	32.09	6.61	55.08	29.45	7.22
8/4/2014	16:30		55.80	32.08	4.92	55.68	32.10	6.60	55.08	29.47	7.20
8/4/2014	16:35		55.85	32.10	4.90	55.62	32.10	6.60	55.07	29.46	7.21
8/4/2014	16:40		55.87	32.10	4.90	55.59	32.11	6.59	55.08	29.46	7.21
8/4/2014	16:45		55.85	32.11	4.89	55.58	32.11	6.59	55.07	29.47	7.20
8/4/2014	16:50		55.80	32.12	4.88	55.57	32.13	6.57	55.07	29.48	7.19
8/4/2014	16:55		55.85	32.12	4.88	55.56	32.13	6.58	55.07	29.49	7.18
8/4/2014	17:00		55.85	32.13	4.87	55.56	32.12	6.58	55.07	29.47	7.20
8/4/2014	17:05		55.83	32.13	4.87	55.56	32.13	6.58	55.07	29.47	7.20
8/4/2014	17:10		55.85	32.14	4.86	55.56	32.13	6.57	55.07	29.49	7.19
8/4/2014	17:15		55.83	32.14	4.86	55.56	32.14	6.56	55.07	29.48	7.19
8/4/2014	17:20		55.85	32.15	4.85	55.55	32.15	6.55	55.07	29.49	7.18
8/4/2014	17:25		55.83	32.16	4.84	55.55	32.15	6.55	55.06	29.49	7.18
8/4/2014	17:30		55.87	32.16	4.84	55.56	32.13	6.57	55.06	29.49	7.18
8/4/2014	17:35		55.85	32.15	4.85	55.55	32.14	6.56	55.06	29.49	7.18
8/4/2014	17:40		55.85	32.16	4.84	55.56	32.15	6.55	55.06	29.50	7.17
8/4/2014	17:45		55.85	32.17	4.83	55.55	32.16	6.54	55.06	29.49	7.18
8/4/2014	17:50		55.85	32.18	4.82	55.55	32.15	6.55	55.06	29.50	7.17
8/4/2014	17:55		55.85	32.19	4.81	55.55	32.15	6.55	55.06	29.51	7.16
8/4/2014	18:00		55.83	32.19	4.81	55.55	32.16	6.54	55.06	29.50	7.17
8/4/2014	18:05		55.85	32.19	4.81	55.56	32.19	6.51	55.06	29.51	7.16
8/4/2014	18:10		55.80	32.20	4.80	55.55	32.16	6.55	55.06	29.53	7.14
8/4/2014	18:15		55.83	32.21	4.80	55.55	32.18	6.52	55.06	29.52	7.16
8/4/2014	18:20		55.83	32.21	4.80	55.55	32.18	6.52	55.06	29.52	7.15
8/4/2014	18:25		55.85	32.21	4.80	55.55	32.17	6.53	55.06	29.53	7.14
8/4/2014	18:30		55.85	32.21	4.79	55.55	32.18	6.52	55.06	29.55	7.12
8/4/2014	18:35		55.83	32.22	4.78	55.55	32.19	6.51	55.05	29.54	7.13
8/4/2014	18:40		55.85	32.22	4.78	55.55	32.19	6.51	55.06	29.53	7.14
8/4/2014	18:45		55.83	32.22	4.78	55.56	32.21	6.49	55.05	29.53	7.14
8/4/2014	18:50		55.83	32.22	4.78	55.55	32.20	6.50	55.06	29.53	7.14
8/4/2014	18:55		55.85	32.22	4.78	55.55	32.19	6.51	55.06	29.53	7.14
8/4/2014	19:00		55.80	32.23	4.77	55.55	32.19	6.51	55.05	29.54	7.13
8/4/2014	19:05		55.83	32.24	4.77	55.55	32.20	6.50	55.05	29.54	7.13
8/4/2014	19:10		55.83	32.24	4.77	55.55	32.19	6.51	55.06	29.55	7.12
8/4/2014	19:15		55.85	32.23	4.77	55.55	32.21	6.49	55.05	29.56	7.11
8/4/2014	19:20		55.85	32.24	4.77	55.55	32.21	6.50	55.05	29.57	7.10
8/4/2014	19:25		55.85	32.24	4.76	55.55	32.21	6.49	55.05	29.57	7.11
8/4/2014	19:30		55.78	32.24	4.76	55.55	32.21	6.49	55.05	29.54	7.13
8/4/2014	19:35		55.83	32.24	4.76	55.55	32.20	6.50	55.05	29.54	7.13
8/4/2014	19:40		55.83	32.24	4.76	55.55	32.20	6.50	55.04	29.55	7.12
8/4/2014	19:45		55.87	32.24	4.76	55.55	32.21	6.49	55.05	29.57	7.10
8/4/2014	19:50		55.85	32.24	4.77	55.55	32.21	6.49	55.05	29.56	7.11
8/4/2014	19:55		55.89	32.24	4.76	55.55	32.20	6.50	55.05	29.54	7.13
8/4/2014	20:00		55.83	32.23	4.77	55.56	32.20	6.50	55.05	29.53	7.14
8/4/2014	20:05		55.87	32.22	4.78	55.55	32.20	6.50	55.05	29.53	7.14
8/4/2014	20:10		55.80	32.21	4.79	55.55	32.19	6.51	55.05	29.53	7.15
8/4/2014	20:15		55.80	32.20	4.80	55.55	32.19	6.51	55.05	29.52	7.15
8/4/2014	20:20		55.85	32.19	4.81	55.56	32.19	6.51	55.04	29.50	7.17
8/4/2014	20:25		55.87	32.17	4.83	55.55	32.18	6.52	55.05	29.48	7.19
8/4/2014	20:30		55.83	32.14	4.86	55.56	32.16	6.55	55.05	29.48	7.19
8/4/2014	20:35		55.85	32.11	4.89	55.56	32.13	6.57	55.04	29.45	7.22
8/4/2014	20:40		55.83	32.08	4.92	55.55	32.13	6.58	55.04	29.42	7.25
8/4/2014	20:45		55.83	32.04	4.96	55.55	32.09	6.61	55.04	29.39	7.28

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Date	Time	ET (min)	Raney Well			AAI-523			TB2-12		
			Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)
8/4/2014	20:50		55.87	32.00	5.00	55.55	32.06	6.64	55.04	29.37	7.30
8/4/2014	20:55		55.87	31.96	5.04	55.56	32.04	6.66	55.04	29.31	7.37
8/4/2014	21:00		55.89	31.93	5.07	55.55	32.00	6.70	55.03	29.28	7.39
8/4/2014	21:05		55.89	31.89	5.12	55.56	31.97	6.73	55.03	29.25	7.42
8/4/2014	21:10		55.89	31.85	5.15	55.55	31.95	6.75	55.03	29.22	7.45
8/4/2014	21:15		55.89	31.81	5.19	55.56	31.91	6.79	55.03	29.21	7.46
8/4/2014	21:20		55.87	31.78	5.23	55.55	31.90	6.80	55.03	29.18	7.49
8/4/2014	21:25		55.89	31.73	5.27	55.55	31.87	6.84	55.02	29.15	7.52
8/4/2014	21:30		55.89	31.69	5.31	55.55	31.82	6.88	55.03	29.10	7.58
8/4/2014	21:35		55.92	31.65	5.35	55.55	31.79	6.91	55.03	29.07	7.60
8/4/2014	21:40		55.92	31.61	5.39	55.55	31.77	6.93	55.03	29.05	7.63
8/4/2014	21:45		55.94	31.58	5.42	55.55	31.74	6.96	55.02	29.00	7.67
8/4/2014	21:50		55.92	31.56	5.44	55.55	31.73	6.97	55.02	28.97	7.70
8/4/2014	21:55		55.92	31.52	5.49	55.56	31.69	7.02	55.02	28.91	7.76
8/4/2014	22:00		55.92	31.48	5.52	55.55	31.66	7.04	55.01	28.91	7.76
8/4/2014	22:05		55.94	31.45	5.55	55.56	31.64	7.06	55.01	28.87	7.80
8/4/2014	22:10		55.96	31.42	5.58	55.55	31.61	7.09	55.01	28.84	7.83
8/4/2014	22:15		55.96	31.40	5.60	55.55	31.59	7.11	55.01	28.83	7.84
8/4/2014	22:20		55.96	31.36	5.64	55.55	31.57	7.14	55.01	28.81	7.86
8/4/2014	22:25		55.94	31.33	5.67	55.55	31.54	7.16	55.01	28.77	7.90
8/4/2014	22:30		55.96	31.30	5.70	55.55	31.53	7.17	55.01	28.75	7.92
8/4/2014	22:35		55.89	31.26	5.74	55.55	31.50	7.20	55.01	28.70	7.97
8/4/2014	22:40		55.98	31.24	5.76	55.55	31.46	7.24	55.00	28.69	7.98
8/4/2014	22:45		55.98	31.20	5.80	55.56	31.45	7.25	55.01	28.68	7.99
8/4/2014	22:50		55.98	31.18	5.82	55.55	31.42	7.28	55.01	28.66	8.01
8/4/2014	22:55		55.98	31.15	5.85	55.55	31.40	7.30	55.01	28.63	8.04
8/4/2014	23:00		56.01	31.14	5.86	55.55	31.40	7.31	55.00	28.63	8.04
8/4/2014	23:05		55.96	31.13	5.87	55.55	31.38	7.32	55.00	28.60	8.07
8/4/2014	23:10		55.98	31.11	5.89	55.55	31.37	7.33	55.00	28.59	8.09
8/4/2014	23:15		56.01	31.09	5.91	55.55	31.35	7.35	55.00	28.58	8.09
8/4/2014	23:20		56.01	31.07	5.93	55.55	31.34	7.36	55.01	28.56	8.11
8/4/2014	23:25		56.01	31.06	5.94	55.55	31.33	7.37	55.00	28.53	8.14
8/4/2014	23:30		56.03	31.04	5.96	55.55	31.30	7.40	55.00	28.51	8.16
8/4/2014	23:35		56.03	31.02	5.98	55.55	31.30	7.40	55.00	28.52	8.15
8/4/2014	23:40		56.03	31.00	6.00	55.55	31.28	7.42	55.00	28.48	8.19
8/4/2014	23:45		56.03	30.99	6.01	55.55	31.26	7.44	55.00	28.49	8.18
8/4/2014	23:50		56.05	30.97	6.03	55.55	31.26	7.45	55.00	28.48	8.19
8/4/2014	23:55		56.01	30.97	6.04	55.55	31.24	7.46	55.00	28.46	8.21
8/5/2014	0:00		56.03	30.95	6.05	55.55	31.23	7.47	55.00	28.44	8.23
8/5/2014	0:05		56.05	30.94	6.06	55.55	31.21	7.49	55.00	28.42	8.25
8/5/2014	0:10		56.01	30.94	6.07	55.55	31.20	7.50	55.00	28.44	8.24
8/5/2014	0:15		56.03	30.93	6.07	55.55	31.20	7.50	55.00	28.42	8.25
8/5/2014	0:20		56.03	30.92	6.08	55.55	31.21	7.49	55.00	28.41	8.26
8/5/2014	0:25		56.01	30.92	6.08	55.55	31.19	7.51	55.00	28.42	8.25
8/5/2014	0:30		56.01	30.91	6.09	55.55	31.18	7.52	55.00	28.42	8.26
8/5/2014	0:35		56.01	30.92	6.08	55.55	31.19	7.51	55.00	28.42	8.25
8/5/2014	0:40		56.03	30.92	6.08	55.54	31.18	7.52	55.00	28.42	8.25
8/5/2014	0:45		56.05	30.93	6.07	55.55	31.20	7.51	55.00	28.42	8.25
8/5/2014	0:50		56.01	30.94	6.07	55.55	31.19	7.51	55.00	28.43	8.24
8/5/2014	0:55		56.05	30.94	6.06	55.55	31.19	7.51	55.00	28.47	8.20
8/5/2014	1:00		56.05	30.95	6.05	55.55	31.21	7.49	55.00	28.47	8.20
8/5/2014	1:05		56.03	30.97	6.03	55.55	31.22	7.48	55.00	28.47	8.20
8/5/2014	1:10		56.05	30.97	6.03	55.55	31.21	7.49	55.00	28.48	8.19
8/5/2014	1:15		56.08	30.98	6.02	55.55	31.22	7.48	55.00	28.50	8.17
8/5/2014	1:20		56.08	30.99	6.01	55.55	31.22	7.48	55.00	28.50	8.17
8/5/2014	1:25		56.03	31.00	6.00	55.55	31.23	7.47	55.00	28.52	8.15
8/5/2014	1:30		56.05	31.02	5.99	55.55	31.24	7.46	55.00	28.51	8.16
8/5/2014	1:35		56.01	31.03	5.97	55.56	31.26	7.45	54.99	28.53	8.14
8/5/2014	1:40		56.08	31.03	5.97	55.55	31.25	7.45	55.00	28.53	8.14
8/5/2014	1:45		56.05	31.05	5.96	55.55	31.26	7.45	55.00	28.55	8.12
8/5/2014	1:50		56.05	31.05	5.95	55.55	31.27	7.43	55.00	28.56	8.11
8/5/2014	1:55		56.08	31.06	5.94	55.55	31.26	7.44	55.00	28.54	8.14
8/5/2014	2:00		56.05	31.06	5.94	55.55	31.27	7.43	55.00	28.57	8.10
8/5/2014	2:05		56.05	31.08	5.92	55.55	31.28	7.43	55.00	28.57	8.10

#29174 Woodland, WA

Date	Time	ET (min)	Ranney Well			AAI-523			TB2-12		
			Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)
8/5/2014	2:10		56.01	31.09	5.91	55.55	31.29	7.41	55.00	28.59	8.08
8/5/2014	2:15		56.05	31.09	5.91	55.55	31.29	7.41	55.00	28.59	8.08
8/5/2014	2:20		55.98	31.10	5.90	55.55	31.30	7.40	55.00	28.61	8.06
8/5/2014	2:25		56.08	31.12	5.88	55.55	31.30	7.40	55.00	28.61	8.06
8/5/2014	2:30		56.05	31.13	5.87	55.55	31.32	7.38	55.00	28.63	8.05
8/5/2014	2:35		56.03	31.14	5.86	55.55	31.31	7.39	55.00	28.63	8.04
8/5/2014	2:40		56.03	31.15	5.85	55.55	31.33	7.37	55.00	28.64	8.03
8/5/2014	2:45		56.01	31.17	5.84	55.54	31.35	7.35	55.00	28.66	8.01
8/5/2014	2:50		55.98	31.18	5.82	55.55	31.36	7.34	55.00	28.67	8.00
8/5/2014	2:55		56.01	31.20	5.80	55.55	31.37	7.34	55.00	28.68	7.99
8/5/2014	3:00		56.05	31.21	5.79	55.55	31.37	7.34	54.99	28.69	7.98
8/5/2014	3:05		56.05	31.23	5.77	55.54	31.37	7.33	55.00	28.70	7.97
8/5/2014	3:10		56.01	31.24	5.76	55.55	31.39	7.31	55.00	28.73	7.94
8/5/2014	3:15		56.01	31.26	5.74	55.55	31.41	7.29	55.00	28.73	7.94
8/5/2014	3:20		56.03	31.27	5.73	55.55	31.42	7.28	55.00	28.75	7.92
8/5/2014	3:25		56.03	31.28	5.72	55.55	31.43	7.27	55.00	28.77	7.90
8/5/2014	3:30		55.96	30.13	6.87	55.54	31.03	7.67	55.00	28.51	8.16
8/5/2014	3:35		56.03	29.93	7.07	55.53	30.84	7.86	55.00	28.41	8.27
8/5/2014	3:40		56.08	30.25	6.76	55.52	30.84	7.86	55.00	28.39	8.28
8/5/2014	3:45		56.10	31.20	5.80	55.53	31.32	7.38	54.99	28.71	7.96
8/5/2014	3:50		56.03	31.31	5.69	55.52	31.45	7.25	54.99	28.78	7.89
8/5/2014	3:55		56.03	31.35	5.65	55.52	31.47	7.23	55.00	28.80	7.87
8/5/2014	4:00		55.98	31.37	5.64	55.53	31.49	7.21	55.00	28.83	7.84
8/5/2014	4:05		56.03	31.38	5.62	55.53	31.47	7.23	55.00	28.83	7.84
8/5/2014	4:10		55.96	31.40	5.60	55.54	31.50	7.20	55.00	28.86	7.81
8/5/2014	4:15		56.03	31.42	5.58	55.54	31.53	7.17	55.00	28.87	7.80
8/5/2014	4:20		56.03	31.44	5.56	55.54	31.54	7.16	55.00	28.90	7.77
8/5/2014	4:25		56.05	31.46	5.54	55.55	31.57	7.13	55.00	28.91	7.76
8/5/2014	4:30		56.01	31.48	5.53	55.55	31.57	7.13	55.00	28.93	7.75
8/5/2014	4:35		56.03	31.49	5.51	55.55	31.58	7.12	55.00	28.93	7.74
8/5/2014	4:40		55.98	31.51	5.49	55.56	31.59	7.11	54.99	28.96	7.71
8/5/2014	4:45		56.03	31.53	5.47	55.56	31.61	7.09	55.00	28.98	7.69
8/5/2014	4:50		56.01	31.54	5.46	55.55	31.62	7.08	55.00	28.99	7.68
8/5/2014	4:55		55.96	31.56	5.44	55.56	31.64	7.06	55.00	29.00	7.67
8/5/2014	5:00		55.96	31.58	5.42	55.56	31.64	7.06	55.00	29.00	7.67
8/5/2014	5:05		56.01	31.59	5.41	55.56	31.65	7.05	54.99	29.02	7.65
8/5/2014	5:10		56.01	31.60	5.40	55.56	31.68	7.02	55.00	29.03	7.64
8/5/2014	5:15		56.03	31.62	5.39	55.56	31.68	7.02	55.00	29.05	7.62
8/5/2014	5:20		56.03	31.63	5.37	55.56	31.69	7.01	55.00	29.07	7.61
8/5/2014	5:25		55.98	31.65	5.35	55.56	31.70	7.00	55.00	29.08	7.59
8/5/2014	5:30		55.92	31.66	5.34	55.56	31.72	6.98	55.00	29.09	7.58
8/5/2014	5:35		55.98	31.68	5.32	55.55	31.73	6.97	54.99	29.06	7.61
8/5/2014	5:40		55.94	31.69	5.31	55.56	31.76	6.95	55.00	29.12	7.55
8/5/2014	5:45		55.96	31.70	5.30	55.56	31.76	6.94	55.00	29.13	7.54
8/5/2014	5:50		55.98	31.72	5.28	55.56	31.76	6.94	55.00	29.13	7.54
8/5/2014	5:55		56.01	31.73	5.27	55.56	31.79	6.91	55.00	29.15	7.52
8/5/2014	6:00		56.01	31.75	5.25	55.56	31.78	6.92	55.00	29.16	7.51
8/5/2014	6:05		56.01	31.76	5.24	55.56	31.80	6.90	55.00	29.17	7.50
8/5/2014	6:10		56.01	31.78	5.22	55.56	31.81	6.90	55.00	29.18	7.49
8/5/2014	6:15		56.01	31.79	5.21	55.56	31.83	6.87	55.00	29.20	7.47
8/5/2014	6:20		55.98	31.80	5.20	55.56	31.84	6.87	55.00	29.21	7.46
8/5/2014	6:25		56.01	31.82	5.18	55.55	31.84	6.86	55.00	29.21	7.46
8/5/2014	6:30		55.96	31.83	5.17	55.56	31.84	6.86	55.00	29.22	7.45
8/5/2014	6:35		55.98	31.84	5.16	55.56	31.88	6.83	55.00	29.24	7.43
8/5/2014	6:40		55.98	31.85	5.15	55.56	31.87	6.83	55.00	29.25	7.42
8/5/2014	6:45		55.96	31.87	5.13	55.56	31.88	6.83	55.00	29.25	7.42
8/5/2014	6:50		55.94	31.88	5.12	55.56	31.90	6.80	55.00	29.27	7.40
8/5/2014	6:55		55.96	31.89	5.11	55.56	31.90	6.80	55.00	29.28	7.39
8/5/2014	7:00		55.96	31.90	5.10	55.56	31.91	6.79	55.00	29.28	7.39
8/5/2014	7:05		55.96	31.91	5.09	55.56	31.92	6.78	54.99	29.30	7.37
8/5/2014	7:10		55.96	31.92	5.08	55.55	31.93	6.77	55.00	29.30	7.37
8/5/2014	7:15		55.96	31.93	5.07	55.56	31.93	6.77	55.00	29.32	7.36
8/5/2014	7:20		55.96	31.95	5.05	55.55	31.95	6.75	55.00	29.33	7.34
8/5/2014	7:25		55.94	31.95	5.05	55.55	31.97	6.74	55.00	29.33	7.34

#29174 Woodland, WA

Date	Time	ET (min)	Ranney Well			AAI-523			TB2-12		
			Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)
8/5/2014	7:30		55.96	31.97	5.04	55.55	31.96	6.74	55.00	29.33	7.34
8/5/2014	7:35		55.96	31.98	5.02	55.56	31.97	6.73	55.00	29.35	7.32
8/5/2014	7:40		55.92	31.98	5.02	55.56	31.97	6.73	55.00	29.36	7.31
8/5/2014	7:45		55.94	32.00	5.01	55.56	31.99	6.71	55.00	29.35	7.32
8/5/2014	7:50		55.94	32.01	4.99	55.55	31.99	6.71	55.00	29.36	7.31
8/5/2014	7:55		55.98	32.02	4.99	55.56	32.00	6.70	55.00	29.38	7.29
8/5/2014	8:00		55.92	32.02	4.98	55.56	32.01	6.69	55.00	29.35	7.32
8/5/2014	8:05		55.96	32.03	4.97	55.55	32.01	6.69	55.00	29.38	7.30
8/5/2014	8:10		55.98	32.04	4.96	55.55	32.03	6.67	55.00	29.39	7.28
8/5/2014	8:15		55.96	32.05	4.95	55.56	32.03	6.67	55.00	29.39	7.28
8/5/2014	8:20		55.94	32.06	4.94	55.56	32.03	6.67	54.99	29.40	7.27
8/5/2014	8:25		55.96	32.06	4.94	55.55	32.05	6.65	55.00	29.41	7.26
8/5/2014	8:30		55.89	32.15	4.85	55.55	32.09	6.61	55.00	29.44	7.24
8/5/2014	8:35		55.87	32.09	4.91	55.56	32.06	6.64	55.00	29.43	7.24
8/5/2014	8:40		55.92	32.09	4.91	55.55	32.08	6.62	54.99	29.44	7.23
8/5/2014	8:45		55.94	32.10	4.90	55.56	32.07	6.63	55.00	29.42	7.25
8/5/2014	8:50		55.87	30.41	6.59	55.56	31.71	6.99	54.99	29.19	7.48
8/5/2014	8:55		55.96	29.56	7.45	55.52	30.98	7.72	54.99	28.78	7.89
8/5/2014	9:00		55.94	29.42	7.59	55.53	30.84	7.86	54.99	28.71	7.96
8/5/2014	9:05		55.96	29.38	7.62	55.53	30.79	7.91	54.99	28.66	8.01
8/5/2014	9:10		55.98	29.36	7.64	55.53	30.77	7.94	54.99	28.65	8.02
8/5/2014	9:15		55.98	29.34	7.66	55.53	30.73	7.97	54.98	28.62	8.05
8/5/2014	9:20		56.01	29.33	7.67	55.53	30.73	7.97	54.99	28.62	8.06
8/5/2014	9:25		56.01	29.32	7.68	55.53	30.72	7.98	54.99	28.59	8.08
8/5/2014	9:30		56.01	29.31	7.69	55.53	30.70	8.00	54.99	28.58	8.09
8/5/2014	9:35		56.01	29.30	7.70	55.53	30.71	7.99	54.99	28.58	8.09
8/5/2014	9:40		56.01	29.30	7.70	55.53	30.70	8.00	54.99	28.58	8.09
8/5/2014	9:45		55.96	29.29	7.71	55.53	30.66	8.04	54.99	28.55	8.13
8/5/2014	9:50		55.98	29.28	7.72	55.53	30.66	8.04	54.99	28.56	8.11
8/5/2014	9:55		56.01	29.28	7.72	55.54	30.67	8.03	54.99	28.56	8.11
8/5/2014	10:00		56.01	29.27	7.73	55.55	30.67	8.03	54.99	28.53	8.14
8/5/2014	10:05		56.01	29.27	7.74	55.54	30.65	8.05	54.99	28.55	8.12
8/5/2014	10:10		56.01	29.27	7.74	55.55	30.64	8.06	55.00	28.53	8.14
8/5/2014	10:15		56.01	29.26	7.74	55.55	30.64	8.06	54.99	28.53	8.14
8/5/2014	10:20		56.01	29.25	7.75	55.56	30.63	8.07			
8/5/2014	10:25		56.01	29.25	7.75				55.84	28.53	8.14
8/5/2014	10:30		56.01	29.24	7.76	61.45	30.63	8.07	55.21	28.53	8.15
8/5/2014	10:35		56.01	29.24	7.77	56.39	30.63	8.07	55.09	28.52	8.15
8/5/2014	10:40		56.03	29.22	7.78	55.76	30.63	8.07	55.04	28.52	8.15
8/5/2014	10:45		56.01	29.22	7.78	55.64	30.63	8.07	55.04	28.51	8.16
8/5/2014	10:50		56.01	29.21	7.79	55.60	30.61	8.10	55.02	28.50	8.17
8/5/2014	10:55	Start	56.01	29.20	7.80	55.58	30.60	8.10	55.02	28.49	8.18
8/5/2014	11:00	Step-test	56.01	29.19	7.81	55.57	30.60	8.11	55.01	28.48	8.19
8/5/2014	11:01	0	56.01	29.19	7.81	55.57	30.59	8.12	55.01	28.48	8.19
8/5/2014	11:02	1	56.03	29.81	7.19	55.57	30.64	8.06	55.01	28.52	8.16
8/5/2014	11:03	2	56.03	30.23	6.77	55.56	30.80	7.90	55.01	28.64	8.03
8/5/2014	11:04	3	56.03	30.50	6.50	55.56	30.97	7.73	55.02	28.74	7.93
8/5/2014	11:05	4	56.03	30.70	6.30	55.56	31.10	7.60	55.02	28.82	7.85
8/5/2014	11:06	5	56.03	30.83	6.17	55.56	31.20	7.50	55.01	28.87	7.80
8/5/2014	11:07	6	56.03	30.92	6.08	55.56	31.29	7.41	55.01	28.91	7.76
8/5/2014	11:08	7	55.98	30.99	6.01	55.56	31.35	7.35	55.01	28.93	7.74
8/5/2014	11:09	8	55.96	31.04	5.96	55.56	31.39	7.31	55.01	28.98	7.69
8/5/2014	11:10	9	55.92	31.06	5.94	55.57	31.43	7.27	55.01	29.01	7.67
8/5/2014	11:11	10	55.94	31.09	5.92	55.57	31.45	7.25	55.01	29.01	7.66
8/5/2014	11:12	11	55.96	31.10	5.90	55.57	31.46	7.24	55.01	29.03	7.65
8/5/2014	11:13	12	55.96	31.11	5.89	55.57	31.48	7.22	55.01	29.04	7.63
8/5/2014	11:14	13	55.92	31.13	5.87	55.56	31.48	7.22	55.01	29.04	7.63
8/5/2014	11:15	14	55.89	31.14	5.86	55.57	31.49	7.21	55.02	29.05	7.62
8/5/2014	11:16	15	55.89	31.15	5.85	55.57	31.51	7.19	55.02	29.07	7.60
8/5/2014	11:17	16	55.89	31.16	5.84	55.57	31.52	7.18	55.01	29.07	7.60
8/5/2014	11:18	17	55.89	31.16	5.84	55.57	31.52	7.18	55.01	29.06	7.61
8/5/2014	11:19	18	55.89	31.17	5.83	55.57	31.53	7.18	55.01	29.08	7.59
8/5/2014	11:20	19	55.87	31.17	5.83	55.57	31.53	7.17	55.00	29.08	7.59
8/5/2014	11:21	20	55.89	31.17	5.83	55.57	31.54	7.16	55.01	29.07	7.60

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Date	Time	ET (min)	Ranney Well			AAI-523			TB2-12		
			Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)
8/5/2014	11:22	21	55.89	31.17	5.83	55.57	31.54	7.16	55.01	29.06	7.61
8/5/2014	11:23	22	55.87	31.17	5.83	55.57	31.55	7.15	55.01	29.07	7.60
8/5/2014	11:24	23	55.87	31.18	5.82	55.57	31.56	7.15	55.01	29.08	7.59
8/5/2014	11:25	24	55.85	31.18	5.82	55.57	31.55	7.15	55.01	29.09	7.58
8/5/2014	11:26	25	55.85	31.18	5.82	55.57	31.55	7.15	55.01	29.09	7.58
8/5/2014	11:27	26	55.87	31.18	5.82	55.57	31.55	7.15	55.01	29.08	7.59
8/5/2014	11:28	27	55.87	31.18	5.82	55.57	31.56	7.15	55.01	29.08	7.59
8/5/2014	11:29	28	55.87	31.19	5.81	55.57	31.54	7.16	55.01	29.07	7.60
8/5/2014	11:30	29	55.89	31.18	5.82	55.57	31.56	7.14	55.01	29.08	7.59
8/5/2014	11:31	30	55.87	31.19	5.81	55.57	31.56	7.14	55.00	29.08	7.59
8/5/2014	11:32	31	55.89	31.19	5.81	55.57	31.56	7.14	55.01	29.06	7.61
8/5/2014	11:33	32	55.89	31.18	5.82	55.57	31.56	7.14	55.00	29.09	7.58
8/5/2014	11:34	33	55.87	31.18	5.82	55.57	31.57	7.13	55.01	29.08	7.59
8/5/2014	11:35	34	55.87	31.19	5.81	55.56	31.55	7.15	55.01	29.08	7.59
8/5/2014	11:36	35	55.87	31.19	5.81	55.57	31.56	7.14	55.01	29.09	7.58
8/5/2014	11:37	36	55.87	31.19	5.81	55.57	31.57	7.13	55.01	29.08	7.59
8/5/2014	11:38	37	55.87	31.18	5.82	55.57	31.57	7.13	55.00	29.08	7.60
8/5/2014	11:39	38	55.85	31.18	5.82	55.56	31.56	7.14	55.01	29.08	7.59
8/5/2014	11:40	39	55.89	31.18	5.82	55.57	31.56	7.14	55.01	29.05	7.62
8/5/2014	11:41	40	55.92	31.18	5.82	55.57	31.56	7.14	55.01	29.07	7.60
8/5/2014	11:42	41	55.92	31.18	5.83	55.56	31.55	7.15	55.01	29.08	7.59
8/5/2014	11:43	42	55.94	31.18	5.82	55.56	31.57	7.13	55.00	29.08	7.60
8/5/2014	11:44	43	55.94	31.18	5.82	55.57	31.55	7.15	55.00	29.07	7.60
8/5/2014	11:45	44	55.92	31.18	5.83	55.57	31.56	7.14	55.01	29.07	7.60
8/5/2014	11:46	45	55.92	31.18	5.83	55.57	31.56	7.14	55.00	29.07	7.60
8/5/2014	11:47	46	55.92	31.18	5.83	55.57	31.55	7.15	55.00	29.08	7.59
8/5/2014	11:48	47	55.92	31.17	5.83	55.57	31.56	7.14	55.00	29.06	7.61
8/5/2014	11:49	48	55.92	31.17	5.83	55.56	31.56	7.14	55.00	29.06	7.61
8/5/2014	11:50	49	55.92	31.18	5.83	55.57	31.56	7.14	55.00	29.06	7.61
8/5/2014	11:51	50	55.94	31.17	5.83	55.57	31.56	7.14	55.00	29.06	7.61
8/5/2014	11:52	51	55.96	31.18	5.82	55.57	31.57	7.14	55.01	29.07	7.60
8/5/2014	11:53	52	55.96	31.17	5.83	55.56	31.56	7.14	55.00	29.05	7.62
8/5/2014	11:54	53	55.98	31.17	5.83	55.56	31.57	7.14	55.01	29.07	7.60
8/5/2014	11:55	54	55.96	31.17	5.83	55.56	31.57	7.13	55.00	29.06	7.61
8/5/2014	11:56	55	55.94	31.17	5.83	55.56	31.57	7.13	55.00	29.06	7.61
8/5/2014	11:57	56	55.96	31.17	5.83	55.56	31.57	7.13	55.00	29.06	7.61
8/5/2014	11:58	57	55.96	31.17	5.83	55.57	31.58	7.13	55.00	29.07	7.60
8/5/2014	11:59	58	55.96	31.17	5.83	55.56	31.56	7.14	55.00	29.06	7.61
8/5/2014	12:00	59	55.96	31.17	5.83	55.56	31.58	7.12	55.01	29.08	7.59
8/5/2014	12:01	60	55.96	31.17	5.83	55.57	31.57	7.13	55.00	29.05	7.62
8/5/2014	12:02	61	55.96	31.36	5.64	55.57	31.59	7.11	55.00	29.07	7.60
8/5/2014	12:03	62	55.96	31.54	5.46	55.57	31.63	7.08	55.00	29.10	7.57
8/5/2014	12:04	63	55.92	31.95	5.05	55.57	31.72	6.98	55.00	29.17	7.50
8/5/2014	12:05	64	55.96	32.00	5.00	55.56	31.83	6.87	55.00	29.23	7.44
8/5/2014	12:06	65	55.94	32.00	5.00	55.57	31.89	6.81	55.00	29.23	7.44
8/5/2014	12:07	66	55.92	32.01	4.99	55.57	31.91	6.79	55.00	29.24	7.43
8/5/2014	12:08	67	55.85	32.01	4.99	55.57	31.93	6.77	55.00	29.27	7.40
8/5/2014	12:09	68	55.92	32.02	4.98	55.57	31.93	6.77	55.00	29.27	7.41
8/5/2014	12:10	69	55.94	32.02	4.98	55.57	31.94	6.76	55.00	29.26	7.41
8/5/2014	12:11	70	55.92	32.03	4.98	55.57	31.96	6.75	55.00	29.27	7.40
8/5/2014	12:12	71	55.92	32.03	4.98	55.57	31.95	6.75	55.00	29.28	7.39
8/5/2014	12:13	72	55.85	32.03	4.97	55.57	31.96	6.75	55.00	29.28	7.39
8/5/2014	12:14	73	55.87	32.03	4.97	55.57	31.95	6.75	55.00	29.29	7.38
8/5/2014	12:15	74	55.89	32.04	4.96	55.56	31.96	6.74	55.00	29.28	7.39
8/5/2014	12:16	75	55.89	32.04	4.96	55.57	31.96	6.74	55.00	29.28	7.39
8/5/2014	12:17	76	55.92	32.04	4.96	55.57	31.96	6.74	55.01	29.29	7.38
8/5/2014	12:18	77	55.92	32.04	4.96	55.57	31.97	6.73	55.00	29.29	7.38
8/5/2014	12:19	78	55.92	32.04	4.96	55.57	31.98	6.72	55.01	29.29	7.38
8/5/2014	12:20	79	55.92	32.04	4.96	55.57	31.96	6.74	55.01	29.30	7.38
8/5/2014	12:21	80	55.89	32.04	4.96	55.56	31.99	6.71	55.00	29.28	7.39
8/5/2014	12:22	81	55.92	32.04	4.96	55.57	31.98	6.72	55.00	29.30	7.37
8/5/2014	12:23	82	55.89	32.05	4.95	55.56	31.96	6.74	55.00	29.29	7.38
8/5/2014	12:24	83	55.92	32.05	4.95	55.56	31.97	6.73	55.00	29.31	7.36
8/5/2014	12:25	84	55.89	32.05	4.95	55.56	31.99	6.71	55.00	29.30	7.37

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Date	Time	ET (min)	Raney Well			AAI-523			TB2-12		
			Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)
8/5/2014	12:26	85	55.92	32.06	4.95	55.57	31.99	6.71	55.00	29.30	7.37
8/5/2014	12:27	86	55.92	32.06	4.94	55.56	32.00	6.70	55.00	29.31	7.36
8/5/2014	12:28	87	55.92	32.06	4.94	55.57	31.98	6.72	55.00	29.31	7.36
8/5/2014	12:29	88	55.89	32.06	4.94	55.56	31.99	6.71	55.00	29.32	7.35
8/5/2014	12:30	89	55.94	32.07	4.93	55.56	32.00	6.70	55.00	29.31	7.36
8/5/2014	12:31	90	55.94	32.07	4.93	55.56	31.99	6.71	55.00	29.30	7.37
8/5/2014	12:32	91	55.94	32.07	4.93	55.56	31.98	6.72	55.00	29.32	7.36
8/5/2014	12:33	92	55.92	32.07	4.93	55.56	32.02	6.69	55.00	29.32	7.35
8/5/2014	12:34	93	55.94	32.07	4.93	55.56	32.00	6.71	55.00	29.30	7.37
8/5/2014	12:35	94	55.94	32.07	4.93	55.56	32.00	6.70	54.99	29.32	7.35
8/5/2014	12:36	95	55.96	32.07	4.93	55.56	31.99	6.71	55.00	29.29	7.38
8/5/2014	12:37	96	55.94	32.07	4.93	55.56	32.00	6.70	55.00	29.31	7.36
8/5/2014	12:38	97	55.94	32.07	4.93	55.56	32.00	6.70	55.00	29.32	7.35
8/5/2014	12:39	98	55.92	32.08	4.92	55.56	32.00	6.70	55.00	29.30	7.37
8/5/2014	12:40	99	55.89	32.08	4.92	55.56	32.01	6.69	55.00	29.33	7.34
8/5/2014	12:41	100	55.89	32.08	4.92	55.56	32.00	6.70	55.01	29.32	7.35
8/5/2014	12:42	101	55.89	32.09	4.92	55.57	32.01	6.69	55.00	29.32	7.35
8/5/2014	12:43	102	55.83	32.08	4.92	55.56	32.02	6.68	55.00	29.32	7.35
8/5/2014	12:44	103	55.83	32.08	4.92	55.57	32.01	6.69	55.00	29.32	7.35
8/5/2014	12:45	104	55.87	32.08	4.92	55.56	32.02	6.68	55.00	29.32	7.35
8/5/2014	12:46	105	55.89	32.09	4.92	55.56	32.01	6.69	55.00	29.32	7.35
8/5/2014	12:47	106	55.89	32.09	4.92	55.56	32.03	6.68	55.01	29.33	7.34
8/5/2014	12:48	107	55.89	32.09	4.92	55.57	32.02	6.68	55.00	29.32	7.35
8/5/2014	12:49	108	55.85	32.08	4.92	55.56	32.02	6.68	55.00	29.31	7.36
8/5/2014	12:50	109	55.87	32.09	4.91	55.57	32.01	6.69	55.00	29.33	7.34
8/5/2014	12:51	110	55.89	32.09	4.92	55.56	32.01	6.69	55.00	29.30	7.37
8/5/2014	12:52	111	55.89	32.09	4.92	55.56	32.03	6.68	55.00	29.32	7.35
8/5/2014	12:53	112	55.92	32.09	4.91	55.56	32.01	6.69	55.00	29.33	7.34
8/5/2014	12:54	113	55.89	32.09	4.91	55.57	32.01	6.69	55.00	29.32	7.35
8/5/2014	12:55	114	55.89	32.10	4.90	55.56	32.02	6.68	55.00	29.32	7.35
8/5/2014	12:56	115	55.92	32.10	4.90	55.56	32.03	6.67	55.00	29.33	7.34
8/5/2014	12:57	116	55.92	32.10	4.90	55.56	32.02	6.68	55.00	29.33	7.34
8/5/2014	12:58	117	55.94	32.10	4.90	55.56	32.03	6.67	55.00	29.33	7.34
8/5/2014	12:59	118	55.94	32.10	4.90	55.56	32.04	6.66	55.00	29.33	7.34
8/5/2014	13:00	119	55.94	32.10	4.90	55.56	32.03	6.67	55.00	29.34	7.33
8/5/2014	13:01	120	55.94	32.14	4.86	55.56	32.02	6.68	55.00	29.34	7.33
8/5/2014	13:02	121	55.94	32.61	4.39	55.56	32.09	6.61	55.00	29.37	7.30
8/5/2014	13:03	122	55.94	33.01	3.99	55.56	32.21	6.49	55.00	29.45	7.22
8/5/2014	13:04	123	55.89	33.47	3.53	55.57	32.36	6.34	55.00	29.54	7.13
8/5/2014	13:05	124	55.89	33.65	3.35	55.56	32.52	6.18	55.00	29.62	7.05
8/5/2014	13:06	125	55.80	33.59	3.41	55.56	32.62	6.08	55.00	29.65	7.02
8/5/2014	13:07	126	55.78	33.55	3.46	55.56	32.67	6.04	55.00	29.68	6.99
8/5/2014	13:08	127	55.80	33.52	3.48	55.56	32.69	6.02	55.00	29.68	6.99
8/5/2014	13:09	128	55.85	33.50	3.50	55.57	32.70	6.00	55.00	29.69	6.98
8/5/2014	13:10	129	55.87	33.49	3.51	55.57	32.68	6.02	55.01	29.69	6.98
8/5/2014	13:11	130	55.89	33.48	3.52	55.57	32.68	6.03	55.00	29.69	6.98
8/5/2014	13:12	131	55.92	33.48	3.52	55.57	32.69	6.01	55.01	29.70	6.97
8/5/2014	13:13	132	55.92	33.48	3.52	55.57	32.68	6.02	55.00	29.69	6.98
8/5/2014	13:14	133	55.92	33.48	3.52	55.57	32.68	6.02	55.00	29.70	6.97
8/5/2014	13:15	134	55.89	33.48	3.52	55.57	32.70	6.00	55.01	29.69	6.98
8/5/2014	13:16	135	55.92	33.49	3.51	55.57	32.69	6.01	55.01	29.72	6.95
8/5/2014	13:17	136	55.92	33.49	3.51	55.57	32.70	6.00	55.01	29.71	6.96
8/5/2014	13:18	137	55.92	33.49	3.51	55.57	32.69	6.01	55.01	29.71	6.97
8/5/2014	13:19	138	55.94	33.50	3.51	55.57	32.71	5.99	55.01	29.72	6.95
8/5/2014	13:20	139	55.94	33.50	3.50	55.57	32.70	6.00	55.02	29.72	6.95
8/5/2014	13:21	140	55.92	33.51	3.49	55.57	32.72	5.98	55.01	29.70	6.97
8/5/2014	13:22	141	55.92	33.51	3.49	55.57	32.72	5.98	55.01	29.73	6.94
8/5/2014	13:23	142	55.87	33.52	3.48	55.57	32.73	5.98	55.01	29.74	6.94
8/5/2014	13:24	143	55.92	33.52	3.48	55.57	32.73	5.97	55.02	29.71	6.96
8/5/2014	13:25	144	55.92	33.52	3.48	55.57	32.74	5.96	55.01	29.73	6.94
8/5/2014	13:26	145	55.89	33.53	3.47	55.57	32.74	5.96	55.02	29.74	6.93
8/5/2014	13:27	146	55.89	33.54	3.46	55.57	32.75	5.95	55.01	29.73	6.94
8/5/2014	13:28	147	55.92	33.54	3.46	55.57	32.74	5.96	55.02	29.74	6.93
8/5/2014	13:29	148	55.92	33.55	3.45	55.57	32.75	5.95	55.02	29.75	6.92

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Date	Time	ET (min)	Ranney Well			AAI-523			TB2-12		
			Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)
8/5/2014	13:30	149	55.89	33.55	3.45	55.57	32.74	5.96	55.02	29.74	6.93
8/5/2014	13:31	150	55.92	33.55	3.45	55.57	32.75	5.95	55.02	29.75	6.92
8/5/2014	13:32	151	55.92	33.54	3.46	55.57	32.75	5.95	55.02	29.75	6.92
8/5/2014	13:33	152	55.89	33.54	3.46	55.57	32.75	5.95	55.03	29.74	6.93
8/5/2014	13:34	153	55.92	33.54	3.46	55.56	32.75	5.96	55.03	29.75	6.92
8/5/2014	13:35	154	55.92	33.55	3.45	55.57	32.77	5.93	55.02	29.76	6.91
8/5/2014	13:36	155	55.92	33.56	3.45	55.57	32.77	5.93	55.03	29.76	6.91
8/5/2014	13:37	156	55.94	33.56	3.44	55.57	32.76	5.94	55.03	29.77	6.90
8/5/2014	13:38	157	55.94	33.56	3.44	55.57	32.77	5.93	55.03	29.74	6.93
8/5/2014	13:39	158	55.92	33.57	3.43	55.57	32.78	5.92	55.03	29.76	6.91
8/5/2014	13:40	159	55.89	33.57	3.43	55.57	32.77	5.93	55.04	29.77	6.90
8/5/2014	13:41	160	55.89	33.58	3.42	55.57	32.77	5.93	55.03	29.77	6.90
8/5/2014	13:42	161	55.87	33.58	3.42	55.57	32.78	5.92	55.03	29.78	6.89
8/5/2014	13:43	162	55.89	33.58	3.42	55.57	32.79	5.91	55.03	29.78	6.89
8/5/2014	13:44	163	55.92	33.58	3.42	55.57	32.79	5.91	55.03	29.76	6.91
8/5/2014	13:45	164	55.87	33.58	3.42	55.57	32.78	5.92	55.03	29.78	6.89
8/5/2014	13:46	165	55.89	33.59	3.41	55.57	32.80	5.90	55.04	29.77	6.90
8/5/2014	13:47	166	55.85	33.59	3.41	55.57	32.79	5.91	55.04	29.79	6.88
8/5/2014	13:48	167	55.89	33.59	3.41	55.57	32.80	5.90	55.04	29.79	6.88
8/5/2014	13:49	168	55.89	33.59	3.41	55.57	32.80	5.90	55.04	29.79	6.88
8/5/2014	13:50	169	55.87	33.60	3.40	55.57	32.80	5.90	55.04	29.77	6.90
8/5/2014	13:51	170	55.89	33.60	3.40	55.57	32.80	5.90	55.04	29.79	6.88
8/5/2014	13:52	171	55.89	33.60	3.40	55.57	32.79	5.91	55.04	29.78	6.89
8/5/2014	13:53	172	55.89	33.60	3.40	55.57	32.81	5.89	55.04	29.80	6.87
8/5/2014	13:54	173	55.89	33.60	3.40	55.57	32.81	5.89	55.04	29.79	6.89
8/5/2014	13:55	174	55.89	33.60	3.40	55.57	32.83	5.87	55.05	29.79	6.89
8/5/2014	13:56	175	55.89	33.61	3.39	55.57	32.82	5.88	55.04	29.80	6.87
8/5/2014	13:57	176	55.89	33.61	3.39	55.58	32.82	5.88	55.04	29.80	6.87
8/5/2014	13:58	177	55.89	33.61	3.39	55.57	32.83	5.88	55.04	29.81	6.86
8/5/2014	13:59	178	55.87	33.60	3.40	55.58	32.84	5.87	55.04	29.81	6.86
8/5/2014	14:00	179	55.85	33.60	3.41	55.57	32.83	5.87	55.04	29.81	6.86
8/5/2014	14:01	180	55.87	33.60	3.40	55.57	32.82	5.88	55.04	29.79	6.88
8/5/2014	14:02	181	55.89	33.60	3.40	55.57	32.83	5.87	55.04	29.81	6.86
8/5/2014	14:03	182	55.87	33.61	3.39	55.57	32.83	5.87	55.03	29.80	6.87
8/5/2014	14:04	183	55.89	33.62	3.39	55.57	32.83	5.88	55.04	29.80	6.88
8/5/2014	14:05	184	55.89	33.62	3.39	55.57	32.83	5.87	55.04	29.80	6.87
8/5/2014	14:06	185	55.89	33.62	3.38	55.57	32.83	5.87	55.04	29.80	6.87
8/5/2014	14:07	186	55.85	33.63	3.37	55.57	32.84	5.86	55.04	29.81	6.86
8/5/2014	14:08	187	55.89	33.63	3.37	55.57	32.85	5.85	55.04	29.81	6.86
8/5/2014	14:09	188	55.89	33.63	3.37	55.57	32.85	5.85	55.04	29.81	6.86
8/5/2014	14:10	189	55.87	33.64	3.36	55.57	32.85	5.85	55.04	29.82	6.85
8/5/2014	14:11	190	55.83	33.64	3.36	55.57	32.84	5.86	55.03	29.81	6.86
8/5/2014	14:12	191	55.87	33.65	3.36	55.57	32.85	5.85	55.03	29.83	6.84
8/5/2014	14:13	192	55.89	33.65	3.36	55.57	32.87	5.83	55.04	29.83	6.85
8/5/2014	14:14	193	55.89	33.65	3.36	55.57	32.85	5.85	55.03	29.84	6.83
8/5/2014	14:15	194	55.89	33.65	3.36	55.57	32.84	5.86	55.03	29.84	6.84
8/5/2014	14:16	195	55.87	33.65	3.35	55.57	32.86	5.84	55.03	29.84	6.83
8/5/2014	14:17	196	55.87	33.65	3.35	55.57	32.86	5.84	55.03	29.82	6.85
8/5/2014	14:18	197	55.89	33.66	3.34	55.57	32.87	5.83	55.03	29.84	6.83
8/5/2014	14:19	198	55.87	33.66	3.34	55.57	32.88	5.83	55.03	29.83	6.84
8/5/2014	14:20	199	55.87	33.66	3.34	55.57	32.88	5.82	55.03	29.83	6.84
8/5/2014	14:21	200	55.89	33.66	3.34	55.57	32.85	5.85	55.03	29.82	6.85
8/5/2014	14:22	201	55.89	33.66	3.34	55.57	32.87	5.83	55.03	29.84	6.83
8/5/2014	14:23	202	55.89	33.66	3.34	55.57	32.86	5.84	55.03	29.84	6.83
8/5/2014	14:24	203	55.87	33.66	3.34	55.57	32.88	5.82	55.03	29.85	6.82
8/5/2014	14:25	204	55.89	33.67	3.33	55.56	32.87	5.83	55.03	29.83	6.84
8/5/2014	14:26	205	55.87	33.67	3.33	55.57	32.89	5.82	55.02	29.84	6.83
8/5/2014	14:27	206	55.85	33.67	3.33	55.57	32.87	5.83	55.03	29.85	6.83
8/5/2014	14:28	207	55.87	33.68	3.33	55.57	32.89	5.81	55.03	29.83	6.84
8/5/2014	14:29	208	55.87	33.68	3.32	55.57	32.88	5.82	55.03	29.85	6.82
8/5/2014	14:30	209	55.89	33.68	3.32	55.57	32.89	5.81	55.03	29.84	6.83
8/5/2014	14:31	210	55.87	33.69	3.31	55.57	32.89	5.81	55.03	29.85	6.82
8/5/2014	14:32	211	55.89	33.68	3.32	55.57	32.89	5.81	55.03	29.86	6.81
8/5/2014	14:33	212	55.89	33.68	3.32	55.57	32.89	5.81	55.03	29.86	6.81

#29174 Woodland, WA

Date	Time	ET (min)	Ranney Well			AAI-523			TB2-12		
			Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)
8/5/2014	14:34	213	55.83	33.68	3.32	55.57	32.90	5.80	55.03	29.86	6.81
8/5/2014	14:35	214	55.87	33.69	3.31	55.57	32.90	5.80	55.03	29.87	6.80
8/5/2014	14:36	215	55.87	33.69	3.31	55.57	32.90	5.80	55.03	29.84	6.83
8/5/2014	14:37	216	55.89	33.69	3.31	55.56	32.91	5.80	55.03	29.86	6.81
8/5/2014	14:38	217	55.87	33.69	3.31	55.57	32.89	5.81	55.03	29.87	6.81
8/5/2014	14:39	218	55.89	33.70	3.30	55.57	32.90	5.80	55.03	29.87	6.81
8/5/2014	14:40	219	55.89	33.70	3.30	55.57	32.91	5.79	55.03	29.86	6.81
8/5/2014	14:41	220	55.87	33.70	3.30	55.57	32.90	5.80	55.03	29.88	6.79
8/5/2014	14:42	221	55.87	33.71	3.30	55.57	32.91	5.79	55.03	29.86	6.81
8/5/2014	14:43	222	55.89	33.71	3.29	55.57	32.91	5.79	55.03	29.86	6.81
8/5/2014	14:44	223	55.89	33.71	3.29	55.57	32.92	5.78	55.03	29.89	6.78
8/5/2014	14:45	224	55.87	33.71	3.29	55.57	32.91	5.79	55.04	29.88	6.79
8/5/2014	14:46	225	55.89	33.71	3.29	55.57	32.92	5.78	55.02	29.89	6.78
8/5/2014	14:47	226	55.87	33.72	3.28	55.57	32.92	5.78	55.03	29.87	6.80
8/5/2014	14:48	227	55.89	33.72	3.28	55.57	32.92	5.78	55.03	29.89	6.78
8/5/2014	14:49	228	55.87	33.72	3.28	55.57	32.92	5.78	55.03	29.86	6.81
8/5/2014	14:50	229	55.87	33.72	3.28	55.57	32.92	5.78	55.03	29.89	6.79
8/5/2014	14:51	230	55.89	33.72	3.28	55.57	32.92	5.78	55.03	29.89	6.78
8/5/2014	14:52	231	55.87	33.73	3.27	55.57	32.93	5.77	55.03	29.89	6.78
8/5/2014	14:53	232	55.87	33.73	3.27	55.57	32.93	5.77	55.03	29.88	6.79
8/5/2014	14:54	233	55.87	33.73	3.27	55.57	32.93	5.77	55.03	29.90	6.77
8/5/2014	14:55	234	55.87	33.73	3.27	55.57	32.93	5.77	55.03	29.88	6.79
8/5/2014	14:56	235	55.89	33.74	3.26	55.57	32.94	5.76	55.02	29.89	6.78
8/5/2014	14:57	236	55.89	33.74	3.26	55.57	32.94	5.77	55.02	29.90	6.77
8/5/2014	14:58	237	55.89	33.74	3.26	55.57	32.95	5.75	55.03	29.91	6.76
8/5/2014	14:59	238	55.89	33.74	3.26	55.57	32.94	5.76	55.03	29.89	6.78
8/5/2014	15:00	239	55.89	33.74	3.26	55.57	32.95	5.75	55.03	29.90	6.77
8/5/2014	15:01		55.89	33.04	3.96	55.57	32.93	5.77	55.03	29.90	6.77
8/5/2014	15:02		55.87	31.64	5.37	55.57	32.67	6.03	55.03	29.68	7.00
8/5/2014	15:03		55.83	30.89	6.11	55.56	32.29	6.41	55.03	29.48	7.19
8/5/2014	15:04		55.83	30.42	6.58	55.55	31.97	6.73	55.03	29.30	7.37
8/5/2014	15:05		55.78	30.12	6.89	55.54	31.68	7.02	55.03	29.19	7.48
8/5/2014	15:06		55.73	29.92	7.08	55.53	31.44	7.26	55.02	29.09	7.58
8/5/2014	15:07		55.80	29.79	7.21	55.53	31.31	7.40	55.02	29.03	7.64
8/5/2014	15:08		55.87	29.71	7.30	55.52	31.22	7.49	55.02	28.98	7.69
8/5/2014	15:09		55.92	29.65	7.36	55.52	31.16	7.54	55.02	28.92	7.75
8/5/2014	15:10		55.92	29.60	7.40	55.52	31.11	7.59	55.01	28.91	7.77
8/5/2014	15:11		55.92	29.57	7.43	55.52	31.07	7.63	55.01	28.87	7.80
8/5/2014	15:12		55.85	29.55	7.45	55.52	31.04	7.66	55.01	28.86	7.81
8/5/2014	15:13		55.83	29.53	7.47	55.52	31.01	7.69	55.02	28.83	7.84
8/5/2014	15:14		55.85	29.51	7.49	55.52	30.99	7.71	55.01	28.81	7.86
8/5/2014	15:15		55.85	29.50	7.50	55.52	30.98	7.72	55.01	28.82	7.85
8/5/2014	15:16		55.85	29.49	7.52	55.52	30.99	7.72	55.01	28.79	7.88
8/5/2014	15:17		55.85	29.48	7.52	55.52	30.95	7.75	55.01	28.77	7.90
8/5/2014	15:18		55.87	29.46	7.54	55.52	30.94	7.76	55.01	28.77	7.90
8/5/2014	15:19		55.89	29.46	7.54	55.52	30.93	7.77	55.00	28.76	7.91
8/5/2014	15:20		55.89	29.44	7.56	55.52	30.93	7.77	55.01	28.75	7.92
8/5/2014	15:21		55.87	29.44	7.56	55.52	30.91	7.79	55.00	28.75	7.92
8/5/2014	15:22		55.89	29.43	7.57	55.52	30.90	7.80	55.00	28.75	7.93
8/5/2014	15:23		55.92	29.43	7.57	55.53	30.90	7.80	55.01	28.73	7.94
8/5/2014	15:24		55.92	29.42	7.58	55.53	30.90	7.80	55.00	28.74	7.93
8/5/2014	15:25		55.94	29.42	7.59	55.53	30.88	7.82	55.01	28.73	7.94
8/5/2014	15:26		55.94	29.41	7.59	55.52	30.88	7.82	55.01	28.72	7.96
8/5/2014	15:27		55.94	29.40	7.60	55.52	30.86	7.84	55.00	28.72	7.95
8/5/2014	15:28		55.94	29.40	7.60	55.53	30.86	7.84	55.00	28.68	7.99
8/5/2014	15:29		55.94	29.39	7.61	55.53	30.85	7.85	55.00	28.70	7.98
8/5/2014	15:30		55.94	29.39	7.61	55.53	30.85	7.85	55.00	28.70	7.97
8/5/2014	15:31		55.94	29.39	7.62	55.53	30.85	7.85	55.00	28.69	7.98
8/5/2014	15:32		55.94	29.38	7.62	55.53	30.84	7.86	54.99	28.68	7.99
8/5/2014	15:33		55.94	29.37	7.63	55.52	30.84	7.86	55.00	28.68	7.99
8/5/2014	15:34		55.94	29.46	7.54	55.53	30.83	7.87	55.00	28.68	7.99
8/5/2014	15:35		55.94	30.30	6.71	55.53	30.95	7.75	55.00	28.76	7.91
8/5/2014	15:36		55.96	30.95	6.05	55.53	31.16	7.54	55.00	28.88	7.79
8/5/2014	15:37		55.96	31.29	5.71	55.54	31.42	7.28	55.00	29.04	7.63



#29174 Woodland, WA

Date	Time	ET (min)	Ranney Well			AAI-523			TB2-12		
			Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)
8/5/2014	15:38		55.98	31.46	5.54	55.53	31.58	7.12	55.00	29.09	7.58
8/5/2014	15:39		56.03	31.59	5.41	55.53	31.71	6.99	55.01	29.17	7.50
8/5/2014	15:40		56.03	31.67	5.33	55.53	31.79	6.92	55.00	29.22	7.45
8/5/2014	15:41		55.98	31.73	5.27	55.54	31.85	6.86	55.01	29.25	7.42
8/5/2014	15:42		56.01	31.77	5.23	55.54	31.89	6.81	55.01	29.27	7.40
8/5/2014	15:43		55.98	31.80	5.20	55.54	31.92	6.78	55.01	29.29	7.38
8/5/2014	15:44		55.96	31.82	5.18	55.54	31.94	6.76	55.01	29.30	7.37
8/5/2014	15:45		55.96	31.83	5.17	55.54	31.96	6.74	55.01	29.32	7.36
8/5/2014	15:46		55.96	31.85	5.15	55.55	31.97	6.74	55.01	29.31	7.36
8/5/2014	15:47		55.98	31.86	5.14	55.54	31.97	6.73	55.01	29.32	7.35
8/5/2014	15:48		55.98	31.87	5.13	55.54	31.99	6.72	55.01	29.33	7.34
8/5/2014	15:49		55.98	31.88	5.13	55.54	31.99	6.71	55.01	29.33	7.34
8/5/2014	15:50		55.94	31.88	5.12	55.54	31.99	6.71	55.00	29.35	7.32
8/5/2014	15:51		55.94	31.88	5.12	55.55	32.00	6.70	55.01	29.35	7.32
8/5/2014	15:52		55.89	31.89	5.11	55.55	32.00	6.70	55.01	29.36	7.31
8/5/2014	15:53		55.85	31.90	5.10	55.54	32.00	6.70	55.01	29.36	7.31
8/5/2014	15:54		55.92	31.90	5.10	55.55	32.01	6.69	55.01	29.36	7.31
8/5/2014	15:55		55.94	31.90	5.10	55.55	32.02	6.68	55.01	29.36	7.31
8/5/2014	15:56		55.89	31.91	5.09	55.54	32.03	6.67	55.01	29.37	7.30
8/5/2014	15:57		55.92	31.91	5.09	55.54	32.02	6.68	55.01	29.36	7.31
8/5/2014	15:58		55.92	31.91	5.09	55.55	32.04	6.66	55.01	29.37	7.30
8/5/2014	15:59		55.89	31.92	5.08	55.55	32.04	6.66	55.01	29.38	7.29
8/5/2014	16:00		55.87	31.92	5.08	55.55	32.05	6.65	55.01	29.36	7.31
8/5/2014	16:01		55.89	31.92	5.08	55.55	32.05	6.65	55.01	29.38	7.29
8/5/2014	16:02		55.92	31.93	5.07	55.55	32.06	6.65	55.01	29.38	7.29
8/5/2014	16:03		55.92	31.93	5.07	55.55	32.05	6.65	55.01	29.40	7.27
8/5/2014	16:04		55.89	31.93	5.07	55.55	32.06	6.64	55.01	29.39	7.28
8/5/2014	16:05		55.83	31.93	5.07	55.55	32.05	6.66	55.01	29.39	7.28
8/5/2014	16:06		55.83	31.94	5.06	55.55	32.05	6.65	55.01	29.37	7.30
8/5/2014	16:07		55.83	31.94	5.06	55.55	32.05	6.66	55.01	29.38	7.29
8/5/2014	16:08		55.85	31.94	5.06	55.55	32.06	6.64	55.01	29.39	7.28
8/5/2014	16:09		55.92	31.95	5.05	55.55	32.06	6.64	55.01	29.38	7.29
8/5/2014	16:10		55.87	31.95	5.05	55.56	32.07	6.63	55.01	29.40	7.27
8/5/2014	16:11		55.85	31.63	5.37	55.55	32.03	6.67	55.01	29.38	7.29
8/5/2014	16:12		55.85	31.30	5.70	55.55	31.94	6.76	55.01	29.32	7.35
8/5/2014	16:13		55.87	31.10	5.91	55.55	31.83	6.87	55.01	29.26	7.41
8/5/2014	16:14		55.87	30.96	6.04	55.55	31.74	6.96	55.01	29.21	7.46
8/5/2014	16:15		55.92	30.87	6.13	55.55	31.66	7.04	55.01	29.18	7.49
8/5/2014	16:16		55.94	30.81	6.19	55.55	31.60	7.10	55.00	29.15	7.52
8/5/2014	16:17		55.96	30.78	6.22	55.55	31.57	7.13	55.01	29.12	7.55
8/5/2014	16:18		55.96	30.75	6.25	55.56	31.53	7.17	55.00	29.11	7.56
8/5/2014	16:19		55.96	30.73	6.27	55.55	31.52	7.18	55.00	29.09	7.58
8/5/2014	16:20		55.96	30.71	6.29	55.55	31.51	7.20	55.01	29.08	7.59
8/5/2014	16:21		55.98	30.70	6.30	55.55	31.50	7.20	55.01	29.08	7.59
8/5/2014	16:22		55.96	30.70	6.30	55.55	31.49	7.21	55.00	29.07	7.61
8/5/2014	16:23		55.96	30.69	6.32	55.55	31.49	7.21	55.00	29.07	7.60
8/5/2014	16:24		55.96	30.84	6.16	55.55	31.47	7.23	55.00	29.08	7.59
8/5/2014	16:25		55.96	31.21	5.79	55.55	31.55	7.15	55.00	29.13	7.54
8/5/2014	16:26		55.96	31.54	5.46	55.55	31.65	7.05	55.01	29.18	7.49
8/5/2014	16:27		55.98	31.67	5.33	55.55	31.78	6.92	55.00	29.24	7.43
8/5/2014	16:28		55.96	31.75	5.25	55.54	31.86	6.84	55.00	29.26	7.41
8/5/2014	16:29		55.89	31.81	5.19	55.55	31.91	6.79	55.00	29.31	7.36
8/5/2014	16:30		55.89	31.85	5.15	55.55	31.96	6.74	55.01	29.34	7.34
8/5/2014	16:31		55.89	31.88	5.12	55.55	31.97	6.73	55.00	29.35	7.32
8/5/2014	16:32		55.89	31.90	5.10	55.55	32.00	6.70	55.01	29.35	7.32
8/5/2014	16:33		55.94	31.91	5.09	55.55	32.02	6.68	55.00	29.37	7.30
8/5/2014	16:34		55.92	31.93	5.07	55.55	32.03	6.67	55.00	29.38	7.29
8/5/2014	16:35		55.92	31.93	5.07	55.55	32.04	6.66	55.00	29.38	7.29
8/5/2014	16:36		55.89	31.95	5.06	55.55	32.05	6.65	55.00	29.39	7.29
8/5/2014	16:37		55.94	31.95	5.05	55.55	32.06	6.65	55.00	29.39	7.28
8/5/2014	16:38		55.89	31.96	5.04	55.55	32.07	6.63	55.01	29.41	7.26
8/5/2014	16:39		55.92	31.96	5.04	55.55	32.07	6.63	55.00	29.39	7.29
8/5/2014	16:40		55.94	31.97	5.04	55.55	32.07	6.63	55.01	29.40	7.27
8/5/2014	16:41		55.92	31.97	5.03	55.55	32.07	6.63	55.01	29.40	7.27

#29174 Woodland, WA

Date	Time	ET (min)	Ranney Well			AAI-523			TB2-12		
			Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)
8/5/2014	16:42		55.92	31.97	5.03	55.55	32.08	6.62	55.00	29.41	7.26
8/5/2014	16:43		55.92	31.98	5.02	55.55	32.08	6.63	55.01	29.42	7.25
8/5/2014	16:44		55.89	31.99	5.01	55.55	32.09	6.61	55.00	29.43	7.24
8/5/2014	16:45		55.85	32.00	5.00	55.55	32.09	6.61	55.00	29.42	7.25
8/5/2014	16:46		55.85	31.99	5.01	55.55	32.10	6.60	55.01	29.44	7.24
8/5/2014	16:47		55.85	31.99	5.01	55.55	32.10	6.61	55.00	29.43	7.24
8/5/2014	16:48		55.89	31.99	5.01	55.54	32.09	6.61	55.01	29.44	7.23
8/5/2014	16:49		55.89	31.99	5.01	55.55	32.10	6.60	55.01	29.43	7.25
8/5/2014	16:50		55.87	31.99	5.01	55.55	32.09	6.61	55.01	29.44	7.23
8/5/2014	16:51		55.92	31.99	5.01	55.55	32.10	6.60	55.01	29.43	7.24
8/5/2014	16:52		55.92	31.61	5.39	55.55	32.07	6.63	55.00	29.40	7.27
8/5/2014	16:53		55.85	31.27	5.73	55.55	31.95	6.75	55.02	29.35	7.32
8/5/2014	16:54		55.78	31.06	5.94	55.55	31.84	6.86	55.01	29.28	7.39
8/5/2014	16:55		55.78	30.93	6.07	55.55	31.73	6.97	55.00	29.23	7.44
8/5/2014	16:56		55.87	30.84	6.16	55.55	31.65	7.05	55.00	29.19	7.48
8/5/2014	16:57		55.92	30.78	6.22	55.54	31.60	7.10	55.00	29.16	7.51
8/5/2014	16:58		55.92	30.74	6.26	55.55	31.58	7.12	55.00	29.14	7.53
8/5/2014	16:59		55.94	30.71	6.29	55.55	31.54	7.16	55.00	29.11	7.56
8/5/2014	17:00		55.96	30.69	6.31	55.55	31.52	7.18	55.01	29.11	7.56
8/5/2014	17:05		55.96	31.60	5.40	55.55	31.69	7.02	55.00	29.21	7.46
8/5/2014	17:10		55.89	31.92	5.09	55.54	32.02	6.68	55.01	29.39	7.28
8/5/2014	17:15		55.87	31.99	5.01	55.54	32.07	6.63	55.01	29.43	7.24
8/5/2014	17:20		55.85	32.02	4.98	55.55	32.10	6.60	55.00	29.46	7.21
8/5/2014	17:25		55.94	32.03	4.97	55.55	32.12	6.58	55.00	29.46	7.21
8/5/2014	17:30		55.78	32.04	4.96	55.55	32.13	6.58	55.01	29.46	7.21
8/5/2014	17:35		55.85	32.05	4.95	55.56	32.15	6.55	55.01	29.46	7.21
8/5/2014	17:40		55.76	32.06	4.94	55.56	32.15	6.55	55.00	29.49	7.18
8/5/2014	17:45		55.78	32.06	4.94	55.56	32.16	6.55	55.01	29.49	7.18
8/5/2014	17:50		55.78	32.07	4.93	55.57	32.17	6.53	55.01	29.50	7.17
8/5/2014	17:55		55.76	32.08	4.92	55.57	32.16	6.54	55.00	29.51	7.16
8/5/2014	18:00		55.87	32.09	4.91	55.56	32.17	6.53	55.00	29.52	7.16
8/5/2014	18:05		55.80	32.09	4.91	55.57	32.19	6.51	55.00	29.52	7.15
8/5/2014	18:10		55.76	32.10	4.90	55.56	32.18	6.52	55.00	29.53	7.15
8/5/2014	18:15		55.80	32.11	4.89	55.56	32.19	6.51	55.00	29.53	7.14
8/5/2014	18:20		55.80	32.11	4.89	55.57	32.20	6.50	55.01	29.53	7.15
8/5/2014	18:25		55.71	32.12	4.88	55.56	32.20	6.50	55.01	29.54	7.13
8/5/2014	18:30		55.78	32.12	4.88	55.57	32.21	6.49	55.01	29.51	7.16
8/5/2014	18:35		55.73	32.12	4.88	55.56	32.21	6.49	55.01	29.54	7.13
8/5/2014	18:40		55.83	32.11	4.89	55.56	32.21	6.49	55.01	29.54	7.13
8/5/2014	18:45		55.78	32.12	4.88	55.57	32.22	6.48	55.01	29.55	7.13
8/5/2014	18:50		55.73	32.14	4.87	55.56	32.22	6.48	55.01	29.55	7.12
8/5/2014	18:55		55.78	32.14	4.86	55.57	32.24	6.46	55.01	29.55	7.12
8/5/2014	19:00		55.78	32.14	4.86	55.57	32.23	6.47	55.01	29.56	7.11
8/5/2014	19:05		55.80	32.14	4.86	55.57	32.24	6.46	55.01	29.57	7.10
8/5/2014	19:10		55.85	32.15	4.85	55.57	32.24	6.46	55.01	29.55	7.12
8/5/2014	19:15		55.78	32.15	4.85	55.56	32.24	6.46	55.01	29.56	7.11
8/5/2014	19:20		55.83	32.15	4.85	55.57	32.24	6.46	55.02	29.57	7.10
8/5/2014	19:25		55.83	32.16	4.84	55.57	32.24	6.46	55.02	29.57	7.10
8/5/2014	19:30		55.78	32.16	4.85	55.57	32.25	6.46	55.01	29.57	7.11
8/5/2014	19:35		55.80	32.16	4.84	55.56	32.24	6.46	55.01	29.58	7.10
8/5/2014	19:40		55.76	32.16	4.84	55.57	32.24	6.46	55.01	29.57	7.10
8/5/2014	19:45		55.85	32.17	4.83	55.57	32.25	6.45	55.01	29.57	7.10
8/5/2014	19:50		55.83	32.17	4.83	55.57	32.25	6.45	55.02	29.58	7.09
8/5/2014	19:55		55.83	32.17	4.83	55.56	32.26	6.44	55.02	29.58	7.09
8/5/2014	20:00		55.78	32.17	4.83	55.56	32.26	6.44	55.01	29.57	7.10
8/5/2014	20:05		55.85	32.18	4.83	55.56	32.25	6.45	55.02	29.58	7.09
8/5/2014	20:10		55.83	32.17	4.83	55.56	32.26	6.44	55.02	29.58	7.09
8/5/2014	20:15		55.71	32.17	4.83	55.56	32.26	6.44	55.02	29.58	7.09
8/5/2014	20:20		55.78	32.17	4.83	55.57	32.26	6.45	55.02	29.58	7.09
8/5/2014	20:25		55.78	32.18	4.82	55.56	32.27	6.43	55.02	29.59	7.08
8/5/2014	20:30		55.80	32.17	4.83	55.56	32.26	6.44	55.01	29.59	7.08
8/5/2014	20:35		55.73	32.18	4.82	55.57	32.26	6.44	55.02	29.56	7.11
8/5/2014	20:40		55.78	32.18	4.82	55.56	32.27	6.43	55.02	29.59	7.09
8/5/2014	20:45		55.80	32.18	4.82	55.56	32.26	6.44	55.02	29.59	7.09

#29174 Woodland, WA

Date	Time	ET (min)	Raney Well			AAI-523			TB2-12		
			Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)
8/5/2014	20:50		55.76	32.18	4.82	55.56	32.27	6.43	55.02	29.59	7.08
8/5/2014	20:55		55.73	32.17	4.83	55.57	32.25	6.45	55.02	29.58	7.09
8/5/2014	21:00		55.78	32.17	4.83	55.56	32.26	6.44	55.02	29.58	7.09
8/5/2014	21:05		55.78	32.17	4.83	55.57	32.26	6.44	55.02	29.58	7.10
8/5/2014	21:10		55.80	32.16	4.85	55.57	32.27	6.43	55.01	29.57	7.10
8/5/2014	21:15		55.78	32.15	4.85	55.56	32.25	6.45	55.02	29.56	7.11
8/5/2014	21:20		55.83	32.13	4.87	55.57	32.24	6.46	55.02	29.55	7.12
8/5/2014	21:25		55.73	32.11	4.89	55.56	32.22	6.48	55.02	29.54	7.13
8/5/2014	21:30		55.71	32.09	4.91	55.56	32.21	6.50	55.01	29.51	7.16
8/5/2014	21:35		55.83	32.06	4.94	55.57	32.20	6.50	55.01	29.50	7.17
8/5/2014	21:40		55.78	32.03	4.97	55.57	32.17	6.53	55.01	29.47	7.20
8/5/2014	21:45		55.71	32.00	5.01	55.56	32.15	6.55	55.01	29.44	7.23
8/5/2014	21:50		55.80	31.96	5.04	55.56	32.13	6.57	55.01	29.41	7.26
8/5/2014	21:55		55.73	31.93	5.07	55.57	32.09	6.61	55.01	29.38	7.29
8/5/2014	22:00		55.83	31.90	5.11	55.56	32.08	6.62	55.01	29.34	7.33
8/5/2014	22:05		55.83	31.86	5.14	55.56	32.05	6.65	55.01	29.32	7.35
8/5/2014	22:10		55.69	31.82	5.18	55.56	32.02	6.68	55.01	29.29	7.38
8/5/2014	22:15		55.69	31.78	5.22	55.57	32.01	6.69	55.00	29.27	7.40
8/5/2014	22:20		55.73	31.75	5.25	55.56	31.95	6.75	55.01	29.23	7.44
8/5/2014	22:25		55.87	31.72	5.28	55.56	31.94	6.76	55.01	29.19	7.48
8/5/2014	22:30		55.64	31.68	5.32	55.56	31.91	6.80	55.01	29.18	7.49
8/5/2014	22:35		55.80	31.64	5.36	55.56	31.88	6.82	55.00	29.13	7.54
8/5/2014	22:40		55.67	31.61	5.40	55.56	31.85	6.86	55.00	29.11	7.56
8/5/2014	22:45		55.80	31.57	5.43	55.56	31.82	6.88	55.00	29.06	7.61
8/5/2014	22:50		55.69	31.53	5.47	55.56	31.80	6.90	55.00	29.04	7.63
8/5/2014	22:55		55.83	31.50	5.50	55.56	31.79	6.92	55.00	29.01	7.66
8/5/2014	23:00		55.69	31.47	5.53	55.56	31.76	6.94	55.00	28.99	7.69
8/5/2014	23:05		55.87	31.44	5.56	55.56	31.73	6.98	55.00	28.96	7.72
8/5/2014	23:10		55.80	31.41	5.59	55.55	31.70	7.00	55.00	28.94	7.73
8/5/2014	23:15		55.76	31.38	5.62	55.56	31.67	7.04	55.00	28.92	7.75
8/5/2014	23:20		55.78	31.35	5.65	55.56	31.67	7.03	55.00	28.88	7.79
8/5/2014	23:25		55.71	31.33	5.67	55.56	31.64	7.06	55.00	28.87	7.81
8/5/2014	23:30		55.73	31.30	5.70	55.56	31.62	7.08	54.99	28.84	7.83
8/5/2014	23:35		55.83	31.27	5.73	55.56	31.59	7.11	54.99	28.81	7.86
8/5/2014	23:40		55.67	31.25	5.75	55.56	31.57	7.13	55.00	28.80	7.87
8/5/2014	23:45		55.73	31.23	5.78	55.56	31.54	7.16	55.00	28.77	7.90
8/5/2014	23:50		55.73	31.20	5.80	55.56	31.54	7.16	54.99	28.75	7.92
8/5/2014	23:55		55.78	31.18	5.82	55.56	31.51	7.19	54.99	28.72	7.95
8/6/2014	0:00		55.83	31.15	5.85	55.56	31.49	7.21	55.00	28.72	7.96
8/6/2014	0:05		55.76	31.13	5.87	55.56	31.48	7.22	55.00	28.70	7.97
8/6/2014	0:10		55.83	31.12	5.88	55.56	31.46	7.24	54.99	28.67	8.00
8/6/2014	0:15		55.80	31.09	5.91	55.56	31.46	7.24	55.00	28.66	8.01
8/6/2014	0:20		55.80	31.08	5.93	55.56	31.44	7.26	54.99	28.63	8.04
8/6/2014	0:25		55.87	31.06	5.94	55.56	31.41	7.29	55.00	28.64	8.04
8/6/2014	0:30		55.80	31.04	5.96	55.56	31.39	7.31	54.99	28.63	8.05
8/6/2014	0:35		55.73	31.03	5.97	55.56	31.40	7.30	54.99	28.60	8.08
8/6/2014	0:40		55.87	31.01	5.99	55.56	31.37	7.33	54.99	28.58	8.09
8/6/2014	0:45		55.76	31.00	6.00	55.56	31.35	7.35	54.99	28.57	8.10
8/6/2014	0:50		55.78	30.99	6.01	55.56	31.35	7.35	54.99	28.56	8.11
8/6/2014	0:55		55.80	30.98	6.02	55.56	31.34	7.37	55.00	28.56	8.11
8/6/2014	1:00		55.76	30.98	6.02	55.56	31.34	7.36	54.99	28.55	8.12
8/6/2014	1:05		55.85	30.97	6.03	55.56	31.34	7.36	54.99	28.55	8.12
8/6/2014	1:10		55.83	30.97	6.03	55.56	31.31	7.39	55.00	28.54	8.13
8/6/2014	1:15		55.87	30.96	6.04	55.56	31.32	7.38	55.00	28.54	8.13
8/6/2014	1:20		55.80	30.96	6.04	55.56	31.32	7.38	54.99	28.53	8.14
8/6/2014	1:25		55.85	30.96	6.05	55.56	31.31	7.39	54.99	28.54	8.13
8/6/2014	1:30		55.71	30.95	6.05	55.56	31.30	7.40	54.99	28.54	8.13
8/6/2014	1:35		55.78	30.97	6.04	55.57	31.31	7.40	54.99	28.54	8.13
8/6/2014	1:40		55.83	30.97	6.03	55.56	31.32	7.38	55.00	28.56	8.12
8/6/2014	1:45		55.85	30.98	6.02	55.56	31.32	7.39	55.00	28.55	8.12
8/6/2014	1:50		55.76	30.98	6.02	55.56	31.32	7.38	54.99	28.56	8.11
8/6/2014	1:55		55.83	30.99	6.01	55.56	31.33	7.37	54.99	28.57	8.10
8/6/2014	2:00		55.73	31.00	6.00	55.56	31.32	7.38	54.99	28.56	8.11
8/6/2014	2:05		55.83	31.01	5.99	55.56	31.33	7.37	55.00	28.59	8.09

#29174 Woodland, WA

Date	Time	ET (min)	Ranney Well			AAI-523			TB2-12		
			Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)
8/6/2014	2:10		55.80	31.03	5.97	55.56	31.35	7.35	55.00	28.61	8.06
8/6/2014	2:15		55.78	31.04	5.96	55.56	31.36	7.34	55.00	28.62	8.05
8/6/2014	2:20		55.80	31.04	5.96	55.56	31.35	7.35	54.99	28.60	8.07
8/6/2014	2:25		55.73	31.06	5.95	55.55	31.38	7.32	55.00	28.63	8.05
8/6/2014	2:30		55.80	31.06	5.94	55.56	31.37	7.33	54.99	28.64	8.03
8/6/2014	2:35		55.92	31.08	5.92	55.56	31.37	7.33	55.00	28.65	8.02
8/6/2014	2:40		55.80	31.09	5.91	55.56	31.38	7.32	54.99	28.67	8.01
8/6/2014	2:45		55.76	31.10	5.90	55.56	31.38	7.32	54.99	28.67	8.00
8/6/2014	2:50		55.85	31.11	5.89	55.56	31.39	7.31	55.00	28.68	7.99
8/6/2014	2:55		55.83	31.12	5.88	55.56	31.42	7.28	54.99	28.68	7.99
8/6/2014	3:00		55.92	31.13	5.87	55.56	31.41	7.29	55.00	28.69	7.98
8/6/2014	3:05		55.78	31.14	5.87	55.57	31.43	7.27	55.00	28.70	7.97
8/6/2014	3:10		55.85	31.15	5.85	55.56	31.42	7.29	54.99	28.71	7.96
8/6/2014	3:15		55.80	31.15	5.85	55.56	31.43	7.27	55.00	28.72	7.95
8/6/2014	3:20		55.87	31.17	5.83	55.56	31.42	7.28	55.00	28.73	7.94
8/6/2014	3:25		55.83	31.18	5.82	55.56	31.46	7.24	55.00	28.74	7.93
8/6/2014	3:30		55.80	31.19	5.81	55.56	31.45	7.25	54.99	28.74	7.93
8/6/2014	3:35		55.85	31.20	5.80	55.56	31.47	7.23	54.99	28.77	7.90
8/6/2014	3:40		55.80	31.21	5.79	55.56	31.47	7.23	54.99	28.77	7.90
8/6/2014	3:45		55.87	31.22	5.78	55.56	31.48	7.22	54.99	28.77	7.90
8/6/2014	3:50		55.83	31.23	5.77	55.56	31.48	7.22	55.00	28.79	7.88
8/6/2014	3:55		55.80	31.25	5.75	55.57	31.49	7.21	54.99	28.80	7.88
8/6/2014	4:00		55.80	31.27	5.73	55.57	31.51	7.19	54.99	28.81	7.86
8/6/2014	4:05		55.87	31.28	5.72	55.57	31.51	7.19	55.00	28.83	7.84
8/6/2014	4:10		55.89	31.29	5.71	55.56	31.52	7.18	54.99	28.83	7.84
8/6/2014	4:15		55.78	31.31	5.70	55.56	31.53	7.17	55.00	28.84	7.83
8/6/2014	4:20		55.92	31.32	5.68	55.56	31.54	7.16	54.99	28.87	7.80
8/6/2014	4:25		55.78	31.34	5.67	55.56	31.57	7.13	54.99	28.87	7.80
8/6/2014	4:30		55.85	31.35	5.65	55.56	31.58	7.12	54.99	28.89	7.78
8/6/2014	4:35		55.85	31.37	5.63	55.56	31.58	7.12	55.00	28.90	7.77
8/6/2014	4:40		55.80	31.38	5.62	55.57	31.59	7.11	54.99	28.91	7.76
8/6/2014	4:45		55.87	31.40	5.60	55.56	31.60	7.10	55.00	28.91	7.76
8/6/2014	4:50		55.89	31.41	5.59	55.56	31.62	7.08	54.99	28.94	7.73
8/6/2014	4:55		55.80	31.43	5.57	55.56	31.63	7.07	55.00	28.95	7.72
8/6/2014	5:00		55.85	31.45	5.55	55.56	31.62	7.08	55.00	28.97	7.70
8/6/2014	5:05		55.92	31.47	5.53	55.56	31.65	7.05	55.00	28.98	7.69
8/6/2014	5:10		55.89	31.48	5.52	55.56	31.66	7.04	55.00	29.00	7.68
8/6/2014	5:15		55.87	31.50	5.51	55.57	31.68	7.02	55.00	29.01	7.66
8/6/2014	5:20		55.80	31.51	5.49	55.56	31.70	7.00	55.00	29.03	7.65
8/6/2014	5:25		55.89	31.53	5.47	55.56	31.70	7.00	55.00	29.02	7.65
8/6/2014	5:30		55.87	31.54	5.46	55.57	31.72	6.98	55.00	29.06	7.61
8/6/2014	5:35		55.89	31.56	5.44	55.57	31.75	6.95	55.00	29.08	7.60
8/6/2014	5:40		55.83	31.57	5.43	55.57	31.74	6.96	55.00	29.09	7.58
8/6/2014	5:45		55.89	31.59	5.41	55.57	31.75	6.95	55.00	29.09	7.58
8/6/2014	5:50		55.87	31.61	5.40	55.56	31.76	6.94	55.00	29.10	7.57
8/6/2014	5:55		55.92	31.62	5.38	55.57	31.78	6.92	54.99	29.13	7.54
8/6/2014	6:00		55.87	31.64	5.37	55.56	31.80	6.91	55.00	29.12	7.55
8/6/2014	6:05		55.80	31.65	5.35	55.57	31.81	6.89	55.00	29.15	7.52
8/6/2014	6:10		55.89	31.67	5.33	55.57	31.83	6.88	55.00	29.16	7.51
8/6/2014	6:15		55.83	31.68	5.32	55.57	31.80	6.90	55.00	29.15	7.52
8/6/2014	6:20		55.87	31.69	5.31	55.57	31.84	6.86	55.00	29.18	7.49
8/6/2014	6:25		55.83	31.70	5.30	55.57	31.86	6.84	55.00	29.21	7.46
8/6/2014	6:30		55.85	31.71	5.29	55.57	31.86	6.84	55.00	29.22	7.45
8/6/2014	6:35		55.87	31.73	5.27	55.57	31.88	6.82	55.00	29.21	7.46
8/6/2014	6:40		55.83	31.74	5.26	55.57	31.87	6.83	55.00	29.22	7.45
8/6/2014	6:45		55.94	31.76	5.24	55.57	31.87	6.83	55.00	29.24	7.43
8/6/2014	6:50		55.89	31.77	5.23	55.57	31.91	6.79	55.00	29.26	7.41
8/6/2014	6:55		55.96	31.78	5.22	55.56	31.92	6.78	55.00	29.26	7.41
8/6/2014	7:00		55.87	31.79	5.21	55.56	31.93	6.77	55.00	29.29	7.38
8/6/2014	7:05		55.85	31.80	5.20	55.56	31.93	6.77	54.99	29.28	7.39
8/6/2014	7:10		55.92	31.82	5.18	55.57	31.93	6.77	54.99	29.29	7.38
8/6/2014	7:15		55.87	31.83	5.17	55.56	31.94	6.76	55.00	29.29	7.38
8/6/2014	7:20		55.92	31.84	5.16	55.56	31.95	6.76	55.00	29.30	7.37
8/6/2014	7:25		55.85	31.85	5.15	55.56	31.96	6.74	55.00	29.31	7.36

#29174 Woodland, WA

Date	Time	ET (min)	Ranney Well			AAI-523			TB2-12		
			Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)	Temperature (F)	Depth to Water (feet)	Water Elevation (feet)
8/6/2014	7:30		55.87	31.87	5.13	55.57	31.98	6.72	55.00	29.32	7.35
8/6/2014	7:35		55.89	31.88	5.12	55.56	31.98	6.72	55.00	29.34	7.33
8/6/2014	7:40		55.94	31.89	5.11	55.57	32.01	6.69	54.99	29.34	7.33
8/6/2014	7:45		55.94	31.90	5.10	55.56	32.01	6.69	54.99	29.38	7.30
8/6/2014	7:50		55.94	31.91	5.09	55.57	32.02	6.69	55.00	29.36	7.31
8/6/2014	7:55		55.96	31.92	5.08	55.57	32.02	6.68	55.00	29.36	7.31
8/6/2014	8:00		55.92	31.93	5.07	55.57	32.01	6.69	55.00	29.37	7.30
8/6/2014	8:05		55.85	31.94	5.06	55.57	32.04	6.66	55.00	29.39	7.28
8/6/2014	8:10		55.87	31.95	5.05	55.56	32.05	6.66	55.00	29.40	7.28
8/6/2014	8:15		55.94	31.95	5.05	55.57	32.07	6.63	55.00	29.40	7.27
8/6/2014	8:20		55.85	31.96	5.04	55.57	32.07	6.63	55.00	29.41	7.26
8/6/2014	8:25		55.87	31.97	5.03	55.57	32.06	6.64	54.99	29.41	7.26
8/6/2014	8:30		55.87	31.99	5.01	55.57	32.07	6.63	54.99	29.43	7.24
8/6/2014	8:35		55.96	32.00	5.00	55.56	32.09	6.61	55.00	29.42	7.25
8/6/2014	8:40		55.89	32.00	5.00	55.56	32.09	6.61	54.99	29.43	7.24
8/6/2014	8:45		55.96	32.01	4.99	55.55	32.09	6.61	55.00	29.43	7.25
8/6/2014	8:50		55.92	32.02	4.98	55.55	32.11	6.59			
8/6/2014	8:55		55.92	32.03	4.98	55.55	32.11	6.59			
8/6/2014	9:00		55.83	32.04	4.97						
8/6/2014	9:05		55.87	32.05	4.95						
8/6/2014	9:08		55.94	32.05	4.95						

COLLECTOR WELL PERFORMANCE TEST DATA SHEET  
PUMPING WELL

Sheet 1 of 3

Client City of Woodland, WA

Well No. CW Location 1380 Lewis River Rd

Job Number 29174 Well Depth \_\_\_\_\_ Measuring Point Top Slab @ Access hole

Well Information \_\_\_\_\_

Test Information Post Test 3 New Laterals

Orifice Size WTP Filter Meter

Date	Time	Elapsed Time, min	Depth to Water, feet	Observed Drawdown, feet	Ramsey Level well house Manometer, in	Pumping Rate, gpm
8/4/14	1459		32.00			1200
	1617		32.09			1200
8/5/14	0845		32.08	Pumping Elev 4.92	4.29	1200
	0848	0	—		Offline	0
	0851	3	30.10			
	0852	4	29.85			
	0853	5	29.70			
	0854	6	29.60			
	0906		29.34		7.06	
	0916		29.31			
	0929		29.28	Rec 2.80	7.13	
	1000		29.26			
	1032		29.21			
	1055		29.18		7.24	
	1100	0	—		Pump #3 online	initially @ 100%
	1103		30.25			78.1% <del>700 gpm</del>
	1104		30.45			
	1105		30.68			80.1% 700 gpm
	1106		30.81			80.6%
	1108		30.96			80.0
	1110		31.05			
	1115		31.12		5.26	80.1
	1123		31.18			79.6
	1130		31.18		5.22	
	1135		31.17		5.22	79.5 702 gpm @ WTP

Well No. \_\_\_\_\_

COLLECTOR WELL PERFORMANCE TEST DATA SHEET  
PUMPING WELL

Sheet 2 of 3

Client City of Woodland WA

Well No. CW Location \_\_\_\_\_

Job Number 29174 Well Depth \_\_\_\_\_ Measuring Point Top Slab

Well Information \_\_\_\_\_

Test Information Post-Test

Orifice Size \_\_\_\_\_

Date	Time	Elapsed Time, min	Depth to Water, feet	Observed Drawdown, feet	Ranney Well House Level / Meter Manometer, in	Pumping Rate, gpm
8/5/14	1145		31.16		5.22 Pump #3	79.3
	1150		31.16		5.23	79.3
	1159		31.15	1.97 <sup>3.5"</sup>	5.23	79.3
	1201			Stop 2 ↑	Pump #3 105	
	1203		31.46		Pump #1 on line	
	1204		31.90			
	1205		32.00			
	1206		32.00		4.39	*1 69.9 *3 67.4
	1210		32.00			
	1215		32.04		4.36	*1 68.9 *3 67.3
	1220		32.05		4.34	*1 68.8 *3 67.3
	1230		32.07		4.31	*1 68.6 *3 67.3
	1235		32.07		4.32	
	1245		32.09		4.30	
	1255		32.09		4.29	*1 68.1 *3 67.3
	1300		32.09	2.91 <sup>4.8"</sup>	4.29	
	1301			Stop 3 ↑		
	1303		33.05	Pump #2 on line @ 1303		*1 98.8 *2 102 *3 97.0
	1305		33.65		2.72	
	1306		33.56			*1 88.8 2 96.0 3 90.6
	1308		33.50		2.85	
	1310		33.47			*1 88.6 2 95.8 3 90.6
	1315		33.47		2.88	
	1320		33.49		2.85	*1 88.7 2 95.4 3 90.6
	1335		33.55	4.37 <sup>4.80"</sup>	2.80	*1 87.7 2 94.0 3 89.7

2140 gpm

2100 gpm @ WTP

Well No. CW

COLLECTOR WELL PERFORMANCE TEST DATA SHEET  
PUMPING WELL

Sheet 3 of 3

Client City of Woodland WA

Well No. CW Location \_\_\_\_\_

Job Number 20174 Well Depth \_\_\_\_\_ Measuring Point Top 565

Well Information \_\_\_\_\_

Test Information Post-Test

Orifice Size \_\_\_\_\_

Elv.  
3.39

Date	Time	Elapsed Time, min	Depth to Water, feet	Observed Drawdown, feet	Ranney Well Hour Low Manometer, in	Pumping Rate, gpm
8/5/14	1345		33.60		2.77	*1 87.8 *2 93.7 *3 89.5
	1400		33.61	4.93 474 gpm	2.74	
	1410		33.62		2.72	*1 87.8 *2 93.6 *3 89.5
	1420		33.65		2.70	
	1430		33.67		2.67	*1 87.4 *2 93.3 *3 88.9
	1445		33.69			
	1455		33.72	4.54	2.62	*1 87.4 *2 93.2 *3 88.8
	1500			Pumps OFF		○
	1503		30.96			
	1505		30.12			
1507		29.76		6.65		
1523		29.38		7.00		
1534				Pumps on line *1		
1624		30.67		Rate ↑ only *1		
1625				*1 + *2 on line	1200	
8/6/14	0850		32.00			
	0907		32.03		*1 83.7 *2 69.6 4.34	1200

87.4

2100 gpm

FZV6N6

Well No. CW



COLLECTOR WELL PERFORMANCE TEST DATA SHEET  
OBSERVATION WELL

Sheet 1 of 1

Client City of Woodland, WA  
 Well No. AAI-523 Location Landward of CW adjacent to access road  
 Job Number 29174 Well Depth \_\_\_\_\_ Screen Stetting \_\_\_\_\_  
 Well Information 6" Steel  
 Test Information CW Post-Test  
 Measuring Point Top 6" Steel

Date	Time	Elapsed Time, min	Depth to Water, feet	Observed Drawdown, feet	Comments
8/4/14	1602		32.06		
8/5/14	0813		32.07		
	0848	0			CW OFFLINE
	0857		30.90		
	0907		30.78		
	0923		30.73	2 <sup>ec</sup> 1.34	
	1001		30.66		x0=30.66 <sup>✓</sup>
	1023		30.63		Downloaded x0
	1050		30.59		
	1100	0			Stop 1
	1113		31.46		
	1126		31.55		
	1138		31.56		
	1155		31.56		
	1212		31.95		
	1222		31.97		
	1238		32.00		
	1253		32.03		
	1313		32.68		
	1348		32.78		
	1402		32.80		
	1421		32.85		
	1457		32.95		
	1500	—	—		Pump off
	1508		31.18		
	1526		30.87		

Flr 6.11

COLLECTOR WELL PERFORMANCE TEST DATA SHEET  
OBSERVATION WELL

Sheet 1 of 1

Client City of Woodland, WA

Well No. TB2-12 Location Upstream of CW next to 35mph sign & concrete slab

Job Number 29174 Well Depth \_\_\_\_\_ Screen Stetting \_\_\_\_\_

Well Information Flash grade completion

Test Information CW Post-Test

Measuring Point Top 2" PVC

Date	Time	Elapsed Time, min	Depth to Water, feet	Observed Drawdown, feet	Comments
8/4/14	1449		29.40		
8/5/14	0814		29.46		
	0848	0			CW offline
	0855		28.87		
	0909		28.70		
	0918		28.68	rec 0.78	
	1003		28.60		x0=28.61
	1019		28.59		Downloaded x0's
	1051		28.56		
	1100	0			Step 1
	1112		29.08		
	1127		29.14		
	1137		29.14		
	1155		29.13		
	1211		29.35		
	1223		29.35		
	1237		29.38		
	1254		29.39		
	1312		29.76		
	1349		29.85		
	1401		29.86		
	1422		29.90		
	1456		29.95		
	1500	—	—		Pump off
	1510		28.96		
	1525		28.78		