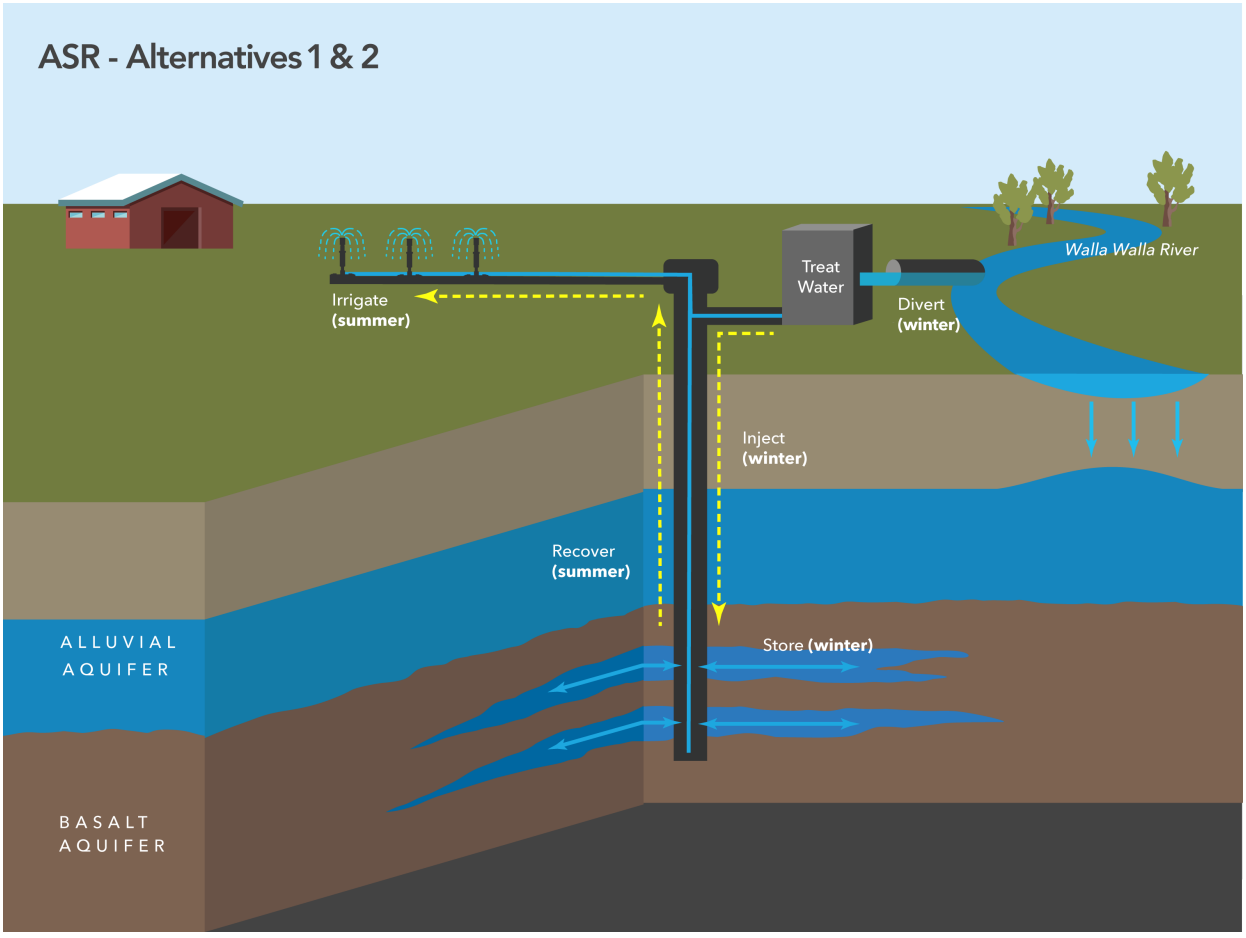
On-Farm
Aquifer Storage & Recovery /Artificial Recharge & Recovery
Eastside Milton-Freewater

October 2018



Prepared by Northwest Land & Water, Inc., for the Walla Walla Basin Watershed Council
With Aspect Consulting, LLC, Esvelt Environmental Engineering, LLC, and Wapiti Consulting

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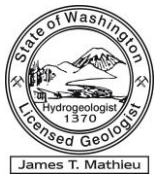

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Introduction

With the backdrop of overallocated irrigation-season water resources and the need to use water more efficiently, the State of Oregon has developed guidelines and rules for Aquifer Storage and Recovery (ASR) and Artificial (Groundwater) Recharge with or without Recovery (ARR; **Appendix A**). These guidelines and rules are part of the State's efforts to facilitate new and innovative ways to re-allocate water. Stakeholders in water-stressed areas such as the Walla Walla Basin are examining ASR and ARR to beneficially use water in ways that yield more sustainable supplies for the benefit of all sectors of a thriving community—people, farms, industry, fish, and wildlife.

The Walla Walla Basin Watershed Council (WWBWC) has been working for over two decades to improve water resource conditions throughout the Basin in both Oregon and Washington. A recent, ongoing WWBWC project includes partnering with the City of Milton-Freewater to investigate ASR as a means of developing sustainable water supplies for residents and businesses in the local community.

Similarly, WWBWC is also interested in looking at ASR and ARR for irrigation water use. To this end, and as part of this project report, WWBWC is examining six alternatives in Oregon—four ASR and two ARR—to compare their benefits and feasibility-level costs for "on-farm" water use. The alternatives have a common element: They each "shift" the diversion of Walla Walla River (WWR) water from late spring–summer to winter–early spring. The goal is to leave more water instream during the late spring–summer irrigation season for fish and other aquatic species while protecting the availability of water for the local agricultural community.

To investigate the six alternatives, WWBWC initiated a short study (June–October 2018) that focused primarily on the "Eastside" area of Milton-Freewater.

This report summarizes results of work conducted for this project by the Northwest Land & Water (NLW) team, which includes Aspect Consulting (Aspect), Esvelt Environmental Engineering (EEE), and Wapiti Consulting (Wapiti). NLW collaborated extensively with WWBWC staff during field work. We also engaged with three irrigators who provided access to their sites and wells and shared their understanding of local conditions on their farms. Two of these irrigators operate Eastside farms and one operates Westside farms.

Project Goal

The project goal is to provide information that will help the WWBWC and its local water stakeholders decide whether to advance an ASR and/or ARR project in the Oregon portion of the Walla Walla Basin, particularly in the Eastside area. This decision hinges on whether 3–5 cfs of water can be left instream from June through September, when flows are lowest, by transferring existing surface water rights with seniority dates of 1871 to 1901. If pursued, the project(s) would require support from multiple entities—local irrigators, irrigation districts, state agencies, and tribes. These ASR or ARR projects will also require substantial funding over multiple years.

Scope of Work

A general scope of work was developed for this project in discussion with WWBWC, and a contract was signed on June 15, 2018. Tasks included:

- Developing conceptual design alternatives for on-farm ASR and ARR
- Conducting a source and receiving water investigation
- Writing a report documenting the design alternatives and source/receiving water evaluation

Tasks were assigned to team members as follows:

- NLW, the team lead, managed the project, interfaced with local irrigators, consulted with Oregon state agencies, collaborated with WWBWC on water sampling, and developed part of the infrastructure features and costs.

- Aspect conducted the water rights analysis and developed part of the infrastructure features and costs.
- EEE conducted water quality and water treatment analyses and developed costs.
- Wapiti conducted specific infrastructure analyses and developed costs (and cost offsets) related to the down-well flow-control valve and solar installation.

Previous Investigations

NLW completed a substantial hydrogeologic characterization of the shallow Eastside alluvial aquifer (with some work on the underlying basalt aquifer) in 2017[1]. This characterization built on work that began in 2015 and continues to date to better understand the storage and movement of WWR water recharged via an Eastside infiltration gallery (IG).

Project Area

Figure 1 is a map showing the project area. This area was targeted for the ASR/ARR alternatives because of willing irrigator participants, historical and ongoing hydrogeologic characterization work, and existing infrastructure, which includes a WWR diversion structure at the Nursery bridge. Wells completed in the basalt aquifer occur predominantly in the southern part of the Eastside area. These wells appear to have favorable ASR characteristics.

Figure 1 also shows a constructed IG that received WWR water during the spring of 2018 and successfully recharged about 75 ac-ft of water to the alluvial aquifer during a 2-month period. This area has demonstrated high infiltration rates and substantial available storage to recharge WWR source water. The limited license for recharge via this IG will expire in 2020.

[1] *See NLW's September 2017 report, "Hydrogeologic Investigation, Eastside Milton-Freewater Managed Aquifer Recharge /Aquifer Storage & Recovery."*

The Alternatives

Table 1 shows the six alternatives we examined for this study. Each assumes the use of the Eastside diversion at the Nursery bridge during the winter through early spring. Attributes "downstream" of the diversion are described below. **Figures 2a and 2b**, **3a and 3b**, and **4a and 4b** are paired maps and diagrams of Alternatives 1 and 2, 3 and 4, and 5 and 6, respectively. Each diagram shows a perspective view to the south-southeast from a location downstream of the Nursery bridge on the WWR.

Note that, for all six alternatives, the irrigator's right to late spring–summer WWR water would be changed to a winter–early spring right leaving the early spring–summer water instream for fish and wildlife. Also, except in cases where the irrigator's existing infrastructure will be used, winter–early spring water would be conveyed via a yet-to-be constructed frost-protected pipe.

Basalt ASR Alternatives

Alternative 1: Recharge Fully Treated Water (UV)

In Alternative 1, water would be treated, recharged in a basalt well, and later recovered via pumping.

- Winter–early spring WWR water would be conveyed to a treatment plant.
- The water would be treated via an engineered filtration media followed by UV disinfection.
- The treated water would be conveyed from the plant to a local basalt ASR well and injected via a down-well flow-control valve (FCV).
- The treated and stored water would be pumped from the well in late spring–summer and conveyed via the farmer's existing irrigation pipe network.

Alternative 2: Recharge Fully Treated Water (Chlorination)

Alternative 2 is the same as Alternative 1 except for the treatment step. Instead of UV disinfection, the water would be treated via chlorination disinfection,

followed by dechlorination, before it is injected into the basalt ASR well for later recovery.

Alternative 3: Phased Treatment & Recharge (UV)

In Alternative 3, water would be initially recharged into the alluvial aquifer via an IG or recharge basin (RB), treated, and then injected into a basalt ASR well for later recovery.

- Winter–early spring WWR water would be conveyed to an IG or RB to recharge the alluvial aquifer, where it would be "filtrated."
- A recovery well would withdraw this water and it would then be delivered to a treatment plant.
- The water would be treated using UV disinfection but *not* filtration media.
- Water from the plant would be conveyed to a local basalt ASR well and injected via a FCV.
- In late spring–summer, the water would be pumped from the well and conveyed via the farmer's existing irrigation pipe network.

Alternative 4: Phased Treatment & Recharge (Chlorination)

Alternative 4 is the same as Alternative 3, except for the treatment step. Instead of UV disinfection, the water would be treated via chlorination disinfection, followed by dechlorination, before it is injected into the basalt ASR well.

Alluvial ARR Alternatives

Alternative 5: Infiltration Gallery

- Winter–early spring WWR water would be conveyed to an IG to recharge the alluvial aquifer.
- This water would be withdrawn from a set of recovery wells for direct irrigation in late spring–summer via the farmer's existing irrigation pipe network.
- Alternatively, the recovered water could be pumped into the Eastside pipeline for more distant delivery.

Alternative 6: Recharge Basin

This is the same as Alternative 5, except that the water would be recharged to the alluvial aquifer via an RB instead of an IG.

Use of Existing Infrastructure

The existing infrastructure presents some limitations but also offers some opportunities.

Eastside Diversion & Pipeline

The Eastside diversion structure and pipeline (**Figure 1**) have a capacity of about 10 cfs. However, the pipeline has numerous valves and standpipes that are at, or above, grade. Consequently, use of the Eastside pipeline is restricted to conveying water when soil and air temperatures are above freezing. This limits the conveyance season and thus the volume of water that can be moved and stored during winter and early spring.

Basalt Irrigation Wells

Basalt wells in the southern part of the Eastside area (**Figure 1**) have yielded water, historically and recently, at rates ranging from 250 to 1,500 gpm (approximately 0.5 to 3 cfs). Groundwater levels in many of these wells have declined at rates ranging from 1 to 4 feet per year during the past several decades (OWRD, 2018). Some have good potential for water storage and are candidates for further investigation and the recovery of injected treated WWR water. One such well sampled during this project to assess its water chemistry is UMAT5227.

Note that two Westside basalt wells were also sampled to examine the variation in basalt well water chemistry. These wells are UMAT5530 and UMAT50939.

Each of these three basalt wells warrant further investigation because of their favorable ASR characteristics:

- They are located near infrastructure that could divert and/or deliver winter–early spring WWR water to a new constructed treatment plant, followed by conveyance for down-well injection.
- They have specific capacities on the order of 100 to 150 gallons per minute per foot (gpm/ft) and depth to water of 150 to 350 feet below ground.
- They have experienced groundwater level declines, suggesting conditions that support the ability to "contain" injected water.

There are 3 to 6 other Eastside basalt wells in vicinty of UMAT5227 that may have favorable ASR characteristics. Each of these wells also warrant further investigation as candiditate sites for injecting, storing, and recovering treated WWR source water.

Alluvial Wells

Three wells—two irrigation wells and a monitoring well—were sampled to assess groundwater quality in the alluvial aquifer. The irrigation wells yield water on the order of 250 gpm (approximately 0.5 cfs) and included UMAT5239 and UMAT6471 (also known as GW_09, WWBWC's ID). We sampled UMAT6471 to better understand the groundwater quality beneath the WWR bed. Because of its proximity to the river, this well likely represents groundwater that receives substantial contributions from recharge via the WWR bed. GW_160 (WWBWC's ID), a monitoring well, was also sampled to characterize groundwater quality.

The samples collected from these wells provide information to indicate the "receiving" water quality for WWR water that may be artificially recharged via an IG or RB. In addition, the sampling results will allow us to estimate the mixed water quality resulting from recharge of WWR via an IG or RB.

"Water Quality / Compatibility" on page 7 describes the results of analyses for source and receiving waters.

Elements & Costs

The elements of the six design alternatives are summarized in **Table 2**, along with their feasibility-level costs. Descriptions of each element follow.

Water Rights

The Eastside pipeline (ditch) surface water rights (certificates) total 13.033 cfs (**Appendix B**). Of these, approximately 75 percent have priority dates between 1871 and 1901 (inclusive). In 2006, 2.4 cfs was voluntarily left instream based on the results of negotiations with the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), local irrigators, and Oregon state. Consequently, in theory, as much as 10.633 cfs (13.033 cfs – 2.4 cfs) could be changed from late spring–summer to winter–early spring diversion and then stored via ASR or ARR, with recovery occurring during the irrigation season. It follows that as much as 10.633 cfs could remain in the WWR from late spring through summer. More information on pertinent water rights attributes is available in **Appendix B**.

Prior to embarking on a project that would ultimately change or transfer a property owner's water rights, a rights protection strategy would need to be developed in negotiation with Oregon state agencies. Our team posed three questions about such protection to OWRD. These questions and OWRD's response are in **Appendix C**. A primary concern during the lengthy ASR or ARR development period is protecting a water right from forfeiture due to non-use—a concern that would be addressed through discussions with stakeholders and likely reflected in the terms and condition of the project's limited license.

Instream Water Protection

Water that remains instream from late spring–summer as described above will require "protection" via legal and administrative measures depending on *where* the instream water is to be protected. The goal of such protections is to ensure that the water will remain

instream to benefit the environment—specifically, fish and wildlife habitat.

Key questions that would need to be addressed include:

- What WWR reach(es) would benefit from water that remains instream?
- Given what is known about the dynamic conditions in the WWR and its interactions with groundwater, what is the expected fate of water that remains instream, now, and in the future?
- What other water right holders are affected by water that remains instream? How would these right holders be affected?

Addressing these questions, discussion with stakeholders, and potential use of Oregon's streamflow restoration tools would likely be part of the ASR or ARR project development and limited license.

Infrastructure

Conveyance Pipeline

A substantial amount of yet-to-be constructed frost-protected pipe (approximately 3 feet below grade) would be needed to convey source water, treated source water (for ASR), and recovered water during winter and early spring. Conceptual pipeline configurations are shown on **Figures 2a**, **3a**, and **4a**, and the costs for each (Alternatives 1–6) are shown in **Table 2**. Note that these pipeline configurations are for comparing costs between the alternatives only; they do not necessarily represent viable pipeline runs.

Wells

ASR Alternatives 1–4 would use two retrofitted existing basalt wells, each with a 1,000 gpm (~2 cfs) capacity, and one new basalt well with a 500 gpm (~1 cfs) capacity. A conceptual design for such a well is shown in **Appendix D**. In addition, Alternatives 3 and 4 would use alluvial wells to pump "aquifer"-filtrated ("bank-filtrated") water to the treatment facility. Two designs for such alluvial wells are shown in **Appendix E**.

Note that up to four alluvial wells may be needed to achieve the desired 2,500-gpm withdrawal and water treatment rate (Alternatives 3 and 4). These wells would be located very near and downgradient of an RB or IG.

Wells for ARR Alternatives 5 and 6 would be strategically located to capture water during the irrigation season that is infiltrated via a RB or an IG in winter and early spring. Two existing irrigation (recovery) wells completed in the alluvial aquifer are shown on **Figure 4a**, along with a hypothetical distribution of four new irrigation (recovery) wells. Locating these four new wells will require further study of hydrogeologic conditions in the Eastside area. They could pump ARR water and directly irrigate a nearby farm and/or pump into the existing Eastside pipeline for more distant conveyance and irrigation.

Pumping, Injection, & Control Equipment

Table 2 lists the down-well and above-ground equipment and associated costs to implement Alternatives 1–6. **Appendix D** shows an equipped ASR well. A notable feature is the FCV, which is necessary to maintain line pressure above the basalt aquifer so that treated water—not air—is driven into the aquifer. This FCV technology is being actively used in basalt irrigation and municipal supply wells in the Pacific Northwest.

The alluvial irrigation (recovery) wells will require standard pumping equipment. These pumps and controls will need to be specified for the hydraulic conditions (lift, line pressure, flow rate) for each unique application.

We estimated the annual pumping cost for each Alternative, assuming a pumping rate of 5 cfs over a 4-month period. For the basalt ASR alternatives (1–4), we assumed that the stored water would be lifted 100 feet; for the ARR alternatives (5–6) we assumed that the stored water would be lifted 50 feet. The annual pumping cost for the basalt ASR and the alluvial ARR is in the range of $17K to $9K. Per acre-foot of water costs range from approximately $15 to $7 (assuming an electric utility rate of $0.10kWh). This estimate does not consider the

energy needed to pump against frictional head loss and system line pressure.

Recharge Basin or Infiltration Gallery

For Alternative 3–4 and 5–6, one or more sites will be needed to infiltrate the diverted winter–early spring WWR water into the alluvial aquifer. WWBWC staff are experts on RBs and IGs, with over two decades of experience designing, building, and maintaining these features to recharge shallow local alluvial aquifers. The choice to build a RB versus an IG is driven by land availability; RBs require more land, which would be permanently removed from farming. On the other hand, IGs are buried just beneath land surface, allowing some on-farm functions to continue.

Two potential RB or IG sites are shown on **Figures 3a** and **4a**. Soil, infiltration, and archaeology studies would be needed to assess the sites. The land area needed to infiltrate 5 cfs of winter WWR would be in the range of ¼ to 3 acres, based on our conceptual level estimates[2]. Field testing is essential to validate the infiltration rates and required basin area.

Cost-offsetting Infrastructure

Two technologies show promise for offsetting the costs of an ASR or ARR project (**Appendix F**). One includes equipping an ASR well with a variable frequency drive (VFD) configured with an electric-power generating Regen™ system. The Regen system is operated by the injection water in an ASR well. It "spins" the pump "backwards," generating electricity that can be captured on the local power grid. Although such a configuration is initially more costly than a standard VFD, data from a Madison Farms ASR system (Echo, OR) shows that the simple payback period is approximately 3 years.

The regen system will also offset costs to pump (recover) injected (stored) water. Analysis of the Madison Farm ASR well for 2014 shows that 13.4% of the annual costs to recover the stored water are paid by the electricity from the regen system.

Another cost-offsetting technology is a photovoltaic array for solar power generation. Our analysis (**Appendix F**) suggests a simple payback period of about 10 years for a 570kW array, which can generate an annual revenue stream on the order to $170K at a utility purchase rate of $0.21 per kWh. Note this array occupies approximately 2.7 acres of land, but current solar panels are 40 percent more efficient per unit area. This would substantially reduce the land required to setup a 570kW array.

Water Treatment

Appendix G details the water treatment technology and costs necessary to meet Oregon drinking water standards for ASR. The disinfection costs for chlorination/dechlorination are slightly higher than those for UV. The largest treatment cost saving comes from use of the river bank or alluvial aquifer to gain filtration credits, thereby minimizing the treatment for microbes (heterotrophic bacteria, cryptosporidium, giardia, viruses). **Table 2** summarizes the costs from **Appendix G**.

Limited License

Each of the six alternatives would be operated under Oregon's Limited License (LL) program. The terms and conditions of an LL for each alternative are difficult to know before meeting with stakeholders and Oregon agencies (**Appendices A** and **C**). However, our experience has shown that meeting water quality and other monitoring requirements for ASR LLs can cost in the range of $30K to $50K per year. An ARR project with a capacity of 5 cfs will likely require a substantial multi-year investigation to better understand how recharged WWR water is stored and moves in the alluvial aquifer. Such an investigation may be part of a LL for an Eastside ARR that phases in the amount of recharged water—for example, beginning with 0.5 cfs and incrementally increasing as the feasibility of 5 cfs becomes a reality.

Alternatives Comparison

Table 2 summarizes the cost of Alternatives 1–6. In a nutshell, Alternatives 1 and 2 cost an order of

[2] *See NLW's September 2017 report, "Hydrogeologic Investigation, Eastside Milton-Freewater Managed Aquifer Recharge /Aquifer Storage & Recovery."*

magnitude more than Alternatives 5 and 6, with costs for Alternatives 3 and 4 falling in between (but only being half of Alternatives 1 and 2). Alternatives 1–4 will require large capital and O&M costs to treat to Oregon drinking water standards. **Table 2** shows the capital and construction costs for the three sets of alternatives:

- $19K/ac-ft (Alternatives 1 and 2)
- $9K/ac-ft (Alternatives 3 and 4)
- $1K/ac-ft (Alternatives 4 and 5)

Annual O&M costs range from $400/ac-ft for Alternative 1 to $40/ac-ft for Alternative 5, excluding pumping costs. Note that, as stated above, the pumping cost for the basalt ASR and the alluvial ARR is in the range of $15 to $7 per ac-ft of water.

Basalt ASR projects are operating successfully in the Pacific Northwest where aquifers behave as relatively "confined" subsurface reservoirs. The key is to characterize the conditions of the basalt aquifer to demonstrate that it can reliably receive, store, and recover the injected WWR water over a multi-year period. Under favorable conditions, the majority of treated and injected WWR water would be recovered for summer irrigation. It may take a substantial amount of testing to identify a favorable basalt aquifer.

The more cost-effective technology uses RBs and IGs in the local alluvial aquifer as part of Alternatives 5 and 6. However, these alternatives also require investigative work to understand where the recharge water "moves" and where best to "capture" it. Some years may be needed to develop this understanding, without the guarantee of a successful outcome—one where the majority of the "recharged" water is recovered without downgradient hydraulic impacts.

Water Quality / Compatibility

Sampling

Source Water (WWR)

Three WWR source water samples were collected as part of the WWBWC's feasibility investigation for basalt ASR for the City of Milton-Freewater[3]. These data are further described in **Appendix G**.

Receiving and 'Test'-Source Water (Wells)

For this project, six wells were sampled. These wells were selected because of irrigator's willingness to participate and the wells are located near key infrastructure for Alternatives 1 through 6. During June and July 2018, we consulted with OWRD, ODEQ, and OHA about the water quality analytes to be tested (**Table H1a and H1b, Appendix H**).

- The three basalt wells were sampled and analyzed to examine "receiving" water quality under an ASR alternative.
- Two alluvial wells were sampled and analyzed to examine "receiving" water quality under an ARR alternative.
- A third alluvial well was sampled and analyzed as a "filtrated" groundwater source that could be disinfected and used to "test" potential basalt wells under an ASR alternative.

Irrigation wells. NLW and WWBCW collaborated on sampling the six wells. Five of these are active irrigation wells that had been pumping continuously for hours to days prior to sampling. Field parameters were measured before and after sampling these five wells (**Table H1a, Appendix H**).

Monitoring wells. One of the wells sampled, GW_160, is a monitoring well installed by WWBWC in 2015[4]. A small-diameter electric pump was

[3] *Draft Milton-Freewater Aquifer Storage and Recovery Feasibility Study Phase 1, Dec 2017.*
[4] *See Appendix B: Well Logs in NLW's September 2017 report, "Hydrogeologic Investigation, Eastside Milton-*

deployed in the well to purge 5 saturated casing volumes at 1 gpm, and then slowed to a rate of 0.1 gpm until field parameters stabilized and samples collected.

All samples were placed in coolers with sealed packages of ice and shipped or hand delivered to three labs: Anatek Labs, Inc. (Moscow, ID), Table Rock Labs (Pendleton, OR), Benton-Franklin Health District (Kennewick).

Results & Compatibility

The source and receiving waters for both the basalt ASR and alluvial ARR options appear to be compatible. Data are summarized in **Tables H1a and H1b** (**Appendix H**), and chains-of-custody and other lab documentation are also included in **Appendix H**.

Basalt Wells

Water quality was tested at the three basalt wells and it complies with Oregon's safe drinking water criteria (**Table H1a, Apendix H**).

Select predicted post-treatment WWR source water (**Appendix G**) and basalt ASR "receiving" water parameters are shown in **Table 3**. The data indicate treated source water has lower alkalinity than receiving basalt aquifer water. The WWR source water has a corrosivity index of less -0.3 (**Appendix G**). This suggests the WWR source water, even post-treament may be slightly corrosive—potentially affecting downhole equipment over the long-term. Alkalinity could be added at the treatment plant to mitigate this potential corrosivity.

Another potential constituent that is somewhat elevated in the predicted post-treatment source water is iron, ranging in concentration from 0.02 to 0.75 mg/L (compare to the basalt receiving waters range of <0.01 to 0.05 mg/L). Elevated iron in water injected to a basalt ASR well poses two potential issues that can have similar results in reducing aquifer permeability and storage. Iron that precipitates in the mixed source-receving water zone of the aquifer may overtime plug void space used to move and store water. Similarly, naturally-occuring iron-metabolizing bacteria can grow in an ASR well and adjacent aquifer, also pluging void space. The way to mitigate this potential problem is reduce the iron load to aquifer through coagulation/flocculation at the treatment plant.

Another parameter, pH, is similar for the predicted post-treatment source water and the basalt well receiving waters (**Table 3**). This similarity bodes well for the mixing of treated source and basalt well receiving waters. However, oxidation-reduction potential (ORP) differs between the source and receiving water. This difference warrants further study to understand, if and how, it would affect reaction chemistry of waters mixed in the aquifer. Note that ORP and dissolved oxygen (DO) are two important parameters in understanding mixed water chemistry and these two parameters can be biased through a pump's action of lifting water to the surface—i.e. down-well measurements of ORP and DO provide more accurate measures.

If source water treatment includes alkalinity adjustment and sufficient iron removal, then we expect no major compatibility issues. These parameters can be better understood during pilot-scale testing and optimized through the life of the basalt ASR project.

Alluvial Wells

The water quality for the two alluvial wells (**Table H1b, Appendix H**) meets Oregon's safe drinking water criteria.

Given the quality of the WWR source water (**Appendix G**), it appears that this "recharged" water (via an IG or RB) would be compatible with the "receiving" waters in the two wells (UMAT5239 and GW_160). This is expected given that the WWR likely contributes a substantial amount of natural recharge to the shallow alluvial aquifer in the vicinity of these two wells. Note that WWR source water recharged via an IG or RB may dissolve solids during water–sediment interactions in the unsaturated

Freewater Managed Aquifer Recharge /Aquifer Storage & Recovery."

(vadose) zone and, in turn, locally elevate total dissolved solids (TDS).

Water quality from alluvial well UMAT6471 also meets Oregon's safe drinking water criteria. Disinfected water from this well could potentially be used to "test" the injection and recovery characteristics for candidate Eastside basalt ASR wells. Water from UMAT6471 appears to have good compatibility with the basalt well "receving" waters.

A small treatment facility could likely be designed and constructed to handle about 0.5 cfs of pumped from alluvial irrigation well UMAT6471 for a cost of $100,000 to $500,000. Existing or new constructed conveyance pipe would be needed to move this treated water to 'test' hydraulic properties of the Eastside basalt wells and basalt aquifer.

Recommendations

- Consider building a "regional" water treatment facility that would serve multiple farms or irrigation districts—for example, one facility on the east side and another on the west side of the WWR.
- Coordinate with the City of Milton-Freewater on its basalt ASR project to make efficient use of knowledge gained and funding for the planning, design, construction, and O&M of an ASR and/or ARR project.
- Consider expanding the City's proposed municipal ASR water treatment facility to also serve farms and/or irrigation districts.
- Consider developing a local aquifer storage "authority" patterned after the administrative and economic structure of local irrigation districts.
- Solicit help from local, state, and federal elected officials to promote and seek funds for ASR and ARR projects that are built, operated, and maintained by a set of local stakeholders, including the local aquifer storage authority.
- Consider developing a small treatment plant (0.5 cfs) to handle winter–early spring water pumped from UMAT6471. Treated water could then be conveyed to test candidate Eastside ASR basalt wells and their aquifers. Such a treatment plant should be designed for expansion to handle higher WWR diversion rates (e.g. 5 cfs) and convey treated water to multiple Eastside basalt ASR projects.
- Consider constructing a frost-protected pipeline from the Eastside diversion to the active Eastside IG. Such a conveyance line would allow recharge of winter–early spring WWR water to the alluvial aquifer, via the existing IG. This pipeline could also convey water for a future expanded AR or ARR project whereby 5 cfs or more is ultimately recharged via a future IG or RB.

Disclaimer

NLW's professional services were performed, its findings obtained, and this report prepared in accordance with generally accepted hydrogeologic practices at this time and in this area, exclusively for the use of the WWBWC and its other project partners. This warranty is in lieu of all other warranties, expressed, or implied.

Tables

Table 1 Eastside Conceptual Design Alternatives

Alternative	Method	Source Treatment		Key Infrastructure	
		Filtration	Disinfection	Recharge	Recovery
1	ASR (basalt)	engineered media	uv	well, flow control valve, pump	well(s), pump(s), conveyance to field(s)
2			chlorine		
3		alluvial aquifer	uv		
4			chlorine		
5	ARR (alluvial)	alluvial aquifer	*not applicable*	gallery	well(s), pump(s), conveyance to field(s)
6				basin	

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Table 2 Costs for Conceptual Design Alternatives, Eastside Milton-Freewater ASR and ARR, 5 cfs

Element ↓	Alternatives												Alt's Cost Range	
	1	Capital & Construction Cost	2	Capital & Construction Cost	3	Capital & Construction Cost	4	Capital & Construction Cost	5	Capital & Construction Cost	6	Capital & Construction Cost	O & M Cost(1)/year w/ treatment plant	O & M Cost(1)/year w/o treatment plant
Water Storage Method	----------*Basalt ASR*----------								----------*Alluvial ARR*----------				*ASR Alt 1*	*ARR Alt 5*
Water Rights	Investigate rights and attributes for 5 cfs	$ 30,000	Investigate rights and attributes for 5 cfs	$ 30,000	Investigate rights and attributes for 5 cfs	$ 30,000	Investigate rights and attributes for 5 cfs	$ 30,000	Investigate rights and attributes for 5 cfs	$ 30,000	Investigate rights and attributes for 5 cfs	$ 30,000	na	na
Diversion	Exists and functions												$ 2,000	$ 2,000
Frost-Protected Conveyance Pipeline	5,000 ft of new line at $20/foot	$ 100,000	5,000 ft of new line at $20/foot	$ 100,000	5,000 ft of new line at $20/foot	$ 100,000	5,000 ft of new line at $20/foot	$ 100,000	2,500 ft of new line at $20/foot	$ 50,000	2,500 ft of new line at $20/foot	$ 50,000	$ 5,000	$ 5,000
Wells	1 new, 2 existing basalt wells	$ 155,000	1 new, 2 existing basalt wells	$ 155,000	1 new, 2 existing basalt; 3 alluvial	$ 365,000	1 new, 2 existing basalt; 3 alluvial	$ 365,000	2 existing, 4 new alluvial	$ 280,000	2 existing, 4 new alluvial	$ 280,000	$ 10,000	$ 10,000
Pumping / Injection Equipment	VFD, FCV, VLS	$ 513,500	VFD, FCV, VLS	$ 513,500	VFD, FCV, VLS	$ 673,500	VFD, FCV, VLS	$ 673,500	VFD, VLS	$ 640,000	VFD, VLS	$ 640,000	$ 10,000	$ 10,000
RB or IG Design/Build	na	na	na	na	IG	$ 150,000	IG	$ 150,000	RB	$ 250,000	RB	$ 250,000	$ 10,000	$ 10,000
Land Assessment & Purchase	Soil, arch	$ 50,000	Soil, arch	$ 50,000	Soil, arch	$ 75,000	Soil, arch	$ 75,000	Soil, arch	$ 50,000	Soil, arch	$ 125,000	na	na
Source Water Treatment	Treatment plant, filtration, UV	$ 21,200,000	Treatment plant, filtration, chlor/dchlor	$ 20,350,000	Treatment plant, no filtration, UV	$ 9,100,000	Treatment plant, no filtration, chlor/dchlor	$ 9,000,000	na	na	na	na	$ 432,000	na
Limited License, Testing, Monitoring	support data, reports, LL	$ 75,000	support data, reports, LL	$ 75,000	support data, reports, LL	$ 75,000	support data, reports, LL	$ 75,000	support data, reports, LL	$ 200,000	support data, reports, LL	$ 200,000	$ 10,000	$ 10,000
TOTALS:		$ 22,123,500		$ 21,273,500		$ 10,568,500		$ 10,468,500		$ 1,550,000		$ 1,625,000	$ 479,000	$ 47,000
Capital-Construction, $/ac-ft of water		$ 19,000		$ 18,000		$ 9,000		$ 9,000		$ 1,000		$ 1,000	$ 400	$ 40
Capital-Construction, $/cfs of water		$ 4,400,000		$ 4,300,000		$ 2,100,000		$ 2,100,000		$ 300,000		$ 300,000	$ 100,000	$ 10,000

Notes:
(1) excludes pumping costs
arch archaeology
RB recharge basin
IG infiltration gallery
ac-ft acre-feet
cfs cubic feet per second

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Table 3 — Select Basalt Well and Predicted Post-Treatment WWR Source Water Quality Results, Summer 2018

Analyte	Units	Drinking Water Standard MCL/SMCL	Eastside Milton-Freewater *Sample 180717008-001 / 5227 Collected 07/12/2018 1:00PM*			Westside Milton-Freewater *Sample 180717034-001 / 50939 Collected 07/12/2018 2:20PM*			Westside Milton-Freewater *Sample 180717035-001 / 5330 Collected 07/12/2018 3:30PM*			Predicted Post-Treatment Water Quality by Source... *...Surface Water @ Point of Diversion on Walla Walla River*	*...Surface Water @ Little Walla Walla River behind Well #5*
			MDL	RDL	Result	MDL	RDL	Result	MDL	RDL	Result	Result[1]	Result[1]
GENERAL CHEMISTRY													
Alkalinity	mg CaCO3/L	--	2	2	104	2	2	104	2	2	106	**50**	**50**
Chloride	mg/L	250	0.01	0.1	7.19	0.01	0.1	3.59	0.01	0.1	6.71	**7**	**7**
Hardness	mg CaCO3/L	--	0.1	1	44.7	0.1	1	65.8	0.1	1	71.5	**24**	**22**
Dissolved Oxygen, field	mg/L	--	--	--	0.23	--	--	0.56	--	--	3.77	**nt**	**nt**
Nitrite - Nitrogen	mg/L	1	0.063	0.1	ND	0.076	0.1	ND	0.063	0.1	ND	**0.06**	**0.06**
Nitrate - Nitrogen	mg/L	10	0.076	0.1	ND	0.063	0.1	ND	0.076	0.1	ND	**0.08**	**0.08**
Oxidation Reduction Potential, field	mV	--	--	--	139.8	--	--	102.4	--	--	107.7	**-20 - 0**	**-40 - 0**
pH	S. U.	--	1	--	7.85	1	--	7.80	1	--	7.80	**7 - 8**	**7 - 8**
pH, field	S. U.	--	--	--	8.02	--	--	7.52	--	--	7.77	**7 - 8**	**7 - 8**
Specific Conductance, field	µS/cm	--	--	--	229,9	--	--	222.1	--	--	243.5	**110**	**110**
Sulfate	mg/L	250	0.057	0.1	0.780	0.057	0.1	4.38	0.057	0.1	6.57	**6.2**	**6.1**
Total Dissolved Solids	mg/L	500	30	50	170	30	50	175	30	50	193	**77**	**106**
Temperature, field	degrees C	--	--	--	23.8	--	--	19.2	--	--	23.6	**nt**	nt
Turbidity, field	NTU	--	--	--	0.86	--	--	0.93	--	--	0.85	**1**	**1**
TOTAL METALS													
Calcium	mg/L	--	0.01	0.1	12.0	0.01	0.1	16.3	0.01	0.1	17.5	**5.7**	**5.4**
Iron	mg/L	0.3	0.0018	0.01	ND	0.0018	0.01	0.0549	0.0018	0.01	0.0293	**0.02 - 0.13**	**0.10 - 0.75**
Magnesium	mg/L	--	0.01	0.1	3.58	0.01	0.1	6.07	0.01	0.1	6.74	**nt**	**nt**
Manganese	mg/L	0.05	0.001	0.001	0.0110	0.001	0.001	0.0261	0.001	0.001	0.0122	**0.01**	**0.012**
Potassium	mg/L	--	0.05	0.1	5.67	0.05	0.1	4.86	0.05	0.1	5.05	**1.5**	**1.5**
Sodium	mg/L	--	0.05	0.1	27.5	0.05	0.1	17.4	0.05	0.1	19.2	**2.7**	**2.7**
MISCELLANEOUS													
Corrosivity		--	--	--	-0.0464	--	--	-0.0996	--	--	-0.103	np	np

Notes:

Post-Treatment Predicted **Results** values are less than (<), or equal to (=), except for ORP and pH values are ranges

nt - not tested

np - not predicted

MDL - method detection limit

RDL - reporting detection limit

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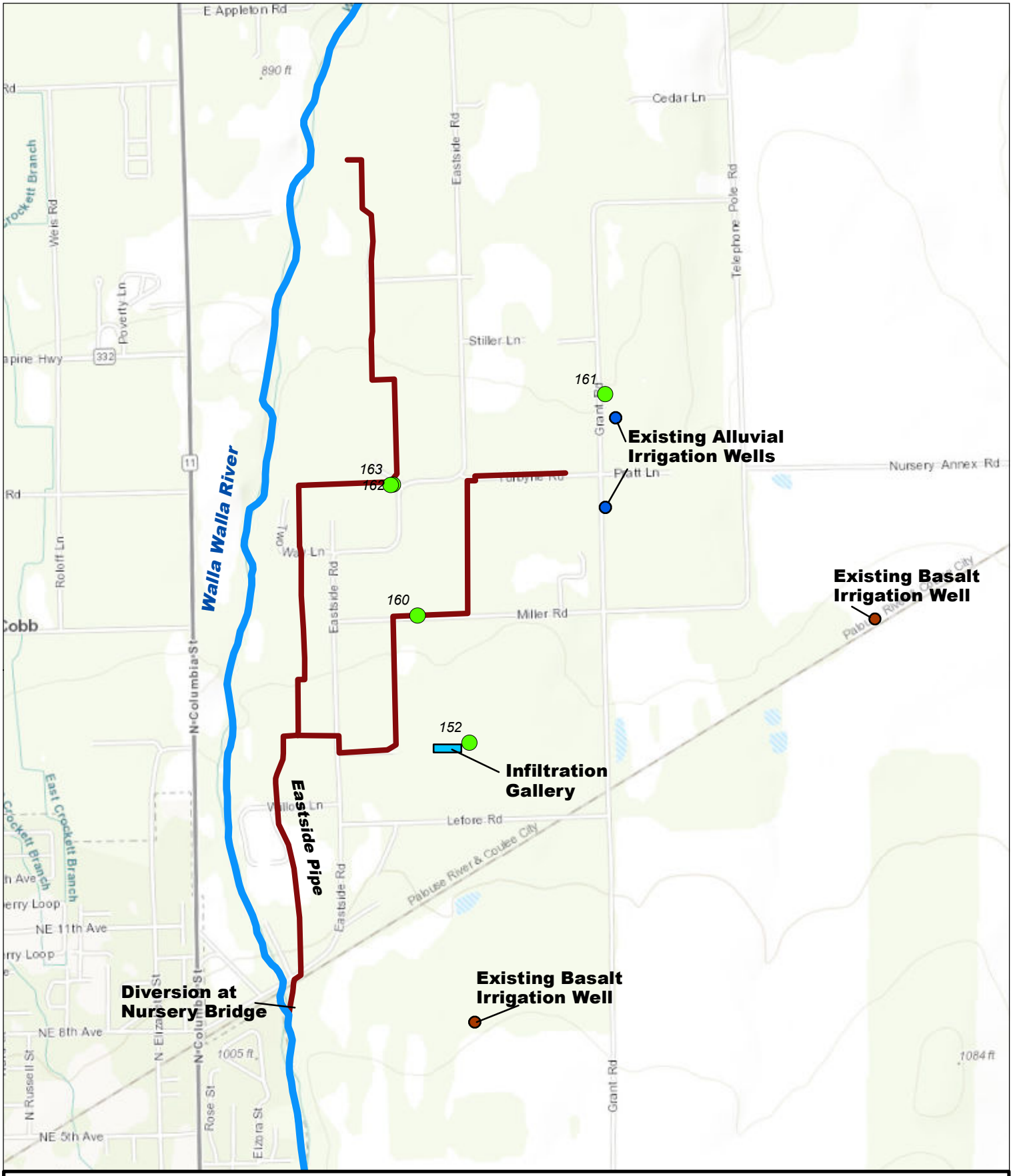
Figures



Legend

- Monitoring Well
- Walla Walla River
- Eastside Pipeline

N

500 250 0 500 Feet

Figure 1 Project Area, River, Diversion, Pipeline, and Wells

Eastside Milton-Freewater ASR / ARR
WWBWC

NORTHWEST Land & Water, INC.

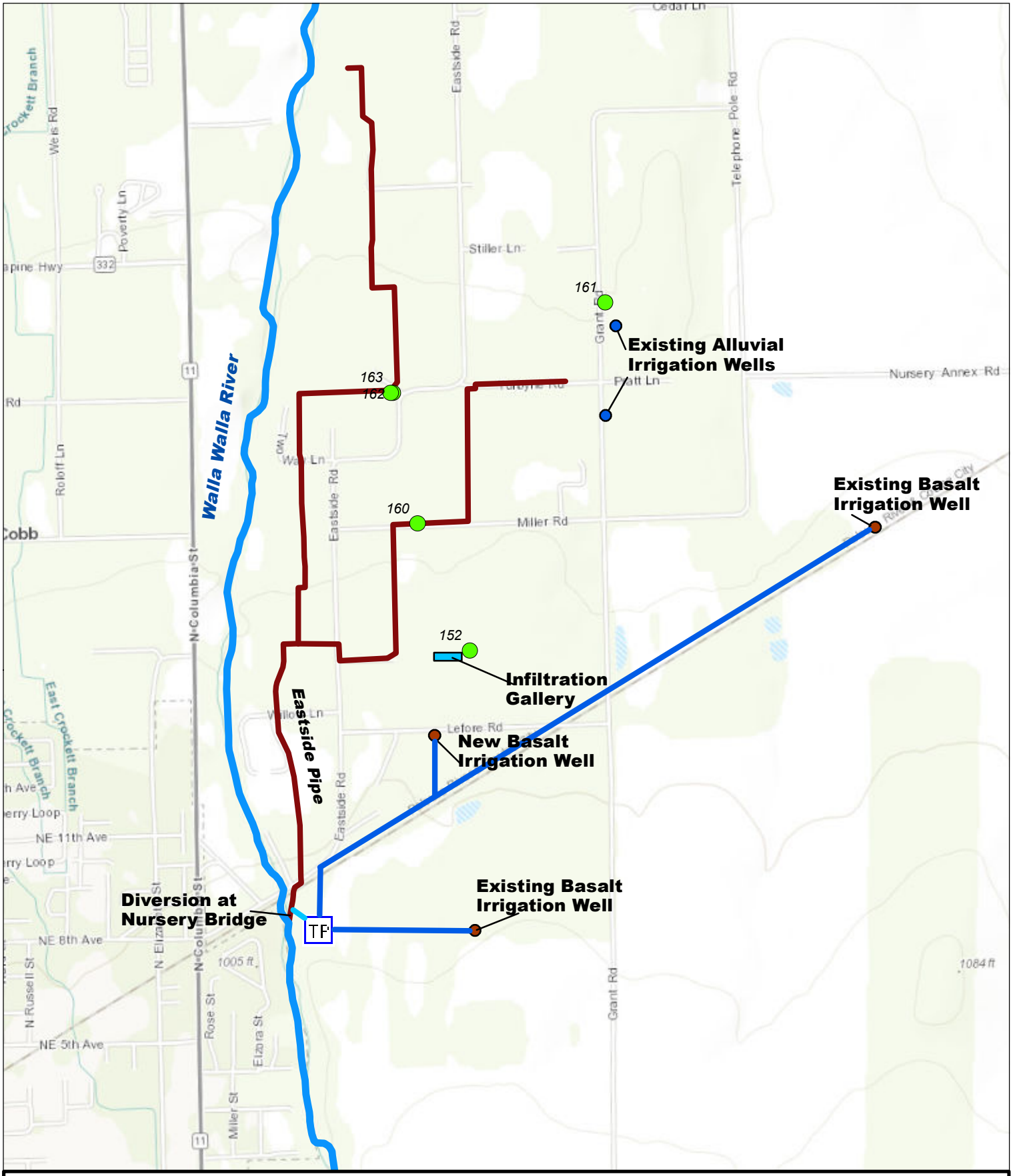


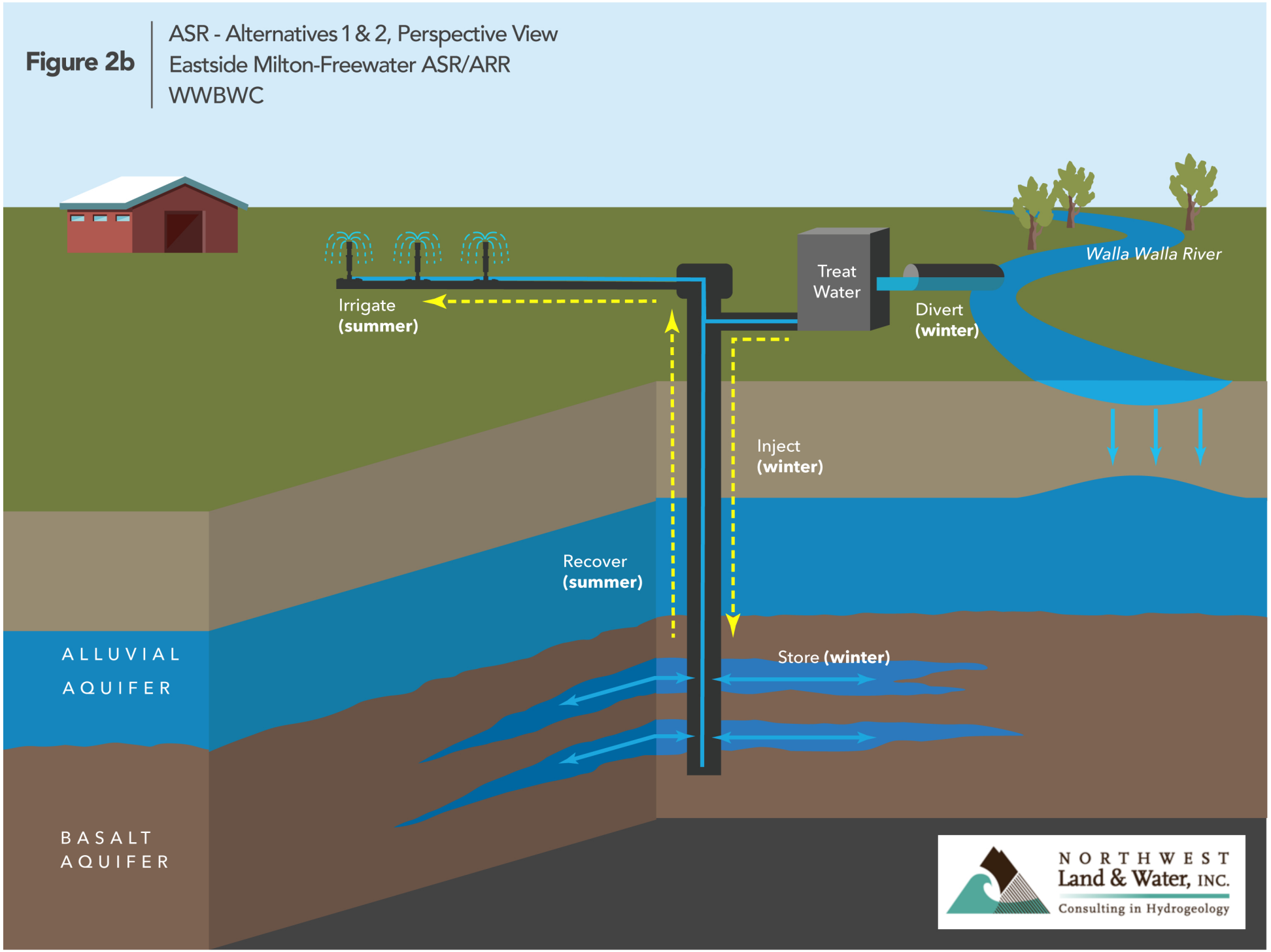
Figure 2a
ASR Alternatives 1 and 2

Eastside Milton-Freewater ASR / ARR
WWBWC

NORTHWEST Land & Water, INC.

Figure 2b

ASR - Alternatives 1 & 2, Perspective View
Eastside Milton-Freewater ASR/ARR
WWBWC



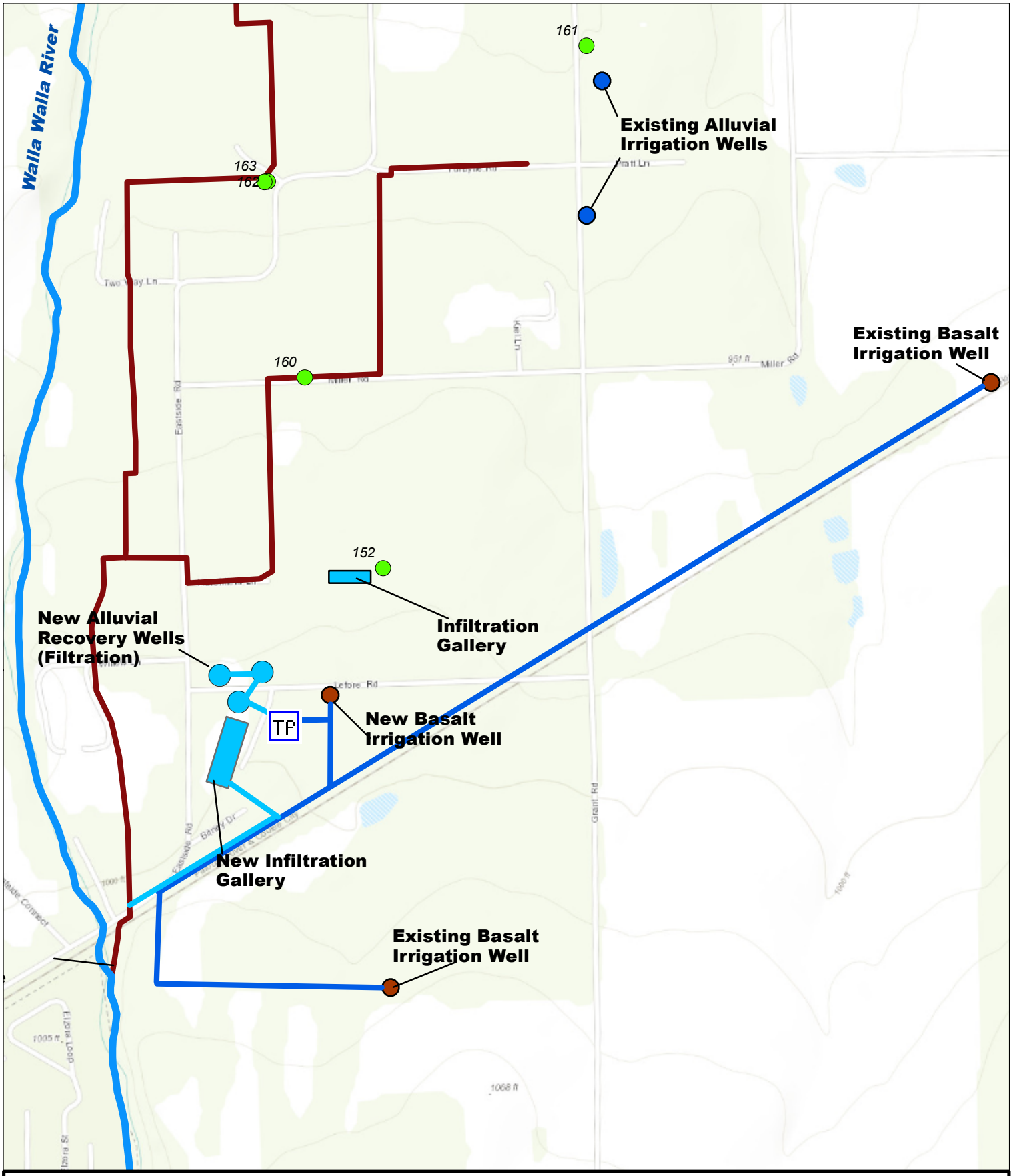


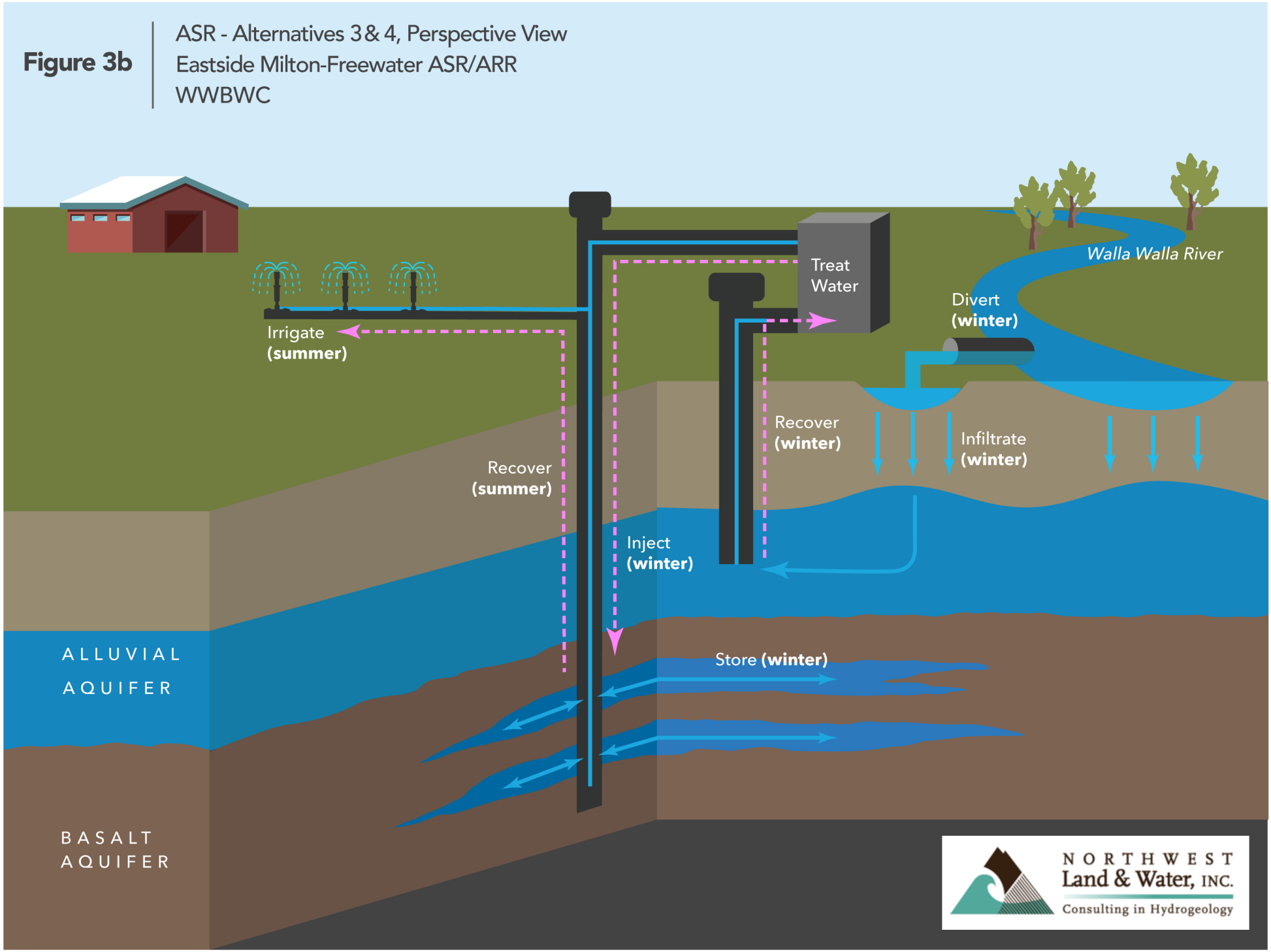
Figure 3a
ASR Alternatives 3 and 4

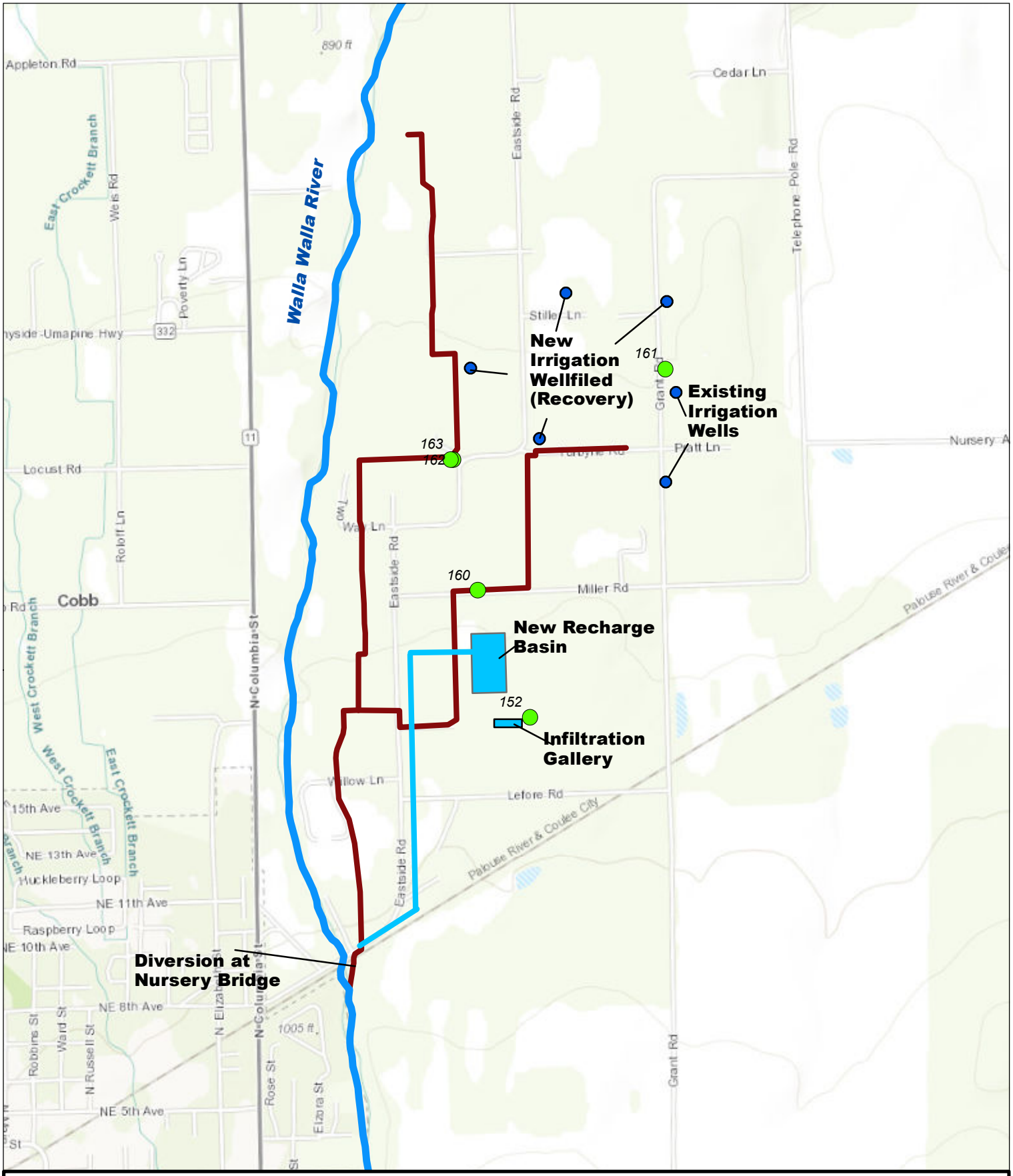
Eastside Milton-Freewater ASR / ARR
WWBWC

NORTHWEST Land & Water, INC.

Figure 3b

ASR - Alternatives 3 & 4, Perspective View
Eastside Milton-Freewater ASR/ARR
WWBWC





Legend

- Monitoring Well
- Walla Walla R
- Eastside Pipeline

N

500 250 0 500 Feet

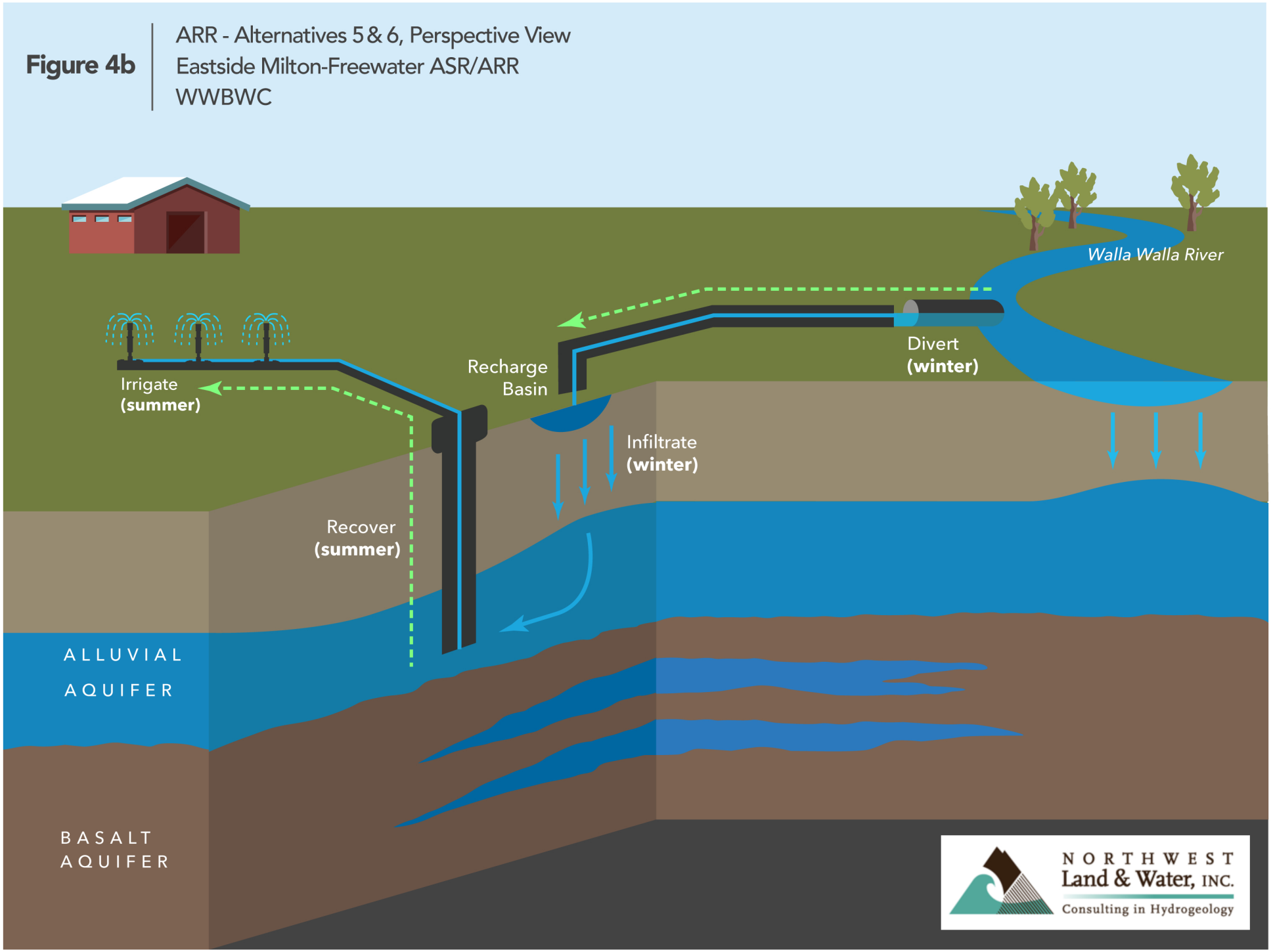
Figure 4a
Alternatives 5 and 6

Eastside Milton-Freewater ASR / ARR
WWBWC

NORTHWEST Land & Water, INC.

Figure 4b

ARR - Alternatives 5 & 6, Perspective View
Eastside Milton-Freewater ASR/ARR
WWBWC



Appendix A
ASR and ARR Application Guidelines (OWRD)

OREGON WATER RESOURCES DEPARTMENT

ASR Limited License Application Guidelines

ASR Limited License (ASR LL) applications require extensive attachments. Consult OAR 690-350-010 to -030 for a complete description. The following list summarizes the major components required to file a complete ASR LL.

1. **ASR Limited License Application Form and maps per 690-350-020(3)**

2. **ASR Test Program Report, developed and signed by Registered Geologist (RG)**
   - Injection rates and schedules
   - Water storage volumes and durations
   - Recovery rates and schedule
   - Water quality sampling including Quality Assurance and Quality Control Plan
   - Water level monitoring plan including location of observation wells (including at least one dedicated observation well that is not an ASR well)
   - Contingency plan for use of recovered water if the intended use isn't possible
   - Final project scope and conceptual design
   - Annual testing report outline

3. **Proposed System Design Report , developed and signed by Professional Engineer (PE)**
   - Injection, recovery, observation and source well construction information
   - Well head assembly and piping system for injection and recovery
   - Other conceptual design components of the system

4. **Hydrogeologic Report, developed and signed by RG with expertise in hydrogeology**
   - Local geology and conceptual hydrogeologic model
   - Description of aquifer targeted for storage
   - Estimated groundwater flow direction and rate of movement
   - Allocation of surface water springs or wells within the area affected by ASR wells
   - Rational for estimating the affected area
   - Anticipated changes to groundwater system due to proposed ASR testing
   - Potential natural resource problems associated with testing
   - Groundwater and surface water conditions prior to ASR
   - Description of how these factors affect ASR feasibility, including recoverability of stored water

5. **Quality of Source Water**
    - Quality and treatment of proposed injection source water during proposed injection season
    - Oregon Health Authority Drinking Water Services (OHA) per OAR 333-061
        - Contact : Tom Pattee, Groundwater Coordinator, Tom.Pattee@state.or.us
    - Oregon Department of Environmental Quality (DEQ) per 340-040
        - Contact Eastern Oregon: Phil Richerson , Phil.Richerson@state.or.us
        - Contact Western Oregon: Seth Sadofsky , Seth.Sadofsky@state.or.us
    - Also include:
        - Alkalinity or bicarbonate, calcium, magnesium, iron, manganese, sodium, potassium, chloride, sulfate, silica, TDS, pH, redox potential and temperature
    - Demonstrate source water meets standards set out in 690-350-020(3)(E)

6. **Quality of Receiving Aquifer Water**
    - Same constituent list as Source water

7. **Evaluate water quality compatibility for potential changes during storage**

Timelines

- Agencies (OWRD, OHA, ODEQ) have 45 days to determine completeness after an ASR application is received by OWRD. This is followed by a notice to applicants regarding completeness.
- If incomplete, the process stops until deficiencies are remedied. OWRD receipt of application amendments begins another 45 day completeness review.
- Once complete, the application goes to a 30 day public comment period.
- Comments may trigger further requests for application amendments.
- The Department has 60 days to act on an application after close of comment period.
- Average time between ASR LL application receipt and issuance is 1 year.

OWRD ASR Contact: Jen Woody 503-986-0855, Jennifer.L.Woody@oregon.gov

OREGON WATER RESOURCES DEPARTMENT

Artificial Groundwater Recharge Application Guidelines

Artificial Groundwater Recharge (AR) applications require extensive attachments. Consult OAR 690-350-110 to -130 for a complete description. AR projects in Oregon usually start by testing under a limited water use license for AR testing. If the licensee wants to recover the stored water and put it to a beneficial use, a second limited license for AR recovery testing is obtained. After testing under a limited license, a licensee can then apply for a permit for artificial groundwater recharge paired with a secondary groundwater permit to recover and use that stored water. These permits are eventually certificated like other water rights in Oregon. The following list summarizes the major components required to file complete AR Testing and AR Recovery Testing Limited License Applications.

1. **Schedule a pre-application conference with Department staff**

<u>Artificial Groundwater Recharge Testing Application</u>

2. **Limited License Application Form and map per OAR 690-340, available at:** http://www.oregon.gov/owrd/Pages/pubs/forms.aspx

3. **Minimum Perennial Stream Flow or Instream Water Right if AR source water is from a stream**
   - Copy of the document or
   - A waiver of this prerequisite from the Oregon Department of Fish and Wildlife or
   - Comments from ODFW that specify conditions under which diversion is allowable (these are often provided directly from ODFW to OWRD)

4. **AR Project Description Report, developed and signed by Registered Geologist (RG) and by Professional Engineer (PE)**
   - Plans for project construction
   - Operational plans, such as injection rates and schedules
   - Water storage volumes and durations
   - Recovery rates and schedule
   - Water quality monitoring plan
   - Water level monitoring plan, including location of observation wells, to determine when, where and how much stored water can be recovered
   - Water quantity measurement plan

5. **Hydrogeologic Feasibility Report, developed and signed by RG with expertise in hydrogeology**
    - Local geology and conceptual hydrogeologic model
    - Description of aquifer targeted for storage
    - Assessment of current conditions in the target aquifer
    - Anticipated changes to groundwater system due to proposed AR testing
    - Description of how these factors affect AR feasibility, including recoverability of stored water

6. **Water Quality**
    - Demonstrate source water meets anti-degradation standards per ODEQ, with water quality data from source water and groundwater
    - Oregon Department of Environmental Quality (DEQ) per 340-040
        - Contact Eastern Oregon: Phil Richerson , Phil.Richerson@state.or.us
        - Contact Western Oregon: Seth Sadofsky , Seth.Sadofsky@state.or.us

AR Recovery Testing Application

1. **Limited License Application Form and map per OAR 690-340**
    - Identify recovery wells, places of use, type and season of use

2. **Identify artificially recharged groundwater reservoir that wells will access**

3. **Provide evidence that the proposed use will actually be from the recharged aquifer, which may include:**
    - Groundwater level data
    - Geologic and geographic similarities
    - Hydraulic information

OWRD AR Contact: Jen Woody 503-986-0855, Jennifer.L.Woody@oregon.gov

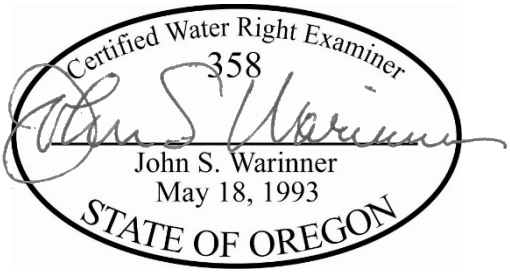
Appendix B
Water Rights Memorandum

MEMORANDUM

Project No.: 180278

October 26, 2018

To: Jim Mathieu, Northwest Land & Water, Inc.



From: **John Warinner, PE, CWRE**
Associate Water Resources Engineer

Re: **On-Farm Aquifer Storage and Recovery Design Alternatives Project**
Water Rights Strategy

On July 9, 2018, Aspect Consulting, LLC (Aspect) entered a subcontract with Northwest Land & Water, Inc. (NLW) to provide support services for the referenced project for the Walla Walla Basin Watershed Council (WWBWC). The Aspect work order was divided into three tasks: water rights strategy, infrastructure, and permits and applications. This memorandum represents the deliverable product for the water rights strategy element of our work order. An Excel workbook is also being attached with this memorandum, to document the details of the analysis and communicate tables and results that are too voluminous to include directly in this memorandum.

Questions to be Investigated

Aspect was asked by NLW to investigate and address the following questions:

1. What are the surface water rights that are currently diverted into Eastside Ditch (pipeline) that could be changed from a late spring/summer diversion to a winter/early spring diversion, followed by storage via Aquifer Storage and Recovery (ASR) or Artificial Groundwater Recharge and Recovery (ARR), then withdrawal (recovery pumping) for late spring/summer irrigation?
2. What are the total rates and volumes of these surface water rights that could potentially be changed in this manner?
3. What are the rates and volumes of water rights in the name of Project Participant A that are currently diverted into Eastside Ditch at Nursery Bridge that could potentially be changed in this manner?

4. What are the rates and volumes of water rights in the name of Project Participant B that are currently diverted into Eastside Ditch at Nursery Bridge that could potentially be changed in this manner?
5. Prepare a table that integrates and concatenates the water right data from the two tables of data acquired from Oregon Water Resources Department (OWRD): the watermaster distribution list for Eastside Ditch, and the points of diversion mapped in the OWRD water rights information system (WRIS).
6. Create a data/acronym dictionary for all attributes and include as "Notes" below the table.
7. What are the 7.68 cfs and 11.1 cfs water rights referred to in the OWRD watermaster distribution list for Eastside Ditch?
8. The water right holders on the Eastside Ditch, plus other irrigators, negotiated relinquishment, voluntary diversion reduction, or some other diversion reduction to satisfy the desire of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and/or other environmental interests to leave more water instream for fish. To what degree was the diversion rate reduced (cfs)? Are these reduced diversion rates reflected in the OWRD watermaster distribution list? Please elaborate on the total Eastside Ditch diversion rate accounting prior to, and after, the negotiation to leave more (summer?) water instream.
9. Develop a strategy that would enable Eastside Ditch water right holders, collectively or as individuals, to change their surface water rights that are currently diverted into Eastside Ditch (pipeline) from late spring/summer diversion to winter/early spring diversion, followed by storage via ASR or ARR, then withdrawal (recovery pumping) for late spring/summer irrigation, conditioned on the feasibility of Eastside ASR and/or ARR. Assumptions regarding the feasibility of ASR and/or ARR include: water quality criteria met, sufficient water recovery rates, full funding of capital and O&M costs, and sufficient participation of stakeholders to support and sustain an Eastside ASR or ARR project(s).
10. Can the State of Oregon trust water rights program be used to reduce risks to water right holders as ASR or ARR feasibility testing is completed from licensing through full commissioning phases? If yes, how?
11. Describe a strategy whereby the changes to the subject water right changes are fully-perfected and diversion of streamflows historically occurring in late spring/summer are changed in time to occur in winter/early spring, as original places of use are irrigated by recovery pumping from the alluvial aquifer and/or basalt aquifer.
12. Please identify all attributes of the groundwater right that authorizes Project Participant A to pump the well shown in a referenced Google Earth image (PDF). This well could potentially play a role in "testing" ASR feasibility on the eastside as it pumps/delivers water across the Nursery Bridge (west to east).

Answers to Questions

The answers or responses to the questions posed by NLW can be summarized as follows. Additional details regarding approaches and methodologies are provided under a subsequent section of this memorandum:

1. **What are the surface water rights that are currently diverted into Eastside Ditch (pipeline) that could be changed from a late spring/summer diversion to a winter/early spring diversion, followed by storage via ASR or ARR, then withdrawal (recovery pumping) for late spring/summer irrigation?**

   Our investigation yielded 48 certificated water rights held by 43 unique parties, which is a combination of private individuals and business entities. These water rights are summarized in Table 1.

Table 1. Surface Water Rights Served by Eastside Ditch

Certificate	Acres	Rate (cfs)
12678	3.0	0.033
38867	43.0	0.750
82661	2.7	0.030
86263	1.65	0.060
86267	1.8	0.070
86271	8.28	0.310
86272	1.2	0.050
86277	16.66	0.340
86286	0.87	0.011
86289	0.58	0.007
86290	0.45	0.006
86291	1.37	0.017
86293	3.85	0.048
86295	2.89	0.037
86297	60.4	2.580
89955	93.0	1.160
89956	80.09	0.540
90631	2.1	0.053
90632	8.75	0.219
90633	1.7	0.043
90634	36.07	0.991
90635	2.3	0.058
90636	9.4	0.173
90637	11.8	0.295
90638	18.43	0.461
90639	3.6	0.091
90640	3.0	0.070
90641	3.4	0.085
90642	4.5	0.113
90643	28.55	0.711
90644	9.54	0.239
90645	2.6	0.020
90646	0.4	0.010
90647	2.5	0.063
90648	1.2	0.010
90649	4.88	1.220
90650	6.4	0.160
90651	9.6	0.240

Certificate	Acres	Rate (cfs)
90652	11.8	0.295
90653	2.6	0.020
90654	15.81	0.393
90655	7.28	0.229
90656	0.8	0.007
90657	9.0	0.225
90658	3.0	0.075
90659	2.18	0.055
90660	8.9	0.223
90661	5.5	0.138
TOTALS	**559.38**	**13.033**

2. What are the total rates and volumes of these surface water rights that could potentially be changed in this manner?

As summarized in Table 1, the 48 water rights represent a total of 559.38 acres and a combined maximum diversion rate of 13.033 cubic feet per second (cfs). The volume or duty represented by these water rights is not easily determined, as it depends on various factors such as authorized volume, cropping, irrigation methods and such. Since most of the eastside land is in permanent orchard crops and pasture, the annual volume can be estimated by multiplying the total acreage by 3.0 acre-feet per acre per year, or 1678 acre-feet.

3. What are the rates and volumes of water rights in the name of Project Participant A that are currently diverted into Eastside Ditch at Nursery Bridge that could potentially be changed in this manner?

Our investigation yielded two (2) certificated water rights in the name of Project Participant A totaling 77.06 acres and a maximum diversion rate of 2.920 cfs. These water rights are summarized in Table 2.

Table 2. Surface Water Rights in the Name of Project Participant A

Certificate	Acres	Rate (cfs)
86277	16.66	0.340
86297	60.4	2.580
TOTALS	**77.06**	**2.920**

4. What are the rates and volumes of water rights in the name of Project Participant B that are currently diverted into Eastside Ditch at Nursery Bridge that could potentially be changed in this manner?

Our investigation yielded two (2) certificated water rights in the name of Project Participant B totaling 173.09 acres and a maximum diversion rate of 1.700 cfs. These water rights are summarized in Table 3.

Table 3. Surface Water Rights in the Name of Project Participant B

Certificate	Acres	Rate (cfs)
89955	93.0	1.160
89956	80.09	0.540
TOTALS	**173.09**	**1.700**

5. **Prepare a table that integrates and concatenates the water right data from the two tables of data acquired from Oregon Water Resources Department (OWRD): the watermaster distribution list for Eastside Ditch, and the points of diversion mapped in the OWRD water rights information system (WRIS).**

   This table has been prepared and is included in the associated Excel workbook under the 11th tab titled "Integrated Dist List + POD Data." This is the next-to-last tab in the workbook. It is relevant to note that there is not a one-to-one correspondence between the records in the Eastside Distribution List provided by the OWRD Umatilla County Watermaster and the POD data obtained from the OWRD WRIS. This is because there is a unique record in the distribution list for each priority date included in the subject water right certificate, and several of the water rights include multiple priority dates. On the other hand, the records in the POD database are organized around discrete uses of water, such as primary irrigation, supplemental irrigation, temperature control (e.g. frost protection), and livestock watering. Therefore, the records have been organized together as best possible, but they do not directly align on a one-to-one basis.

6. **Create a data/acronym dictionary for all attributes and include as "Notes" below the table.**

   The data/acronym dictionary for the data attributes in the Watermaster Distribution List and OWRD WRIS POD database has been created in the associated Excel workbook under the 12th tab titled "Data Attribute Dictionary." Additional detail can be accessed at the following links to the OWRD website:

   - GIS metadata for POD database
     - https://arcgis.wrd.state.or.us/data/wr_pod_metadata.pdf
   - Water Right database codes
     - https://www.oregon.gov/owrd/WRDFormsPDF/wris_code_key.pdf

7. **What are the 7.68 cfs and 11.1 cfs water rights referred to in the OWRD watermaster distribution list for Eastside Ditch?**

   The Eastside Ditch distribution list was acquired from OWRD via Umatilla County Watermaster Greg Silbernagel. Aspect has inquired with Greg Silbernagel (Watermaster), Mike Ladd (OWRD District Manager) and Walla Walla River Irrigation District (WWRID) Manager Teresa Kilmer to determine the relevance of these references to 7.68 cfs and 11.1 cfs. Greg Silbernagel responded that he is not the author of the distribution list, but has some personal experience deciphering some of the notations in the list. He noted that "part" typically means "part of the acreage identified on the Excel spreadsheet directly above it." He added, "As an example, a 20-acre parcel has 11.1 acres of water rights. It is then

subdivided but the decree map was not specific as to which 11.1 acres of the 20-acre parcel had water rights. Each tax lot would then receive a part of the water right that has not been determined, but we still account for 11.1 acres of water rights on one tax lot and note 'part' on the others."

8. **The water right holders on the Eastside Ditch, plus other irrigators, negotiated relinquishment, voluntary diversion reduction, or some other diversion reduction to satisfy the desire of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and/or other environmental interests to leave more water instream for fish. To what degree was the diversion rate reduced (cfs)? Are these reduced diversion rates reflected in the OWRD watermaster distribution list? Please elaborate on the total Eastside Ditch diversion rate accounting prior to, and after, the negotiation to leave more (summer?) water instream.**

   In 2006, Walla Walla River Irrigation District (WWRID) applied for an Allocation and Use of Conserved Water transaction (CW-46) that proposed to reduce the diversion into Eastside Ditch from 9.4 cfs to 7.0 cfs for conservation of 2.4 cfs. The Final Order issued by OWRD, based on the actual tabulation of the water rights served by the Eastside diversion and the water conserved on each property, identifies that a total conservation of 2.833 cfs. The entire 2.833 cfs was allocated to the State of Oregon for instream flow benefit. The Final Order also clarified that the Eastside landowners originally held 9.6 cfs of water rights, and 6.767 cfs after the transaction.

   Yes, these reduced diversion rates are reflected in the OWRD water right tables and distribution list.

   This instream flow contribution added to a larger voluntary bypass of flow at the primary WWRID diversion upstream of Nursery Bridge. According to Teresa Kilmer (WWRID Manager): "The Civil Penalty Settlement Agreement with the United States Fish and Wildlife Service (USFWS) required that WWRID and Hudson Bay District Improvement Company (HBDIC) bypass a minimum of 27 cfs through June of each year and 25 cfs the remainder of the year. Of the 25 cfs left instream, WWRID has protected 2.833 cfs from the Eastside Piping Project, 2.16 cfs from the Milton Ditch Piping Project and 1.76 cfs from the Powell Ditch Piping Project. WWRID also has approximately 4 cfs in pending landowner Conserved Water Applications from properties served by the Little Walla Walla River. That means that 10.753 cfs of the 25 cfs is protected with a senior priority date. The remaining 14.247 cfs is voluntarily bypassed. The Civil Penalty Settlement Agreement expired in 2007."

9. **Develop a strategy that would enable Eastside Ditch water right holders, collectively or as individuals, to change their surface water rights that are currently diverted into Eastside Ditch (pipeline) from late spring/summer diversion to winter/early spring diversion, followed by storage via ASR or ARR, then withdrawal (recovery pumping) for late spring/summer irrigation, conditioned on the feasibility of Eastside ASR and/or ARR. Assumptions regarding the feasibility of ASR and/or ARR include: water quality criteria met, sufficient water recovery rates, full funding of capital and**

O&M costs, and sufficient participation of stakeholders to support and sustain an Eastside ASR or ARR project(s).

Water users on Eastside Ditch currently hold water right certificates that authorize them to withdraw water from the Walla Walla River (in some cases referred to as the Tum A Lum River or Tum A Lum Reach of the Walla Walla River) and use the water for irrigation and other related agricultural uses on the lands they own and/or farm. The water right certificates specify the location where water is to be diverted, the period (months) during which water may be diverted and used, the rate at which water may be diverted, and the maximum volume that may be used each year.

The water right certificates currently held by the Eastside Ditch water users do not authorize the water users to withdraw water at other times of the year, nor do they authorize the water users to intentionally infiltrate or inject the water into alluvial or basalt groundwater aquifers, or to withdraw water from the alluvial or basalt groundwater aquifers.

To divert surface water, intentionally route it into groundwater aquifers, then recover it using groundwater wells, the water users must hold a different type of water right. OWRD authorizes both ARR and ASR with a unique permitting artifact called a limited license.

Oregon Revised Statute (ORS) 537.135 establishes the requirements for a permit to appropriate water for recharging ground water sources. ORS 537.143 establishes the rules governing the issuance of a limited license to use or store surface or ground water or to use stored water.

The State of Oregon has intentionally designed the limited license process to include phases to coordinate with agency representatives prior to applying for a limited license, as well as testing the feasibility and viability of the proposed approach prior to issuing a long-term or permanent authorization for the use.

The strategy that would enable Eastside Ditch water right holders to change their **water management practices** as described in Question 9 would involve the following general process:

- Apply for and acquire a Limited License to test the overall feasibility of the ARR/ASR concept(s)
- Test, refine and confirm the overall feasibility and long-term sustainability of the ARR/ASR concept(s)
- Codify the practice in the form of a Limited License Permit
- Continue the new practice indefinitely under the Limited License Permit

It is important to note that this strategic pathway would not change the existing surface water rights. As stated above, Oregon Water Law does not allow the existing water rights to be changed in this manner. Rather, this strategic pathway would augment the existing surface water rights. Further, to preserve the opportunity for the Eastside Ditch water users to return to their “normal” use of their existing water rights, actions should be taken to

ensure that the existing water rights are protected through this strategic "concept testing and refinement" process.

In the context of this project, we have initiated communications with OWRD regarding any existing statutes that would automatically protect the existing water rights during this "concept testing and refinement" process. According to Jennifer Woody (OWRD hydrogeologist), there are no existing statutes that directly provide this protection from forfeiture under these circumstances. Protection of the existing water rights would need to be done in a "normal" manner, which is by using/exercising them at least once every five years and/or leasing them instream (if that is feasible under these circumstances).

This strategic pathway can be more fully developed and articulated during the planning phase of an ASR/ARR Limited License project.

10. **Can the State of Oregon trust water rights program be used to reduce risks to right holders as ASR or ARR feasibility testing is completed from licensing through full commissioning phases? If yes, how?**

    The State of Oregon does not have a "trust water rights program" that is equivalent to the program of this name that has been established in Washington State by the Washington Department of Ecology. However, the State of Oregon does allow a similar transaction referred to as an Instream Lease. The feasibility of using an Instream Lease to protect existing surface water rights during ASR/ARR testing under a Limited License is case-specific. This potential transaction mechanism can be more fully investigated and evaluated during the planning phase of an ASR/ARR Limited License project. If a given surface water right cannot be protected through an Instream Lease, the best existing alternate strategy for protecting it is probably just to use/exercise the water right at least once every five years, if this remains possible and feasible to do.

11. **Describe a strategy whereby the changes to the subject water rights changes are fully-perfected and diversion of streamflows historically occurring in late spring/summer are changed in time to occur in winter/early spring, then original places of use are irrigated by recovery pumping from the alluvial aquifer and/or basalt aquifer.**

    As stated in the response to Item 10, the State of Oregon has intentionally designed the limited license process to include phases to coordinate with agency representatives prior to applying for a limited license, as well as testing the feasibility and viability of the proposed approach prior to issuing a long-term or permanent authorization for the use.

    Limited Licenses are typically issued for a 5-year duration, and are typically renewable for additional 5-year periods, potentially indefinitely. Once a conceptual water management practice such as ASR/ARR has been completely tested and confirmed to be viable and sustainable on a long-term basis, the Limited License process affords the opportunity to convert the Limited License into a permanent permit form.

    This strategic pathway can be more fully developed and articulated during the planning phase of an ASR/ARR Limited License project.

12. **Please identify all attributes of the groundwater right held by Project Participant A that authorizes Project Participant A to pump the well shown in a referenced Google Earth image (PDF). This well could potentially play a role in "testing" ASR feasibility on the eastside as it pumps/delivers water across the Nursery Bridge (west to east).**

    Use of water from the subject well is authorized under Certificate 86287, which was originally applied for with Application G-2645 and originally authorized under Permit G-2543. Certificate 86287 was issued on May 28, 2010 in the name of Project Participant A. This certificate of water right confirms the right to use the waters of Tucker Well No. 2 within the Walla Walla River Basin for supplemental irrigation of 52.7 acres, as follows:

    - 17.3 acres in Tax Lot 100, T6N, R35E, WM, in the SE SE quarter-quarter of Section 36.
    - 34.7 acres in Tax Lot 100, T6N, R35E, WM, in the NE SE quarter-quarter of Section 36.
    - 0.7 acres in Tax Lot 900, T6N, R35E, WM, in the NW SE quarter-quarter of Section 36.

    The priority date for this water right is June 28, 1963. The authorized point of appropriation is located 52 chains East and 17 chains South from the northeast corner of Section 1, T5N, R35E, WM.

Limitations

Work for this project was performed for Northwest Land & Water, Inc. (Client), and this memorandum was prepared in accordance with generally accepted professional practices for the nature and conditions of work completed in the same or similar localities, at the time the work was performed. This memorandum does not represent a legal opinion. No other warranty, expressed or implied, is made.

All reports prepared by Aspect Consulting for the Client apply only to the services described in the Agreement(s) with the Client. Any use or reuse by any party other than the Client is at the sole risk of that party, and without liability to Aspect Consulting. Aspect Consulting's original files/reports shall govern in the event of any dispute regarding the content of electronic documents furnished to others.

Attachments:
Excel file (Water Rights Data Tables_On-Farm ASR_with_landowners_2018-10-26.xls.)
Excel file (Water Rights Data Tables_On-Farm ASR_without_landowners 2018-10-26.xls.)

Appendix C
Dialogue with OWRD, Protecting Landowner's Water Rights During ASR or ARR Development

Dialogue with OWRD
Protecting Landowner's Water Rights During ASR or ARR Development

CONTEXT (by NLW team)

Suppose one or more landowners have existing water rights to use surface water for irrigation. Then they apply for a Limited License to divert water at the same location (authorized POD), but at a different time (winter), and then use that water to recharge an alluvial and/or basalt aquifer, and use one or more wells to recover (appropriate) the water from the alluvial and/or basalt aquifers. This is all done as a test to determine whether this alternate timing and pathway of water use can sustainably mitigate diversion of surface water during the irrigation season.

QUESTIONS (by NLW team)

Q1: During the lengthy process required to test/confirm that it works for the water users to use water under the Limited License, how do they protect their original water rights and avoid relinquishing them due to non-use?

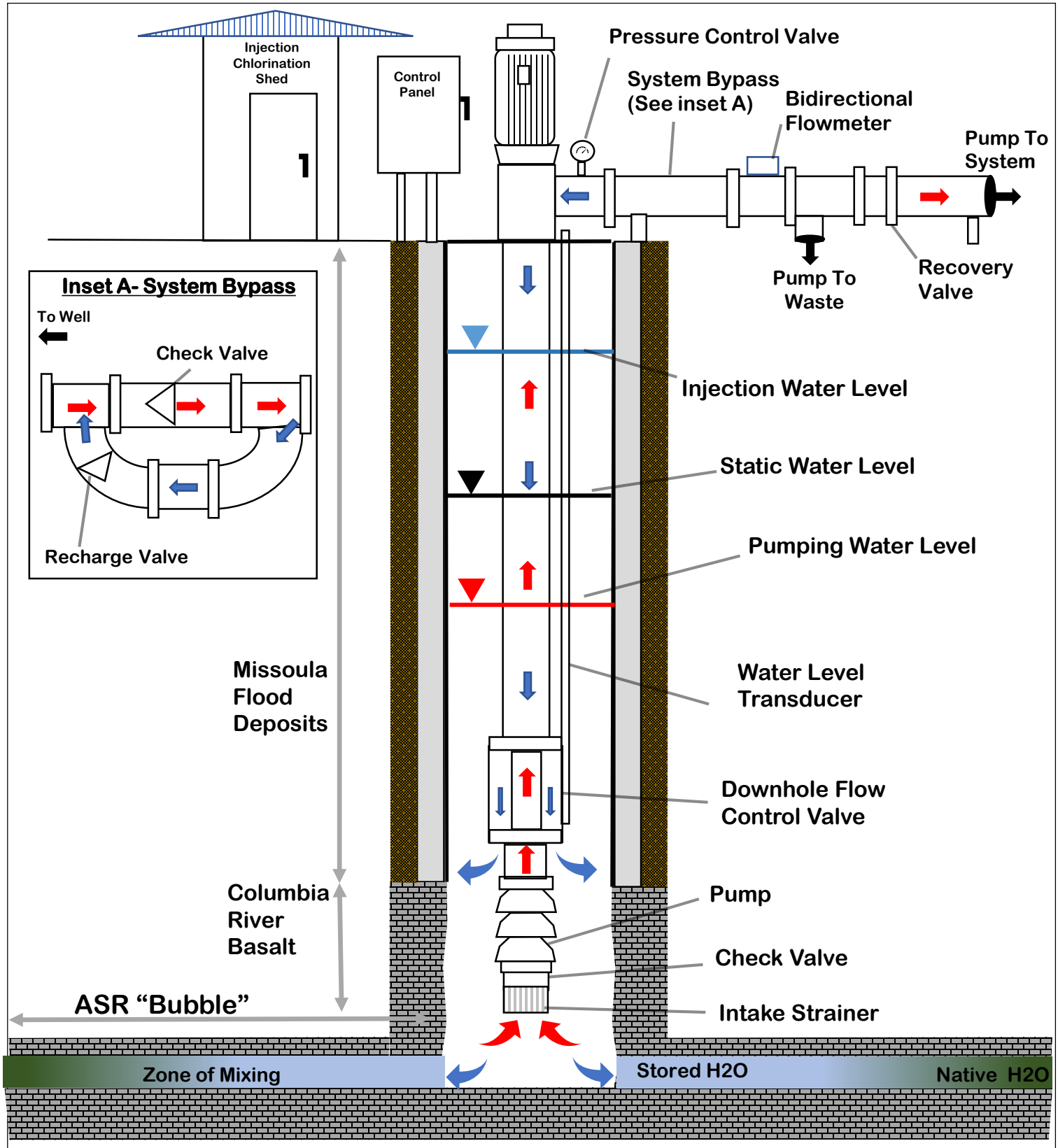
Q2: Is this protection of water rights under a Limited License done on a project basis in negotiation with OWRD… or is there specific language in the OAR/ORS that addresses such water right protection and the associated terms and conditions?

Q3: If/when the entire process is complete, and all stakeholders are convinced that the alternative pattern of water use works in a sustainable manner, is there a way for the water users to protect their priority date and the opportunity to return to their original water rights if circumstances change?

Answer (by OWRD)

In response to questions 1 and 2, there are no statutes that directly provide the protections from forfeiture as described in the hypothetical example below, except that exercising the entire water right at least 1 year out of 5 provides protection from forfeiture as per ORS 540.610. The Department will need to review the specific details of the existing rights and proposed project implementation to address question 3 and cannot provide an answer at this time.

Appendix D
Conceptual Schematic of ASR Well System



Legend

- Injection Flow Direction
- Pumping Flow Direction

Notes:
Not to Scale – For Illustrative Purposes Only

Flow Control Valve arrangement for vertical line shaft turbine is similar to that for a submersible pump . Check valve is above the pump for a submersible installation.

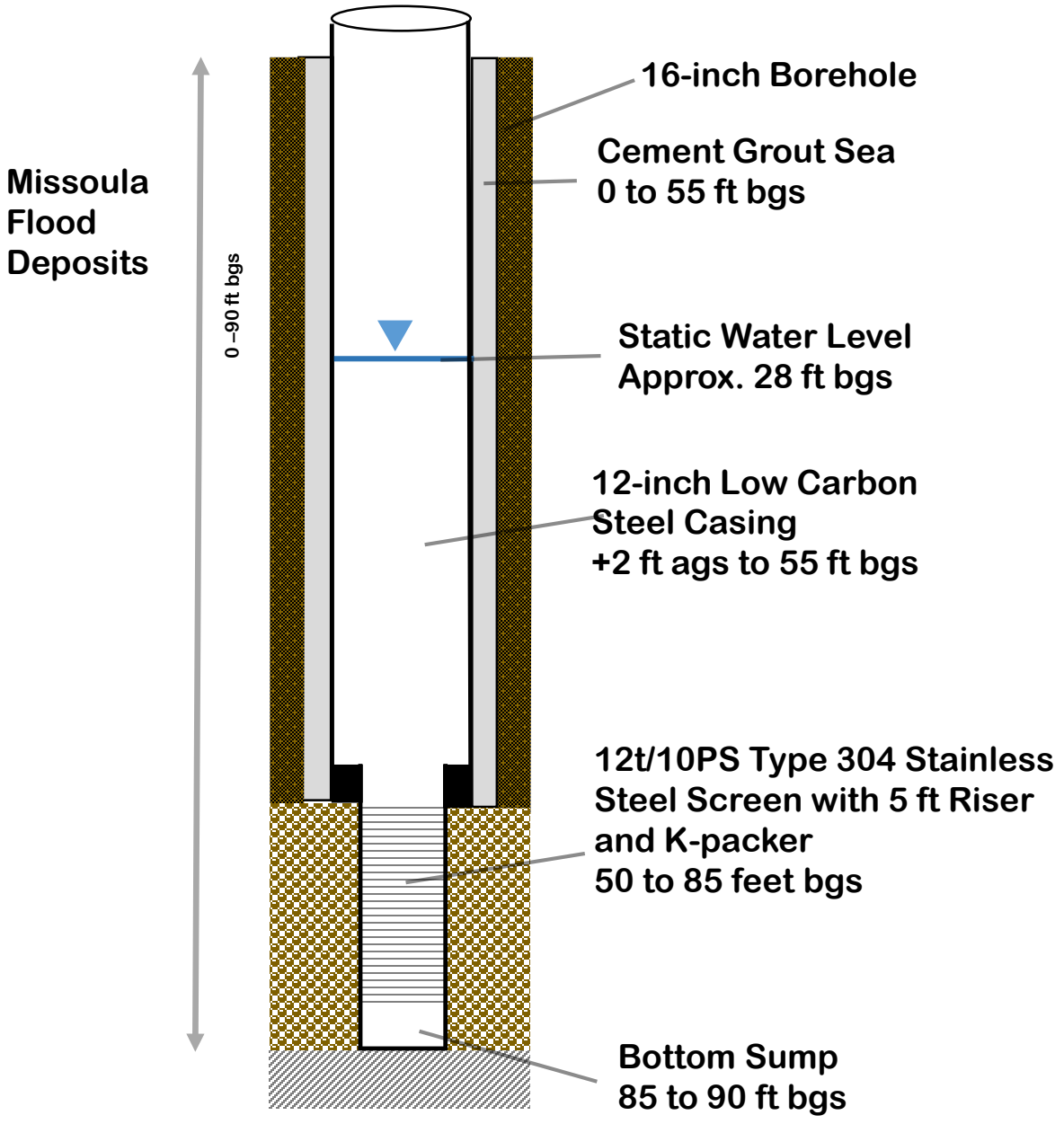
Conceptual Schematic of ASR Well System

On-Farm ASR Evaluation
Walla Walla Basin Watershed Council
Walla Walla, Oregon

Aspect CONSULTING	OCT-2018	BY: CDA/ ---	FIGURE NO. 1
	PROJECT NO. 180287.001	REVISED BY: ---/---	

Appendix E
Conceptual Designs for ARR Wells

Option 1
AR Well Natural Pack



Legend

- Cemented Gravel
- Gravel and Boulders
- Bentonite Bottom Seal

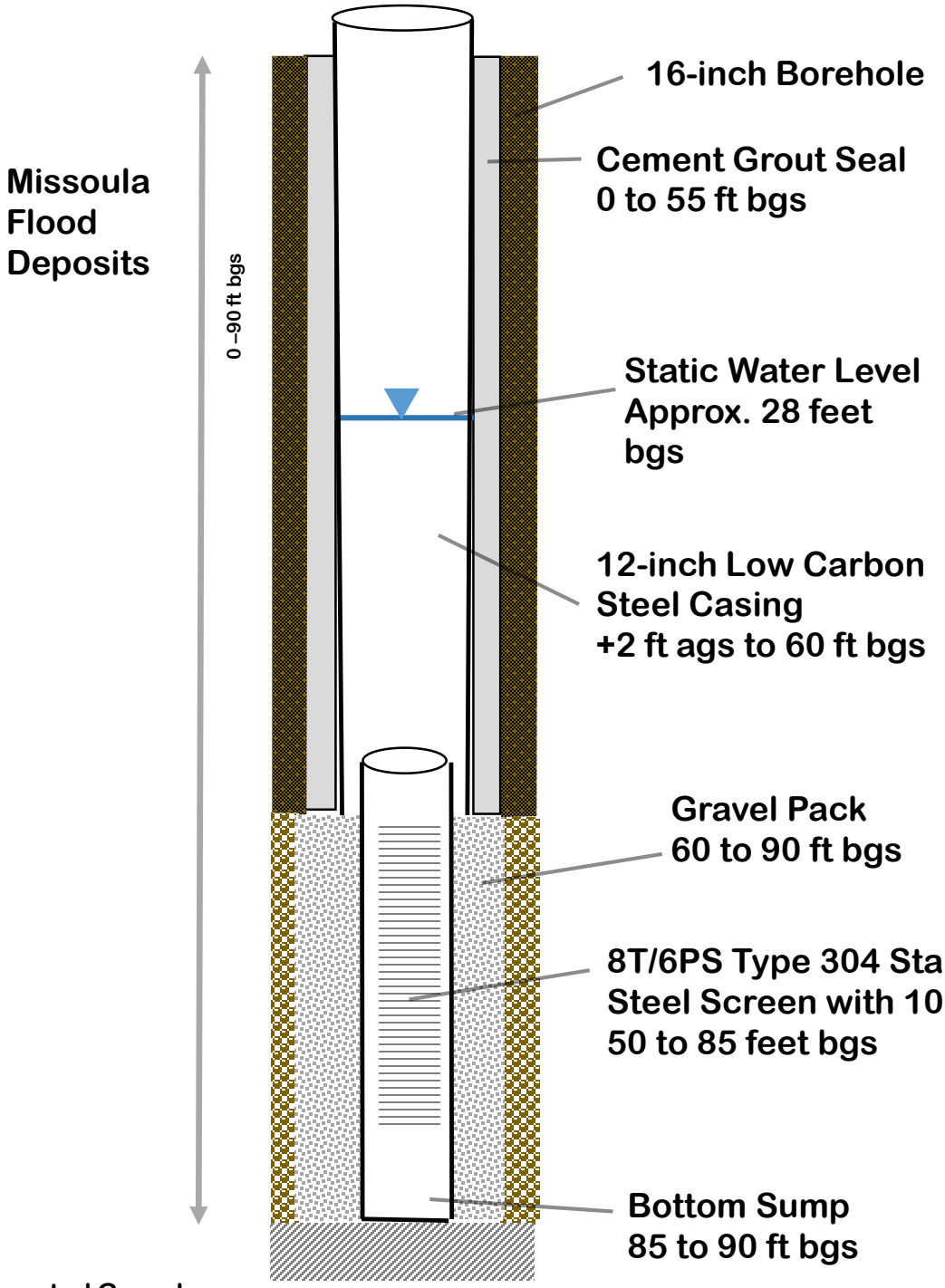
Not to Scale – For Illustrative Purposes Only

Conceptual Design for AR Recovery Well

On-Farm ASR Evaluation
Walla Walla Basin Watershed Council
Walla Walla, Oregon

Aspect CONSULTING	OCT-2018	BY: CDA/ ---	FIGURE NO. 2
	PROJECT NO. 180287.001	REVISED BY: ---/---	

Option 2
AR Well Gravel Pack



Legend

- Cemented Gravel
- Gravel and Boulders
- Gravel Pack
- Bentonite Bottom Seal

Not to Scale – For Illustrative Purposes Only
Actual well design will be dependent on subsurface conditions

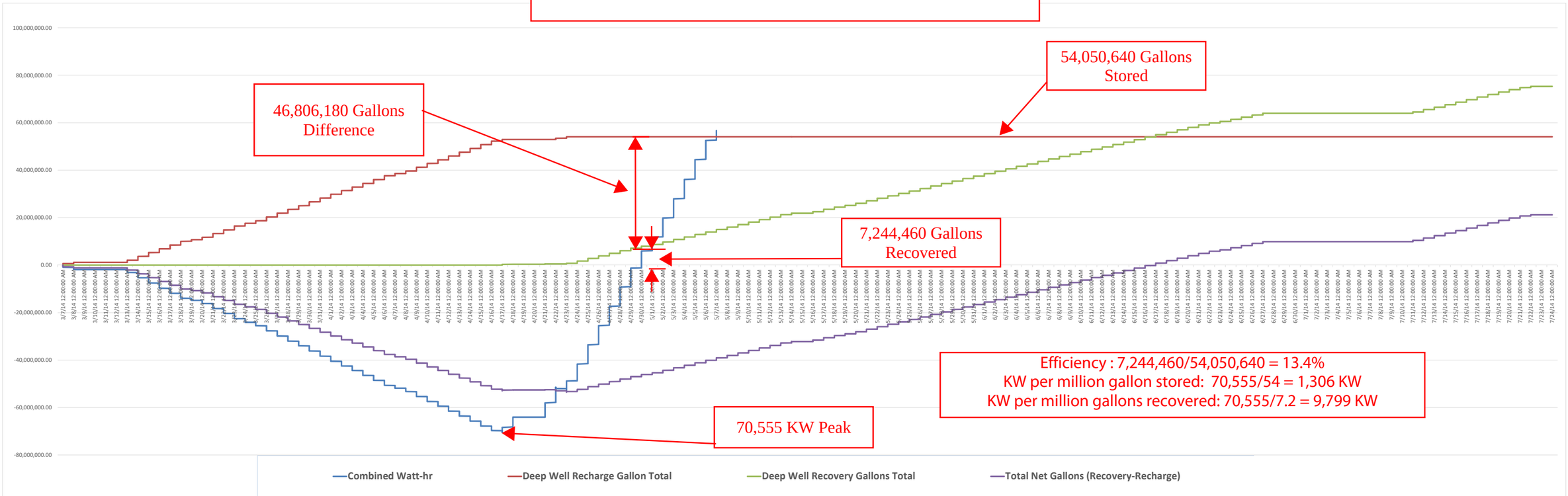
Conceptual Design for AR Recovery Well

On-Farm ASR Evaluation
Walla Walla Basin Watershed Council
Walla Walla, Oregon

Aspect CONSULTING	OCT-2018	BY: CDA/ ---	FIGURE NO. 3
	PROJECT NO. 180287.001	REVISED BY: ---/---	

Appendix F
Solar and Regen(TM) Electric Power Generation

2014 MADISON FARMS ASR



VARIABLE FREQUENCY DRIVE COST COMPARISON AND PAYBACK

OPTION 1 : 200 HP VFD (NO REGENERATION): $7,754.00

OPTION 2: 200 HP VFD W/ 100 HP REGENERATION: $13,975.00

INITIAL CAPITAL COST FOR REGENERATION VFD DRIVE: $13,975.00 - $7,754.00 = $6,221.00

@ $.03 PER KWHR FOR REGENERTION FROM THE UTILITY,

70,555 KW * $.03/KW = $2,116.65

$6,221.00/$2,116.65 = 2.94 YEARS

SOLWATT, LLC : ECHO, OREGON

PHOTO VATALIC STUDY

10/1/2018

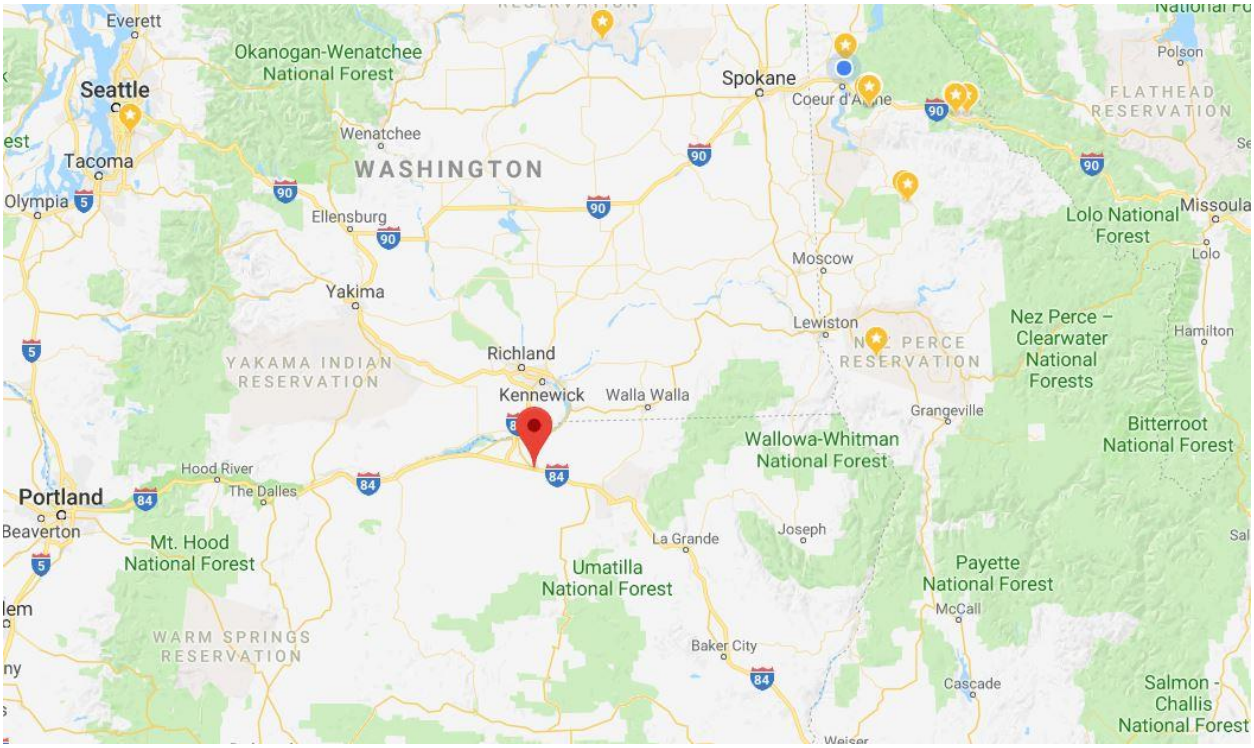
WAPITI CONSULTING

MATTHEW JOHNSON, P.E.

Introduction:

Solwatt, LLC owns a 570.34 KW photovoltaic (PV) solar system located in Echo, Oregon. The PV system was installed in 3 phases (9.9kW, 360.64kW, and 199.9kW) in 2013. The following information was gathered on the PV system to verify power production and supply an estimated payback period based on the existing PV power production and the cost of current installation.

Echo, Oregon Location:



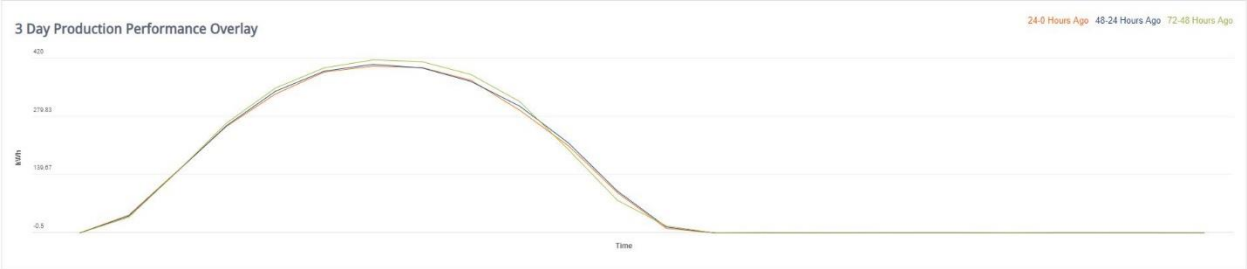
Generation this Year is Equivalent to the Impact of

554 Tons of CO_2 Saved 63,426 Gallons of Gas Saved 14,095 Trees Planted

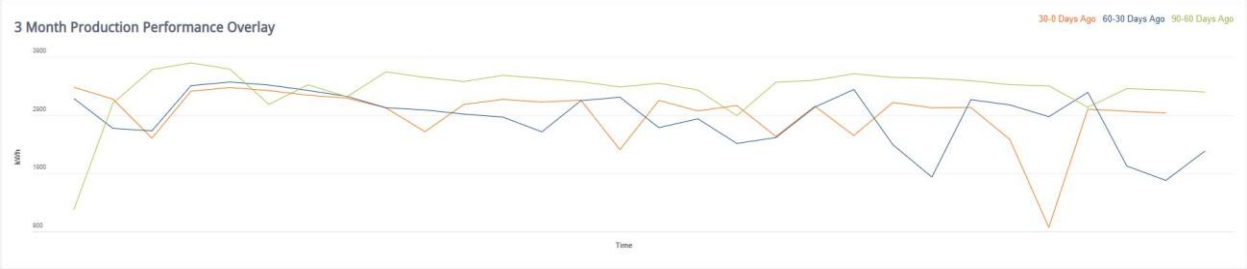
For every kilowatt installed you are generating

154 kWh per month 1,373 kWh per year

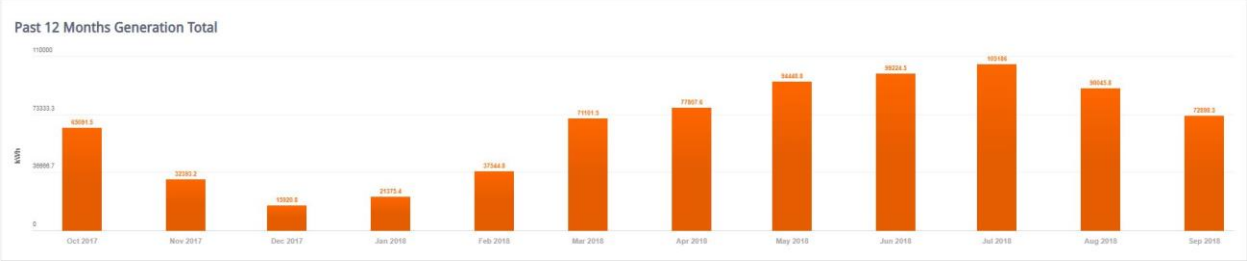
3 day production:



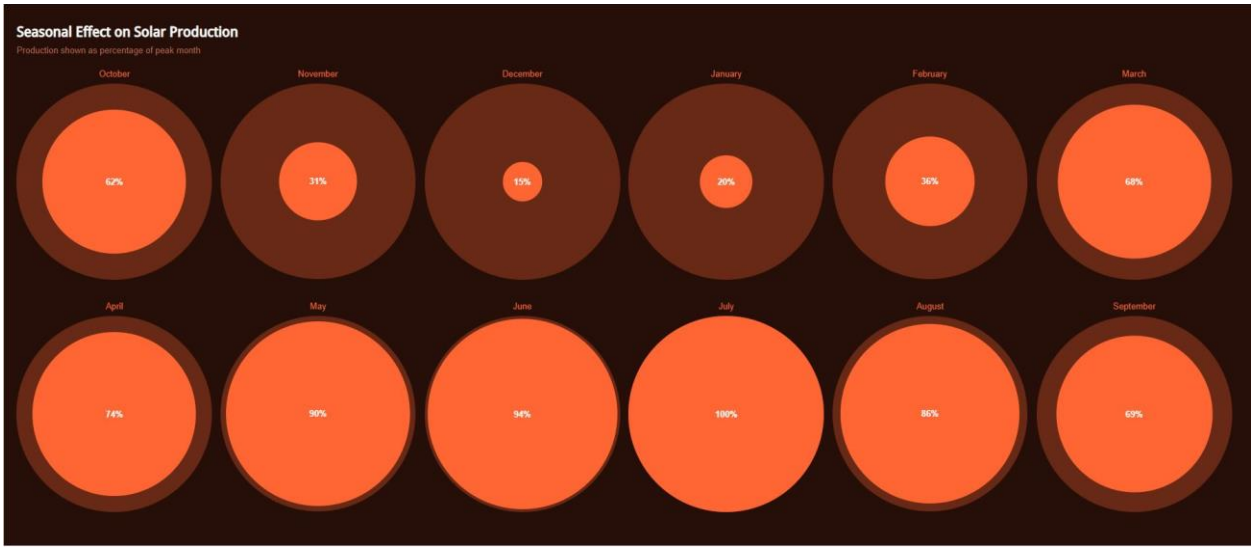
3 month production:



12-month production:



Season effects on solar production:



Conclusion:

Current average solar rate of installation is $3.00 per watt in the Walla Walla, WA area. At the average installation rate, the 570.34 KW solar installation would be: $1,711,020.00.

In 2017 the 570.34 KW solar farm produced 1,373 KWH for every 1 KW installed. At a rate of $0.2145 per kWh, the solar farm generated $170,000.00 that year.

With an installation cost of $1,711,020.00 and an annual revenue of $170,000.00, the installed solar system would have a payback period of 10.06 years. This payback period does not include any tax credits or offsets that may be available from the utility at the time of the contract. Credits or offsets can greatly reduce the payback period.

ON FARM AQUIFER STORAGE COST ESTIMATE		
3R VALVE SYSTEM		$131,416.00
	ASR VALVE (10" VALVE - 4000 GPM -NSF CERTIFIED)	
	CONTROL PANEL W/ CONTROL SYSTEM - SCADA MONITORING	
	150 FEET HYDRAULIC NSF HOSE (DOWN WELL)	
	100 FEET HYDRUALIC HOSE (WELL HOUSE TO WELL HEAD)	
REGENERATOR VFD (480 VAC : 200 HP PUMPING - 100 HP REGENERATION)		$6,100.00
SOLAR	1 MEGAWATT INSTALLED AT $3.00/WATT	$3,000,000,000.00

Appendix G
Surface Water Treatment Plant Process Evaluation

ESVELT ENVIRONMENTAL ENGINEERING, LLC
8908 EAST DALTON AVENUE, SPOKANE WA 99212, www.esvelt.com
Phone: 509-926-3049
Fax: 509-922-3073

TECHNICAL MEMORANDUM

Date: October 8, 2018

Project: Walla Walla Basin Watershed Council, Oregon
On-farm Aquifer Storage and Recovery Design Alternatives Project
Surface Water Treatment Plant Process Evaluation

Prepared For: Jim Mathieu, LG, LHg, RG
Principal Hydrogeologist
Northwest Land & Water, Inc
6556 37th Avenue NE
Seattle, WA 98115

Prepared By: Allison Esvelt, MSCE, PE, BCEE, Principal
Esvelt Environmental Engineering, LLC

1.0 BACKGROUND

1.1 Purpose

The purpose of the On-farm Aquifer Storage and Recovery Design Alternatives Project is to develop design alternatives and conduct a source water investigation in order to implement aquifer storage and recovery (ASR) or Artificial (Groundwater) Recharge and Recovery (ARR) of approximately 3 to 5 cubic feet per second (cfs) (~2 to 3.25 MGD) of surface water from the Walla Walla River. The surface water stored in the aquifer will be withdrawn from June through September for agricultural irrigation. The purpose of this technical memorandum is to evaluate alternate surface water treatment plant processes to comply with the water quality standards for ASR and ARR.

2.0 REGULATORY REQUIREMENTS

2.1 Aquifer Storage and Recovery

Oregon regulations for ASR and Artificial Groundwater Recharge (AR) are covered in Chapter 690 Division 350 of the Oregon Administrative Rule (OAR), Sections 690-350-0010 to 690-350-0030. Per OAR 690-350-0010(6) Water Quality, water used for ASR must meet the most stringent of the drinking water standards specified in OAR 333-061-0030, the treatment requirements and performance standards specified in OAR 333-061-0032, and the groundwater maximum measurable levels specified in OAR 340-040-0090.

2.2 Surface Water Treatment for Drinking Water

The treatment system must comply with state regulations for the treatment of surface water used for drinking water under OAR Chapter 333 Division 61 *Drinking Water* and federal regulations under Title 40 Code of Federal Regulations (CFR) Part 141 *National Primary Drinking Water Standards* and Part 143 *National Secondary Drinking Water Standards.* Specific federal regulations that apply to the treatment of surface water sources are included in the following subparts:

- Surface Water Treatment Rule (SWTR) 40 Code of Federal Regulations (CFR) 141, Subpart H (40 CFR 141.70-141.75) – *Filtration and Disinfection*

- Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBP) 40 CFR 141, Subpart L (141.130-141.135) – *Disinfectant Residuals, Disinfection Byproducts, and Disinfection Byproduct Precursors*
- Long Term 1 Enhanced Surface Water Treatment Rule (LT1ESWTR) - 40 CFR 141, Subpart T (141.500-141.571) - *Enhanced Filtration and Disinfection—Systems Serving Fewer Than 10,000 People*
- Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBP) 40 CFR 141, Subpart V (141.620-141.629) – *Stage 2 Disinfection Byproducts Requirements.*
- Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) 40 CFR 141, Subpart W (141.700-141.723) - *Enhanced Treatment for Cryptosporidium*

Surface waters are particularly susceptible to contamination from pathogens such as bacteria, viruses, and parasites. Due to this susceptibility, the rules are primarily focused on the inactivation or removal of pathogens in the raw water source, including *Giardia lamblia*, viruses, heterotrophic bacteria*, Legionella*, and *Cryptosporidium*. Additional requirements of the rules are meant to minimize public health risks occurring from disinfection byproducts. The treated water will be required to meet the surface water treatment requirements summarized in Table 1.

Table 1. Surface Water Treatment Regulatory Requirements

Parameter	Regulation	Requirement
Pathogen Inactivation	SWTR 40 CFR 141.70 OAR 333-061-0032	3-log (99.9%) removal and/or inactivation of *Giardia lamblia* cysts
	SWTR 40 CFR 141.70 OAR 333-061-0032	4-log (99.99%) removal and/or inactivation of viruses
	LT1ESWTR 40 CFR 141.500 LT2ESWTR 40 CFR 141, Subpart W OAR 333-061-0032	2-log (99%) removal of *Cryptosporidium* oocysts plus 0 to 3-log additional treatment for filtered systems(1)
Turbidity	LT1ESWTR 40 CFR 141.551 OAR 333-061-0030	≤ 0.3 NTU for 95% of measurements(2) ≤1 NTU maximum value(2)
Total Organic Carbon (TOC) (for Disinfection Byproducts)	Stage 1 DBP 40 CFR 141.135 OAR 333-061-0032	TOC removal requirements are based on the raw water TOC concentration and alkalinity and apply when TOC > 2.0 mg/L.

Notes:
(1) Specific treatment requirement depends on the type of filtration system and source water monitoring results for Cryptosporidium.
(2) Specific treatment requirement depends on the type of filtration system.

To comply with the requirements in Table 1, the surface water will be required to be filtered and disinfected prior to injection for ASR. The exception to this requirement is when the source water can meet certain restrictive water quality and watershed protection requirements, which is not the case for the Walla Walla River. Filtration systems receive varying levels of log removal credits in accordance with the type of filtration and filtration performance in the treatment train as shown in Table 2. The total log removal of pathogens from filtration plus disinfection processes must be at least those listed in Table 1.

Table 2. Surface Water Treatment Pathogen Reduction Credits by Filtration Technology

Filtration Treatment Technology	Maximum Logs of Credit for Physical Removal (1)			Minimum Logs of Inactivation Needed by Disinfection		
	Viruses	*Giardia*	*Cryptosporidium*	Viruses	*Giardia*	*Cryptosporidium(2)*
Conventional	2.0	2.5	2.0	2.0	0.5	0-3.0
Direct or In-Line	1.0	2.0	2.0	3.0	1.0	0-3.0
Bank Filtration (3)	0	2.0	2.0	4.0	1.0	0-3.0
Microfiltration	0	>3.0	>2.0	4.0	0	0-3.0
Ultrafiltration	0	>3.0	>2.0	4.0	0	0-3.0

Notes:
(1) Source: (EPA, 2016)
(2) Specific treatment requirement depends on the type of filtration system and source water monitoring results for *Cryptosporidium*.
(3) Assumes bank filtration study demonstrates a 2-log reduction of *Giardia* and *Cryptosporidium*, and a 2-log removal credit is granted by the Oregon Health Authority.

2.3 Artificial Recharge and Recovery

Artificial Groundwater Recharge (AR) projects are subject to the regulations in OAR 690-350-0110 to 690-350-0130, and are not subject to the provisions of the regulation governing ASR projects per OAR 690-350-0110(1), provided they do not inject water into a drinking water aquifer. These AR projects must comply with the groundwater quality protection requirements in OAR Chapter 340 Division 40. Per OAR 340-040-0030(3)(b), the permitted concentration limits for new facilities shall be established at the background water quality level. This is to insure that the recharged water does not degrade the existing groundwater quality.

3.0 WATER QUALITY

3.1 Source Water Quality

Source water quality from the Walla Walla River to the water treatment system as well as background groundwater quality for the receiving aquifer was obtained from an on-going ASR feasibility project in Milton-Freewater (Murraysmith, 2018) and is summarized in Appendix A to this Technical Memorandum. The water was sampled on three occasions during the months of March and April of 2018. Overall the source water quality is high with slightly elevated concentrations of turbidity, copper, and iron found in one of the samples, collected on March 15, 2018, as compared to the background groundwater quality. The turbidity can be reduced through filtration and the trace metals can be reduced through a combination of coagulation and/or oxidation, and filtration for compliance with applicable standards.

The alkalinity of the source water is lower than the background groundwater. Lower alkalinity sometimes indicates that the source water may be corrosive. The corrosivity of the source water samples were less than -0.3 indicating that the water could be slightly corrosive. The background groundwater has a higher alkalinity and does not appear to be corrosive based on this limited data set. Alkalinity can be added to the treated water to control its corrosivity in the recharge aquifer if needed.

Two (2) additional source water samples were collected on August 9, 2018, and analyzed for total organic carbon (TOC). The TOC concentrations were below the 2.0 mg/L threshold for requiring enhanced coagulation or enhanced softening for compliance with the disinfection byproducts rule when disinfecting with chlorine-based compounds.

3.2 Treated Water Quality

Table 3 below provides the predicted treated water quality based on the source water quality presented in Appendix A. Iron is the only parameter that may exceed the secondary maximum contaminant level (MCL) depending on the final technology selected and how well the chemical and physical treatment is optimized.

Table 3. Predicted Treated Water Quality Based on Source Water Quality

Parameter	Drinking Water MCL or SMCL (1)	Treated Water Quality by Source	
		Surface Water @ Point of Diversion on Walla Walla River	Surface Water @ Little Walla Walla River behind Well #5
Alkalinity, mg/L as $CaCO_3$ (2)	-	≤50	≤50
Chloride, mg/L (3)	250	≤7.0	≤7.0
Calcium, mg/L	-	≤5.7	≤5.4
Fluoride, mg/L	4.0	≤0.1	≤0.1
Hardness, mg/L as $CaCO_3$	-	≤24	≤22
Magnesium, mg/L	-	≤2.3	≤2.1
Nitrate-N, mg/L	10	≤0.08	≤0.08
Nitrite-N, mg/L	1	≤0.06	≤0.06
Oxidation-Reduction Potential, millivolts (2)	-	-20 - 0	-40 - 0
pH, S.U.	6.5 – 8.5	7 - 8	7 - 8
Potassium, mg/L	-	≤1.5	≤1.5
Sodium, mg/L	20	≤2.7	≤2.7
Specific Conductance, µS/cm (4)	700	≤110	≤110
Sulfate, mg/L (5)	250	≤6.2	≤6.1
Total Dissolved Solids, mg/L (6)	500	≤77	≤106
Turbidity, NTU (2)	1	≤1	≤1
Arsenic, mg/L	0.01	≤0.001	≤0.001
Copper, mg/L	1.3	≤0.001	≤0.0013
Iron, mg/L (7)	0.3	≤0.02 - 0.13	≤0.10 - 0.75
Lead, mg/L	0.015	≤0.001	≤0.001
Manganese, mg/L	0.05	≤0.01	≤0.012
Mercury, mg/L	0.002	≤0.0001	≤0.0001
Zinc, mg/L	5	≤0.0013	≤0.002
Synthetic/Volatile Organic Compounds, µg/L	Various	Non-Detect	Non-Detect

Notes:
(1) Maximum Contaminant Level or Secondary Maximum Contaminant Level per OAR 333-061-0030 and 40 CFR Part 141 and 143.
(2) This parameter is adjusted in the treatment process.
(3) Assumes ~2.5 mg/L of chloride is added from coagulation with aluminum chlorohydrate (ACH) and ~4 mg/L from chlorine.
(4) Assumes increase of ~45 µS/cm due to increase in total dissolved solids.
(5) Assumes increase of ~5.4 mg/L due to dechlorination with sulfur dioxide.
(6) Assumes ~30 mg/L is added from chemical addition.
(7) Assumes 20 to 90 percent removal through coagulation/flocculation process (Crittenden, J. et al, 2012).

4.0 SURFACE WATER TREATMENT UNIT PROCESS ALTERNATIVES

4.1 Filtration Alternatives

Per OAR 333-061-0030(3), to comply with the drinking water standard for turbidity, surface waters may be filtered using the following methods:

- Conventional filtration - a series of processes including coagulation, flocculation, sedimentation, and granular-media filtration.
- Direct filtration - a series of processes including coagulation and granular-media filtration but excluding sedimentation.
- Diatomaceous earth filtration - filtration through diatomaceous earth particles (i.e. silica and clay minerals) deposited on a support membrane.
- Slow Sand Filtration - a process involving passage of raw water through a bed of sand at low velocity.
- Membrane filtration - a pressure or vacuum-driven separation process in which particulate matter larger than one micrometer is rejected by engineered media.

Conventional and direct filtration methods both use coagulation and flocculation steps ahead of porous granular media filters to remove particulates in the raw water. However, unlike the conventional filtration process which includes a sedimentation step ahead of the filters, the direct filtration process does not include sedimentation. For low turbidity raw water (<5 NTU), the sedimentation step used downstream of the flocculation process is not typically required for turbidity removal. The filters used with the conventional and direct filtration processes can be gravity or pressure filters, single-media or multi-media with varying bed depths. In general, the allowable surface filtration rate is higher for gravity filters than for pressure filters, and increases with media depth.

Diatomaceous earth filtration is primarily used in small water treatment systems and consists of filtration through diatomaceous earth particles (i.e. silica and clay minerals). Slow sand filters consist of filtering raw water through large sand beds at low velocity (generally less than 235 gallons per square foot per day) in which a thin layer of biological medium has been allowed to develop at the surface of the bed. Both diatomaceous earth and slow sand filtration are not recommended for this project due to their lower maximum surface filtration rate as compared to conventional, direct, or in-line filters. The lower allowable surface filtration rate increases the area requirements and cost of filtration for higher flow treatment systems. These types of filters can also be labor intensive requiring periodic scraping and replacement of the upper media bed.

Membrane filters used for surface water treatment are typically micro-filtration (MF) filters with openings from 0.1 to 1.0 microns (1 micron = 10-6 meter), or ultra-filtration (UF) filters with openings from 0.01 to <0.1 microns. The membranes in these size ranges are typically low-pressure “hollow-fiber” membranes consisting of a tubular fiber where water is passed through the fiber wall. The hollow-fiber membranes are arranged in modules, which can be contained in canisters for pressure flow applications or submerged in filter tanks for vacuum-driven or gravity-flow applications. The most common membrane materials are organic polymers, such as polyvinylidene difluoride (PVDF), or more recently, ceramic, such as aluminum oxide. MF and UF membrane filters remove suspended solids (not dissolved solids) by direct filtering (or screening) action. Chemical coagulation improves the effectiveness by agglomerating the very small particles into larger particles that are more readily removed. This can also remove some “dissolved” constituents, such as dissolved trace metals, if the correct coagulant is chosen. For pathogen reduction in compliance with drinking water standards, coagulation is not typically required ahead of UF membrane filters, but it is required ahead of MF membrane filters. While membranes would be an appropriate filtration

technology for this project, the cost for membrane systems are typically higher than for package granular-media filters and therefore, are not included in the cost estimates.

The granular-media filters used in the cost comparisons for this project are package direct granular-media filters because these will be the most cost effective given the size of the proposed treatment system (~2 to 3.25 MGD) and the high quality of the source water. Package filtration systems typically refer to systems where the filtration system manufacturer provides most of the components for the system including the tanks and controls. These types of filters can also be used in combination with processes for trace metal removal such as oxidation and media adsorption. This would involve injecting a chemical oxidant such as sodium hypochlorite or potassium permanganate to oxidize the dissolved metals and then adsorption onto oxide-coated granular media, such as manganese oxide-coated sand (green sand).

The components of the package granular-media filters include:

- Aluminum or steel filtration tanks,
- Filtration granular media (sand or a combination of silica sand and anthracite),
- Filter media support structure,
- Filter underdrain system,
- Filter backwash pumps,
- Blower for air scouring the filter media,
- Automatic inlet, outlet, backwash, and filter-to-waste valves,
- Compressed air system for valve actuators and filter air scour,
- Miscellaneous manual isolation valves and associated piping,
- Filter headloss pressure or level sensor and transmitter,
- Feed and filtrate turbidity analyzers and transmitters, and
- Feed and filtrate flow meters and transmitters.

Bank filtration is an alternate filtration technology that uses a horizontal or vertical well to recover surface water that has naturally infiltrated into groundwater through a river bed or bank. Bank filtration uses the soil to filter the water prior to withdrawal for disinfection. OAR 333-061-0032(8) describes the requirements for groundwater sources under the direct influence of surface water seeking alternative filtration credit through bank filtration: "(a) At water systems with all microscopic particulate analysis (MPA) risk scores less than 30, water suppliers may choose the option to evaluate for bank filtration credit. The water supplier must conduct a demonstration of performance study that includes an assessment of the ability of the local hydrogeologic setting to provide a minimum of 2-log reduction in the number of particles and microorganisms in the *Giardia* and *Cryptosporidium* size range between surface water and the groundwater source. The bank filtration study must involve the collection of data on removal of biological surrogates and particles in the Cryptosporidium size range of 2–5 microns or other surrogates approved by the Authority, and related hydrogeologic and water quality parameters during the full range of operating conditions. The demonstration study methods shall be reviewed and approved by the Authority prior to implementation. Final assessment of removal credit granted to the well shall be made by the Authority based on the study results."

If a bank filtration study demonstrates a 2-log reduction of *Giardia* and *Cryptosporidium*, and a 2-log removal credit is granted by the Oregon Health Authority, then bank filtration may be used in lieu of one of the other filtration methods listed in OAR 333-061-0030(3). An additional 1-log removal of *Giardia* and 4-log removal of viruses would still be required through disinfection. For the purposes of comparing alternative costs for this project, it is assumed that bank filtration is demonstrated to receive the 2-log removal credit for *Giardia* and *Cryptosporidium.*

4.2 Disinfection Alternatives

The following disinfectants are typically used for surface water treatment for potable use:

- Chlorine-based compounds (i.e., chlorine gas, sodium or calcium hypochlorite, chlorine dioxide gas, chloramines), and
- Ultraviolet (UV) light.

Of the above technologies, chlorine has historically been, and still is, the most common form of disinfection. Chlorine gas is typically the least cost of the chlorine-based compounds used for chlorination. Because a chlorine residual is not required or desirable for aquifer recharge, a sulfur dioxide feed system would also be required for dechlorination of the disinfected water. Chlorine and sulfur dioxide gas may be furnished in 1-ton or 150-pound cylinders. Typically, scrubbers are not required for storage of up to four (4) 150-pound cylinders as long as a fire suppression system and 1-hour fire rating is provided for the storage room.

The other components of the chlorination/dechlorination system include:

- Chlorine contact tank to provide adequate disinfectant residual contact time with baffles, weirs, and isolation gates,
- In-line chemical mixers,
- Gas detectors connected to an external alarm indication system,
- Safety equipment such as an emergency eye wash and shower,
- Gas feeders (one primary and one standby),
- Scales to measure the quantities of gas used,
- Control panel to control the gas regulator, monitor the flow of gas injected, and maintain the proper dose, and
- Chlorine residual analyzers and transmitters.

UV disinfection, while less common, is becoming more prevalent due to decreasing equipment costs and increased competition among manufacturers. For surface water treatment facilities the size proposed for this project, UV disinfection is typically the most cost effective disinfection technology in life-cycle costs. This is especially true for aquifer recharge systems since they do not require a chlorine residual to be maintained in the finished water. It is also preferred due to safety reasons related to the storage of toxic gases and liquid chemicals.

UV disinfection systems are available in open-channel and closed-vessel configurations. Closed-vessel UV is used in the cost comparisons for this project, because of the smaller footprint, ease of installation, the ability to do off-site validation of the UV reactor, the more efficient reactor hydraulics, and the safety and sanitary features of the closed-vessel for a drinking water treatment application. Closed-vessel UV systems typically have higher equipment costs and lower installation costs than open-channel UV systems.

The UV system includes:

- UV system reactors with the UV lamps, UV intensity analyzers, and lamp cleaning system,
- Control panel to control number and output of lamps based on maintaining the proper UV dose,
- Power distribution center,
- UV transmittance analyzer and transmitter, and
- Inlet and outlet isolation valves and piping.

A comparison of the two primary disinfection alternatives is summarized in Table 4.

Table 4. Comparison of Disinfection Alternatives

	Chlorination/Dechlorination	Ultraviolet Disinfection
Treatment Effectiveness and Pathogen Destruction	Highly effective on bacteria and viruses. Requires higher contact time and residual for cyst inactivation.	Highly effective on bacteria, cysts, and at higher doses, viruses, with short contact times.
Water Quality Effects on Treatment Effectiveness	Higher doses required on water with higher pH, solids, organic compounds, sulfides, iron, although testing shows these to be low for the source water.	Less effective on water with high solids, iron, high turbidity, and low UV transmittance. Higher hardness may increase fouling of UV sleeves requiring more frequent cleaning. Source water has low dissolved solids and hardness. Iron and turbidity are reduced through coagulation/oxidation and filtration.
Disinfected Water Quality Impacts	Increases total dissolved solids, chlorides, and halogenated disinfection byproducts. May also increase corrosivity of treated water.	Minimal. No disinfection byproducts.
Chemical Storage and Handling	Requires heated storage and heat tracing for liquid piping. Sodium hypochlorite decomposes and off-gases over time. 12.5% solution should be stored for 30 days or less. Spill containment required. Chlorine gas storage requires fire suppression, gas scrubber, gas detection system, scales, and carrier water. Bulk chemicals are highly corrosive.	Most new UV systems are equipped with automated cleaning systems that minimize bulk chemical use for lamp cleaning.
Toxicity/Safety Concerns	Potential for liquid or gas leaks and associated health and aquatic life toxicity.	Safety measures such as eye protection must be worn when maintaining UV equipment.
Operational Complexity	More complex due to multiple chemical feeds, maintaining proper chemical dose and supply, and residual monitoring.	Less complex due to UV dose monitoring being integral with the UV system controls and less likely to need frequent calibration and adjustment.
Ease of Implementation	Requires new chlorine contact tank, typically a constructed concrete tank for the size of the proposed system. Liquid chlorine storage and piping heating system required.	Systems for water treatment are typically closed-vessel, and these are supplied in pre-fabricated vessels that are easier to install in pressure piping.
Capital Cost	Higher due to construction of chlorine contact tank and feed facilities. Feed facilities require chemical feeds, residual monitoring and controls, and chemical heating systems and spill containment.	Entire system is located indoors for freeze protection. Capital cost is still lower due to small footprint of system, and simplicity to install pre-fabricated vessels in piping.
Annual Cost	Higher cost due to high cost of bulk chemicals.	Higher power cost, but this is typically much lower than chemical disinfectant cost. Lamp replacement adds operational and maintenance cost.

5.0 COST COMPARISONS OF PROCESS TRAIN ALTERNATIVES

5.1 Surface Water Treatment Process Train Alternatives

As part of the project scope, four (4) treatment trains are compared:

1. Direct filtration with chlorination/dechlorination,
2. Direct filtration with UV disinfection,
3. Bank filtration with chlorination/dechlorination, and
4. Bank filtration with UV disinfection.

The four surface water treatment trains that are included in the cost estimates are summarized below.

(1) Source Water → Screening → Pumping → Alkalinity Addition → Coagulation → Flash Mixing → Flocculation → Granular Media Filtration → Chlorination → Dechlorination → Pumping → Aquifer Recharge

(2) Source Water → Screening → Pumping → Alkalinity Addition → Coagulation → Flash Mixing → Flocculation → Granular Media Filtration → UV Disinfection → Pumping → Aquifer Recharge

(3) Source Water → Bank Filtration → Pumping → Chlorination → Dechlorination → Pumping → Aquifer Recharge

(4) Source Water → Bank Filtration → UV Disinfection → Pumping → Aquifer Recharge

In addition to the components previously summarized for the filtration and disinfection systems, the surface water treatment trains will also require the following:

- Site clearing, grading, paving, fencing, and utilities,
- Source water intake trash rack and screen*,
- Source water pump station and wetwell,
- Chemical feed systems and storage for alkalinity and coagulant*,
- Flash mixers and flocculators and associated basins to enhance coagulation and flocculation*,
- Backwash lagoon for filter backwash water*,
- Backwash return pumps to convey backwash water to the head of the process for treatment*,
- Treated water pump station and wetwell,
- Building utility water and drain pumps,
- Process piping, valves, and supports,
- Overhead crane,
- Standby generator,
- Water treatment building, slab, stairs, and railings,
- Heating, ventilating, fire suppression, plumbing, lighting, for water treatment building,
- Electrical feeders, distribution, motor control center, and
- Control panels, instrumentation, software, programming.

Items with a '*' next to them are not required for bank filtration.

5.2 Capital and Operational Costs

A summary of the feasibility level cost estimates for the surface water treatment train alternatives described above is provided in Table 5 for 5 CFS (~3.25 MGD) capacity facilities. A detailed cost estimate for each alternative is provided in Appendix B. The project capital cost includes the construction contract cost plus costs for a pilot study, design, construction management, and contract administration. A thirty-five (35) percent contingency has been added to the project capital cost to reflect the relative inaccuracy of the cost estimates. The purpose of the cost estimates is to determine the feasibility of the project and compare various alternatives and is not recommended for project budgeting or funding.

Table 5. Capital Cost Estimates for Surface Water Treatment Plant Alternatives

	Direct Filtration with Chlorine Disinfection 5 CFS	Direct Filtration with UV Disinfection 5 CFS	Bank Filtration with Chlorine Disinfection 5 CFS	Bank Filtration with UV Disinfection 5 CFS
Construction Contract Cost	$9,525,000	$9,118,000	$4,038,000	$3,977,000
Project Capital Cost	$11,746,000	$11,250,000	$5,052,000	$4,978,000
35% Contingency	$4,112,000	$3,938,000	$1,769,000	$1,743,000
Project Capital Cost with Contingency	$15,858,000	$15,188,000	$6,821,000	$6,721,000
Annual O&M Cost	$431,790	$400,880	$223,650	$205,720

6.0 REFERENCES

Crittenden, J. et al. (2012). *MWH's Water Treatment: Principles and Design, 3rd Edition.* Hoboken, NJ: John Wiley & Sons, Inc.

EPA. (2016). *SWTR Fact Sheet: Requirements for Filtered Public Water Systems.* U.S. Environmental Protectin Agency (EPA), Region 8.

Murraysmith. (2018). *Draft Technical Memorandum Milton-Freewater Aquifer Storage and Recovery Feasibility Study Project - Investigation of Water Treatment Alternatives.* Portland, OR: MurraySmith.

APPENDIX A

Source and Receiving Water Quality Data

Table 1: Milton-Freewater ASR Receiving and Source Water Analytical Results

Sample Location:			Well #5 Groundwater				Surface Water @ Point of Diversion on Walla Walla River				Surface Water @ Little Walla Walla River behind Well #5				Surface Water @ Little Walla Walla River behind Well #5				Notes
Sample ID:			*MF-ASR-W5-030118*				*MF-ASR-WWR-030118*				*MF-ASR-LWWR-1*				*MF-ASR-LWWR-2*				
Sample Date/Time:			3/1/18 9:45 AM				3/1/18 11:20 AM				3/15/18 10:55 AM				4/5/2018 14:40:00 PM [1]				
Batch:			180302017				180302020				180316032				180410059				
Lab Name:			*Anatek Laboratorties*				*Anatek Laboratorties*				*Anatek Laboratorties*				*Anatek Laboratorties*				
ANALYTE GROUP / Analyte	**Units**	**Drinking Water Standard MCL/SMCL**	**MDL**	**RDL**	**Result**	**Q**	**MDL**	**RDL**	**Result**	**Q**	**MDL**	**RDL**	**Result**	**Q**	**MDL**	**RDL**	**Result**	**Q**	
GENERAL CHEMISTRY (GC)																			Groundwater & Surface water
Alkalinity (total)	mg CaCO3/L	NA	2	2	**80**		2	2	**30.0**		2	2	**26.0**		2	2	**28**		[b]
Temperature	degrees Fahrenheit		–––	–––	–––		–––	–––	–––		–––	–––	–––		–––	–––	–––		
Chloride	mg/L	/250	0.01	0.1	**6.46**		0.01	0.1	**0.500**		0.01	0.1	**0.420**		0.01	0.1	**0.416**		
Fluoride	mg/L	4.0/2.0	0.071	0.1	**0.123**		0.071	0.1	ND		0.071	0.1	ND		0.071	0.1	ND		
Hardness	mg CaCO3/L	/250	0.1	1	**82.2**		0.1	1	**23.8**		0.1	1	**21.0**		0.1	1	**22.1**		
Nitrate+Nitrite (total N)	mg/L as N	10	0.01	0.1	**0.493**		0.01	0.1	ND		0.01	0.1	ND		0.01	0.1	ND		
Nitrate-N	mg/L as N	10	0.076	0.1	**0.493**		0.076	0.1	ND		0.076	0.1	ND		0.076	0.1	ND		
Nitrite-N	mg/L as N	1	0.063	0.1	ND		0.063	0.1	ND		0.063	0.1	ND		0.063	0.1	ND		
Orthophosphate as P	mg/L	NA	0.042	0.1	ND		0.042	0.1	ND		0.042	0.1	ND		0.042	0.1	ND		
Oxidation-Reduction Potential	millivolts	NA	–––	–––	-41		–––	–––	-18.5		–––	–––	-38.3		–––	–––	-28.6		
pH	pH units	/6.5-8.5	1	–––	7.85		1	–––	7.29		1	–––	7.30		1		7.41		
Specific Conductance	µS/cm	/700	1	1	**235**		1	1	**65.0**		1	1	**55.2**		1	1	**63.8**		
Sulfate	mg/L	/250	0.057	0.1	**10.6**		0.057	0.1	**0.822**		0.057	0.1	**0.648**		0.057	0.1	**0.609**		
Total Dissolved Solids	mg/L	/500	30	50	**129**		30	50	**47**		30	50	**76.0**		30	50	**74.0**		
Turbidity	NTU	1	0.01	0.1	**0.56**		0.01	0.1	**1.30**		0.01	0.1	**5.11**		0.01	0.1	**1.99**		
Total Kjeldahl nitrogen	mg/L	NA	0.357	0.5	ND		0.357	0.5	ND		0.464	0.5	ND		0.464	0.5	ND		
TOTAL METALS (M)																			Groundwater & Surface water
Arsenic	mg/L	0.010	0.001	0.001	ND		0.001	0.001	ND		0.001	0.001	ND		0.001	0.001	ND		[a]
Calcium	mg/L	NA	0.03	0.1	**19.6**		0.01	0.1	**5.71**		0.03	0.1	**5.12**		0.03	0.1	**5.37**		[c]
Copper	mg/L	1.3*	0.001	0.001	0.00100		0.001	0.001	ND		0.001	0.001	**0.00125**		0.001	0.001	ND		[a,c]
Iron	mg/L	/0.3	0.0018	0.01	ND		0.0018	0.01	**0.168**		0.0018	0.01	**0.941**		0.0018	0.01	**0.241**		[c]
Iron (dissolved)	mg/L	NA	0.01	0.01	ND		0.01	0.01	**0.0315**		0.01	0.01	**0.138**		0.01	0.01	**0.0176**		[c]
Lead	mg/L	0.015 (AL)	0.001	0.001	ND		0.001	0.001	ND		0.001	0.001	ND		0.001	0.001	ND		[a,b,c]
Magnesium	mg/L	NA	0.001	0.1	**8.06**		0.001	0.1	**2.24**		0.001	0.1	**1.99**		0.001	0.1	**2.11**		[c]
Manganese	mg/L	/0.05	0.01	0.01	ND		0.01	0.01	ND		0.01	0.01	**0.0121**		0.01	0.01	ND		[c]
Manganese (dissolved)	mg/L	NA	0.01	0.01	ND		0.01	0.01	ND		0.01	0.01	ND		0.01	0.01	ND		[c]
Mercury	mg/L	0.002	0.00001	0.0001	ND		0.00001	0.0001	ND		0.00001	0.0001	ND		0.00001	0.0001	ND		[a,b,c]
Potassium	mg/L	NA	0.05	0.1	**3.70**		0.05	0.1	**1.48**		0.05	0.1	**1.37**		0.05	0.1	**1.49**		[c]
Sodium	mg/L	20**	0.05	0.1	**8.96**		0.05	0.1	**2.7**		0.05	0.1	**2.15**		0.05	0.1	**2.64**		[c]
Zinc	mg/L	/5	0.001	0.001	**0.00372**		0.001	0.001	**0.00128**		0.001	0.001	**0.00198**		0.001	0.001	ND		[c]
MISCELLANEOUS (MISC)																			Groundwater & Surface water
Corrosivity	Standard units	/non-corrosive	–––	–––	-0.134		–––	–––	-1.07		–––	–––	-1.14		–––	–––	-0.994		
BACTERIOLOGICALS (BAC)																			Surface water only
Total Coliform (Presence/Absence)	cfu/100mL		–––	–––	–––		1	1	Present	[4]	1	1	Present	[5]	1	1	Present	[5]	
SYNTHETIC ORGANIC CHEMICALS (SOC)																			Surface water only
Chlordane, Technical	µg/L	2	–––	–––	–––		0.0288	0.2	ND		0.0288	0.2	ND		0.0288	0.2	ND		[a,b]
Glyphosate [2]	µg/L	700	–––	–––	–––		3.2	5	ND		3.2	5	ND		3.2	5	ND		[a]
Heptachlor Epoxide	µg/L	0.2	–––	–––	–––		0.0165	0.02	ND		0.0165	0.02	ND		0.0165	0.02	ND		[a,b]
Hexachlorobenzene	µg/L	1	–––	–––	–––		0.0066	0.1	ND		0.0066	0.1	ND		0.0066	0.1	ND		[a,b]
Hexachlorocyclopentadiene	µg/L	50	–––	–––	–––		0.011	0.1	ND		0.011	0.1	ND		0.011	0.1	ND		[a,b]
Lindane (BHC - GAMMA)	µg/L	0.2 as total PAH's	–––	–––	–––		0.0152	0.04	ND		0.0152	0.04	ND		0.0152	0.04	ND		[a,c]
Aroclor 1016 (PCB)	µg/L	0.5 as total PCB's	–––	–––	–––		0.08	0.08	ND		0.08	0.08	ND		0.08	0.08	ND		[a,b]
Aroclor 1221 (PCB)	µg/L	0.5 as total PCB's	–––	–––	–––		0.5	1	ND		0.5	1	ND		0.5	1	ND		[a,b]
Aroclor 1232 (PCB)	µg/L	0.5 as total PCB's	–––	–––	–––		0.1	0.5	ND		0.1	0.5	ND		0.1	0.5	ND		[a,b]
Aroclor 1242 (PCB)	µg/L	0.5 as total PCB's	–––	–––	–––		0.1	0.3	ND		0.1	0.3	ND		0.1	0.3	ND		[a,b]

Table 1: Milton-Freewater ASR Receiving and Source Water Analytical Results

Sample Location:			Well #5 Groundwater				Surface Water @ Point of Diversion on Walla Walla River				Surface Water @ Little Walla Walla River behind Well #5				Surface Water @ Little Walla Walla River behind Well #5				Notes
Sample ID:			*MF-ASR-W5-030118*				*MF-ASR-WWR-030118*				*MF-ASR-LWWR-1*				*MF-ASR-LWWR-2*				
Sample Date/Time:			3/1/18 9:45 AM				3/1/18 11:20 AM				3/15/18 10:55 AM				4/5/2018 14:40:00 PM [1]				
Batch:			180302017				180302020				180316032				180410059				
Lab Name:			*Anatek Laboratorties*				*Anatek Laboratorties*				*Anatek Laboratorties*				*Anatek Laboratorties*				
ANALYTE GROUP / Analyte	**Units**	**Drinking Water Standard MCL/SMCL**	**MDL**	**RDL**	**Result**	**Q**	**MDL**	**RDL**	**Result**	**Q**	**MDL**	**RDL**	**Result**	**Q**	**MDL**	**RDL**	**Result**	**Q**	
Aroclor 1248 (PCB)	µg/L	0.5 as total PCB's	----	----	----		0.1	0.1	ND		0.1	0.1	ND		0.1	0.1	ND		[a,b]
Aroclor 1254 (PCB)	µg/L	0.5 as total PCB's	----	----	----		0.1	0.1	ND		0.1	0.1	ND		0.1	0.1	ND		[a,b]
Aroclor 1260 (PCB)	µg/L	0.5 as total PCB's	----	----	----		0.1	0.2	ND		0.1	0.2	ND		0.1	0.2	ND		[a,b]
Total PCB	µg/L		----	----	----		0.095	0.5	ND		0.095	0.5	ND		0.095	0.5	ND		
Pentachlorophenol	µg/L	1	----	----	----		0.04	0.04	ND		0.04	0.04	ND		0.04	0.04	ND		[a,b]
Malathion [3]	µg/L		----	----	----		0.1	0.2	ND		0.1	0.2	ND		0.1	0.2	ND		
Chlorpyrifos [3]	µg/L		----	----	----		0.0165	0.2	ND		0.0165	0.2	ND		0.0165	0.2	ND		
Azinphos-methyl [3]	µg/L		----	----	----		0.1	0.1	ND		0.1	0.1	ND		0.1	0.1	ND		
VOLATILE ORGANIC CHEMICALS (VOC)																			Surface water only
Benzene	µg/L	5	----	----	----		0.1	0.5	ND		0.1	0.5	ND		0.1	0.5	ND		
Ethylbenzene	µg/L	700	----	----	----		0.1	0.5	ND		0.1	0.5	ND		0.1	0.5	ND		
Toluene	µg/L	1000	----	----	----		0.1	0.5	ND		0.1	0.5	ND		0.1	0.5	ND		
Total Xylenes	µg/L	10000	----	----	----		0.1	0.5	ND		0.1	0.5	ND		0.1	0.5	ND		

Notes:

[1] - Chain of custody has the wrong date written on it. Sample was collected on 4/5/2018.

[2] - Glyphosphate was chosen as a herbicide proxy.

[3] - Chosen as a pesticide proxy as it is a common organophosphate based on conversation with WA DEQ, will analyzed using EPA Method 8141 for water, not drinking water.

[4] - Anatek Lab analyzed this sample accidentally and are not certified in Oregon to meet drinking water standards.

[5] - Table Rock Analytical Laboratories analyzed for total coliform as they are certified to meet drinking water standards in Oregon.

BOLD = Result detected above method RDL.

Data Sources used to reduce analytical list:

[a] - Listed in OAR 330-061-0030.

[b] - Anderson Petty & Associates, 2011. City of Milton-Freewater, Oregon Water Management and Conservation Plan Update Addendum. May. p.16.

[c] - GeoSystems Analysis, Inc., 2016. Surface Water and Groundwater Monitoring and Reporting Plan. May. Table 5.

* Action Level set by the EPA

** Guideline level recommended by the EPA

MCL = Maxiumim Contaminant Level

SMCL = Secondary Maximum Contaminant Level

MDL = Method Detection Limit

RDL = Representative Detection Limit

Q = Qualifier

pCi/L = Picocuries per liter

PCB = Polychlinated biphenyl

mg CaCO3/L = milligram of calcium carbonate per liter

µg/L = Micrograms per liter

µS/cm = Micro-Siemens per centimeter

mg/L = Milligrams per liter

NTU = Nephelometric turbidity unit

MV = Millivolts

ND = Not detected

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn:

Batch #: 180810018
Project Name: JIM MATHIEW/ NLW

Analytical Results Report

Sample Number	180810018-001	**Sampling Date**	8/9/2018	**Date/Time Received**	8/10/2018	11:45 AM	
Client Sample ID	WWRD-1A	**Sampling Time**	2:50 PM	**Extraction Date**	08/13/2018		
Matrix	Water						
Comments							

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
TOC	0.734	mg/L	0.1	8/13/2018 8:28:00 PM	RPR	SM 5310B	

Sample Number	180810018-002	**Sampling Date**	8/9/2018	**Date/Time Received**	8/10/2018	11:45 AM	
Client Sample ID	WWRD-1B	**Sampling Time**	2:52 PM	**Extraction Date**	08/13/2018		
Matrix	Water						
Comments							

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
TOC	0.738	mg/L	0.1	8/13/2018 8:48:00 PM	RPR	SM 5310B	

Authorized Signature

Todd Taruscio, Lab Manager

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Login Report

Customer Name: WALLA WALLA BASIN WATERSHED COUNCIL
810 S. MAIN RD
MILTON-FREEWATER OR 97862

Order ID: 180810018
Order Date: 8/10/2018

Contact Name:

Project Name: JIM MATHIEW/ NLW

Comment:

Sample #: 180810018-001 **Customer Sample #:** WWRD-1A

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 8/9/2018
Quantity: 1 **Date Received:** 8/10/2018 11:45:00 AM **Time Collected:** 2:50 PM
Comment:

Test	Lab	Method	Due Date	Priority
TOC - MOSC	M	SM 5310B	8/22/2018	***Normal (~10 Days)***

Sample #: 180810018-002 **Customer Sample #:** WWRD-1B

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 8/9/2018
Quantity: 1 **Date Received:** 8/10/2018 11:45:00 AM **Time Collected:** 2:52 PM
Comment:

Test	Lab	Method	Due Date	Priority
TOC - MOSC	M	SM 5310B	8/22/2018	***Normal (~10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	3.7
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	Yes
Is there a trip blank to accompany VOC samples?	No
Labels and chain agree?	Yes
Total number of containers?	2

180810 018 WWBW Last Due 8/22/2018
1st SAMP 8/9/2018 1st RCVD 8/10/2018
JIM MATHIEW/ NLW

Anatek Labs, Inc.

Chain of Custody Record

1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246
504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

Company Name: WWBWC	Project Manager: Marie Cobb / WWBWC
Address: 810 S. Main St	Project Name & #: Jim Mathieu / NLW
City: Mitlon-Freewater State: OR Zip: 97862	Email Address: jim@nlwinc.com
Phone:	Purchase Order #:
Fax:	Sampler Name & phone:

Turn Around Time & Reporting

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal __Next Day* __2nd Day* __Other*_____
*All rush order requests must be prior approved.
__Phone __Mail __Fax __Email

Provide Sample Description / **List Analyses Requested** / **Note Special Instructions/Comments**

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	Preservative: TOC
	WWRD-1A	8/9/18 14:50	H2O	1	40	✓
	" -1B	" 14:52	H2O	1	40	✓

Inspection Checklist

Received Intact?	(Y)	N
Labels & Chains Agree?	(Y)	N
Containers Sealed?	(Y)	N
VOC Head Space?	Y	(N)

UPS

	Printed Name	Signature	Company	Date	Time
Relinquished by	Jim Mathieu	Jim Mathieu	NLW	8/9/18	15:00
Received by	Brianne Peterson	B Peterson	Anatek	8/10/18	1145
Relinquished by					
Received by					
Relinquished by					
Received by					

Temperature (°C): 3.7 - 18.3
Preservative: HCL
Date & Time: 8/10/18 1145
Inspected By: BP

APPENDIX B

Feasibility Level Cost Estimates of Surface Water Treatment for Aquifer Recharge

APPENDIX B

	Client: Walla Walla Basin Watershed Council, Oregon	Direct Granular Media Filtration and Chlorine Disinfection				Direct Granular Media Filtration and UV Disinfection				Bank Filtration and Chlorine Disinfection				Bank Filtration and UV Disinfection			
	Ref: Feasibility Level Cost Estimate for Surface Water Treatment Plant	5 CFS (3.23 MGD, 2250 GPM) Capacity				5 CFS (3.23 MGD, 2250 GPM) Capacity				5 CFS (3.23 MGD, 2250 GPM) Capacity				5 CFS (3.23 MGD, 2250 GPM) Capacity			
	Date: October 8, 2018																
No.	Description	Quantity	Unit	Unit Price	Extension	Quantity	Unit	Unit Price	Extension	Quantity	Unit	Unit Price	Extension	Quantity	Unit	Unit Price	Extension
1	River intake rip rap, machine placed	3	SQYD	$ 100	$ 300	3	SQYD	$ 100	$ 300	3	SQYD	$ 100	$ 300	3	SQYD	$ 100	$ 300
2	Inlet Trash Rack	1	LS	$ 1,300	$ 1,300	1	LS	$ 1,300	$ 1,300	1	LS	$ 1,300	$ 1,300	1	LS	$ 1,300	$ 1,300
3	Intake Piping - 14" DI	200	LF	$ 80	$ 16,000	200	LF	$ 80	$ 16,000	200	LF	$ 80	$ 16,000	200	LF	$ 80	$ 16,000
4	Intake Piping Trenching and Back Fill 10' deep	74	CUYD	$ 15	$ 1,200	74	CUYD	$ 15	$ 1,200	74	CUYD	$ 15	$ 1,200	74	CUYD	$ 15	$ 1,200
5	Site Clearing and Grubbing	1	ACRE	$ 5,000	$ 5,000	1	ACRE	$ 5,000	$ 5,000	1	ACRE	$ 5,000	$ 5,000	1	ACRE	$ 5,000	$ 5,000
6	Site Grading	4800	SQYD	$ 5	$ 24,000	4800	SQYD	$ 5	$ 24,000	4800	SQYD	$ 5	$ 24,000	4800	SQYD	$ 5	$ 24,000
7	Site Utility Trenching	400	LF	$ 2	$ 800	400	LF	$ 2	$ 800	400	LF	$ 2	$ 800	400	LF	$ 2	$ 800
8	Site Asphalt Paving	4000	SF	$ 5	$ 20,000	4000	SF	$ 5	$ 20,000	4000	SF	$ 5	$ 20,000	4000	SF	$ 5	$ 20,000
9	Site Fencing	835	LF	$ 50	$ 41,800	835	LF	$ 50	$ 41,800	835	LF	$ 50	$ 41,800	835	LF	$ 50	$ 41,800
10	Site Sewer 6" PVC	200	LF	$ 9	$ 1,700	200	LF	$ 9	$ 1,700	200	LF	$ 9	$ 1,700	200	LF	$ 9	$ 1,700
11	Site Sewer Trenching 5 - 10' deep	74	CUYD	$ 10	$ 800	74	CUYD	$ 10	$ 800	74	CUYD	$ 10	$ 800	74	CUYD	$ 10	$ 800
12	Site Electrical Utility Service	1	LS	$ 1,600	$ 1,600	1	LS	$ 1,600	$ 1,600	1	LS	$ 1,600	$ 1,600	1	LS	$ 1,600	$ 1,600
13	Raw Water Screen 6 mm	1	EA	$ 120,000	$ 120,000	1	EA	$ 120,000	$ 120,000	1	EA	$ 120,000	$ 120,000	1	EA	$ 120,000	$ 120,000
14	Raw Water Wetwell Earthwork	330	CUYD	$ 20	$ 6,600	330	CUYD	$ 20	$ 6,600	330	CUYD	$ 20	$ 6,600	330	CUYD	$ 20	$ 6,600
15	Raw Water Wetwell Structural Fill	10	CUYD	$ 5	$ 100	10	CUYD	$ 5	$ 100	10	CUYD	$ 5	$ 100	10	CUYD	$ 5	$ 100
16	Raw Water Wetwell Walls	30	CUYD	$ 900	$ 27,000	30	CUYD	$ 900	$ 27,000	30	CUYD	$ 900	$ 27,000	30	CUYD	$ 900	$ 27,000
17	Raw Water Wetwell Slabs	10	CUYD	$ 500	$ 5,000	10	CUYD	$ 500	$ 5,000	10	CUYD	$ 500	$ 5,000	10	CUYD	$ 500	$ 5,000
18	Raw Water Wetwell Grating	60	SQFT	$ 40	$ 2,400	60	SQFT	$ 40	$ 2,400	60	SQFT	$ 40	$ 2,400	60	SQFT	$ 40	$ 2,400
19	Raw Water Pumps, Vertical Turbine, 1,125 GPM 50'TDH, 20 HP Each, 1 Standby	3	EA	$ 23,000	$ 69,000	3	EA	$ 23,000	$ 69,000	3	EA	$ 23,000	$ 69,000	3	EA	$ 23,000	$ 69,000
20	Coagulant Feed Pumps 3 GPH, 1 Standby	2	EA	$ 16,000	$ 32,000	2	EA	$ 16,000	$ 32,000	0	EA	$ 16,000	$ -	0	EA	$ 16,000	$ -
21	Alkalinity Feed Pumps 2 GPH, 1 Standby	2	EA	$ 16,000	$ 32,000	2	EA	$ 16,000	$ 32,000	0	EA	$ 16,000	$ -	0	EA	$ 16,000	$ -
22	FRP Bulk Chemical Storage Tanks, 3,000 Gallon Each	2	EA	$ 34,000	$ 68,000	2	EA	$ 34,000	$ 68,000	0	EA	$ 34,000	$ -	0	EA	$ 34,000	$ -
23	Flash Mixers	2	EA	$ 14,000	$ 28,000	2	EA	$ 14,000	$ 28,000	0	EA	$ 14,000	$ -	0	EA	$ 14,000	$ -
24	Flash Mix Basin Earthwork	44	CUYD	$ 20	$ 900	44	CUYD	$ 20	$ 900	0	CUYD	$ 20	$ -	0	CUYD	$ 20	$ -
25	Flash Mix Basin Concrete Walls	12	CUYD	$ 900	$ 10,800	12	CUYD	$ 900	$ 10,800	0	CUYD	$ 900	$ -	0	CUYD	$ 900	$ -
26	Flash Basin Concrete Slab	2	CUYD	$ 500	$ 1,000	2	CUYD	$ 500	$ 1,000	0	CUYD	$ 500	$ -	0	CUYD	$ 500	$ -
27	Flash Basin Grating	50	SQFT	$ 40	$ 2,000	50	SQFT	$ 40	$ 2,000	0	SQFT	$ 40	$ -	0	SQFT	$ 40	$ -
28	Flocculators	3	EA	$ 14,000	$ 42,000	3	EA	$ 14,000	$ 42,000	0	EA	$ 14,000	$ -	0	EA	$ 14,000	$ -
29	Flocculation Basin Earthwork	430	CUYD	$ 20	$ 8,600	430	CUYD	$ 20	$ 8,600	0	CUYD	$ 20	$ -	0	CUYD	$ 20	$ -
30	Flocculation Basin Concrete Walls	57	CUYD	$ 900	$ 51,300	57	CUYD	$ 900	$ 51,300	0	CUYD	$ 900	$ -	0	CUYD	$ 900	$ -
31	Flocculation Basin Concrete Slab	12	CUYD	$ 500	$ 6,000	12	CUYD	$ 500	$ 6,000	0	CUYD	$ 500	$ -	0	CUYD	$ 500	$ -
32	Flocculation Basin Grating	300	SQFT	$ 40	$ 12,000	300	SQFT	$ 40	$ 12,000	0	SQFT	$ 40	$ -	0	SQFT	$ 40	$ -
33	Flash and Flocculation Basins Hydraulic Gates	8	EA	$ 6,000.00	$ 48,000	8	EA	$ 6,000.00	$ 48,000	0	EA	$ 6,000.00	$ -	0	EA	$ 6,000.00	$ -
34	Filters, Tanks, Granular-Dual Media, Internals, Controls, Turbidimeters	1	LS	$ 1,170,000	$ 1,170,000	1	LS	$ 1,170,000	$ 1,170,000	0	LS	$ 1,170,000	$ -	0	LS	$ 1,170,000	$ -
35	Filter System Air Compressor 50 ACFM, 175 PSI, 15 HP, 1 Standby	2	EA	$ 22,000	$ 44,000	2	EA	$ 22,000	$ 44,000	0	EA	$ 22,000	$ -	0	EA	$ 22,000	$ -
36	Filter System Air Scour Blower 1,000 SCFM 5 PSI, 30 HP	1	EA	$ 53,000	$ 53,000	1	EA	$ 53,000	$ 53,000	0	EA	$ 53,000	$ -	0	EA	$ 53,000	$ -
37	Filter Backwash Pump, Centrifugal, 2,250 GPM 15' TDH, 15 HP Each, 1 standby	3	EA	$ 19,000	$ 57,000	3	EA	$ 19,000	$ 57,000	0	EA	$ 19,000	$ -	0	EA	$ 19,000	$ -
38	Backwash Lagoon Grading	2,800	SQYD	$ 5	$ 14,000	2,800	SQYD	$ 5	$ 14,000	0	SQYD	$ 5	$ -	0	SQYD	$ 5	$ -
39	Backwash Lagoon Earthwork	4,300	CUYD	$ 15	$ 64,500	4,300	CUYD	$ 15	$ 64,500	0	CUYD	$ 15	$ -	0	CUYD	$ 15	$ -
40	Backwash Lagoon Liner, Double with Leak Detection, 180,000 Gallons, 1 Standby	19,400	SQFT	$ 5	$ 97,000	19,400	SQFT	$ 5	$ 97,000	0	SQFT	$ 5	$ -	0	SQFT	$ 5	$ -
41	Backwash Lagoon Concrete Access Ramp 6"	13	SQYD	$ 225	$ 3,000	13	SQYD	$ 225	$ 3,000	0	SQYD	$ 225	$ -	0	SQYD	$ 225	$ -
42	Backwash Lagoon Rip Rap Along Sides	75	CUYD	$ 100	$ 7,600	75	CUYD	$ 100	$ 7,600	0	CUYD	$ 100	$ -	0	CUYD	$ 100	$ -
43	Backwash Return Pumps, Vertical Turbine, 125 GPM 50' TDH, 5 HP Each, 1 Standby	2	EA	$ 23,000	$ 46,000	2	EA	$ 23,000	$ 46,000	0	EA	$ 23,000	$ -	0	EA	$ 23,000	$ -
44	Chlorine Feed System 100 lbs/day, Regulators, Scales, Feeders, Control Panel	1	EA	$ 75,000	$ 75,000	0	EA	$ 50,000	$ -	1	EA	$ 75,000	$ 75,000	0	EA	$ 50,000	$ -
45	Sulfur Dioxide Feed System 100 lbs/day, Regulators, Scales, Feeders, Control Panel	1	EA	$ 75,000	$ 75,000	0	EA	$ 50,000	$ -	1	EA	$ 75,000	$ 75,000	0	EA	$ 50,000	$ -
46	Chlorine Residual Analyzers	2	EA	$ 3,000	$ 6,000	0	EA	$ 3,000	$ -	2	EA	$ 3,000	$ 6,000	0	EA	$ 3,000	$ -
47	Chlorine and Sulfur Dioxide Static Mixer	2	EA	$ 2,000	$ 4,000	0	EA	$ 2,000	$ -	2	EA	$ 2,000	$ 4,000	0	EA	$ 2,000	$ -
48	Gas Detetectors	2	EA	$ 2,000	$ 4,000	0	EA	$ 2,000	$ -	2	EA	$ 2,000	$ 4,000	0	EA	$ 2,000	$ -
49	Safety Shower and Eye Wash	2	EA	$ 2,000	$ 4,000	1	EA	$ 2,000	$ 2,000	1	EA	$ 2,000	$ 2,000	0	EA	$ 2,000	$ -
50	UV Disinfection System - In-Line + Redundant Module Per Train	0	MODS	$ 110,000	$ -	6	MODS	$ 110,000	$ 660,000	0	MODS	$ 110,000	$ -	8	MODS	$ 110,000	$ 880,000
51	Chlorine Contact Basin Earthwork, 270,000 Gallons, CT=60, Baffling Factor 0.5	4000	CUYD	$ 20	$ 80,000	0	CUYD	$ 20	$ -	4000	CUYD	$ 20	$ 80,000	0	CUYD	$ 20	$ -
52	Chlorine Contact Basin Concrete Walls	710	CUYD	$ 900	$ 639,000	0	CUYD	$ 900	$ -	710	CUYD	$ 900	$ 639,000	0	CUYD	$ 900	$ -
53	Chlorine Contact Basin Concrete Slab	240	CUYD	$ 500	$ 120,000	0	CUYD	$ 500	$ -	240	CUYD	$ 500	$ 120,000	0	CUYD	$ 500	$ -
54	Chlorine Contact Basin Guardrail	325	LF	$ 135	$ 43,900	0	LF	$ 135	$ -	325	LF	$ 135	$ 43,900	0	LF	$ 135	$ -
55	Treated Water Wetwell Earthwork	330	CUYD	$ 20	$ 6,600	330	CUYD	$ 20	$ 6,600	330	CUYD	$ 20	$ 6,600	330	CUYD	$ 20	$ 6,600
56	Treated Water Wetwell Structural Fill	10	CUYD	$ 5	$ 100	10	CUYD	$ 5	$ 100	10	CUYD	$ 5	$ 100	10	CUYD	$ 5	$ 100
57	Treated Water Wetwell Walls	30	CUYD	$ 900	$ 27,000	30	CUYD	$ 900	$ 27,000	30	CUYD	$ 900	$ 27,000	30	CUYD	$ 900	$ 27,000
58	Treated Water Wetwell Slabs	10	CUYD	$ 500	$ 5,000	10	CUYD	$ 500	$ 5,000	10	CUYD	$ 500	$ 5,000	10	CUYD	$ 500	$ 5,000
59	Treated Water Wetwell Grating	200	SQFT	$ 40	$ 8,000	200	SQFT	$ 40	$ 8,000	200	SQFT	$ 40	$ 8,000	200	SQFT	$ 40	$ 8,000
60	Treated Water Pumps, Vertical Turbine, 1,125 GPM 100 PSI, 100 HP Each, 1 Standby	3	EA	$ 30,000	$ 90,000	3	EA	$ 30,000	$ 90,000	3	EA	$ 30,000	$ 90,000	3	EA	$ 30,000	$ 90,000
61	Utility Water Pump 20 HP 100 GPM @ 120 PSI	1	EA	$ 7,900	$ 7,900	1	EA	$ 7,900	$ 7,900	1	EA	$ 7,900	$ 7,900	0	EA	$ 7,900	$ -
62	Building Drain Pumps 100 GPM 30' TDH, 2 HP Each, 1 Standby	2	EA	$ 9,600	$ 19,200	2	EA	$ 9,600	$ 19,200	2	EA	$ 9,600	$ 19,200	2	EA	$ 9,600	$ 19,200
63	Overhead Crane	1	LS	$ 123,000	$ 123,000	1	LS	$ 123,000	$ 123,000	0.5	LS	$ 123,000	$ 61,500	0.5	LS	$ 123,000	$ 61,500
64	Standby Generator	1	LS	$ 200,000	$ 200,000	1	LS	$ 200,000	$ 200,000	1	LS	$ 200,000	$ 200,000	1	LS	$ 200,000	$ 200,000
65	Equipment Installation and Mark-Up	20%	%	$ 2,418,400	$ 483,700	20%	%	$ 2,912,400	$ 582,500	20%	%	$ 734,900	$ 147,000	20%	%	$ 1,441,000	$ 288,200
66	Raw Water Pump Piping and Valves - 8" & 14"	1	LS	$ 120,000	$ 120,000	1	LS	$ 120,000	$ 120,000	1	LS	$ 120,000	$ 120,000	1	LS	$ 120,000	$ 120,000
67	Filter Piping and Valves - 8" & 14"	1	LS	$ 60,000	$ 60,000	1	LS	$ 60,000	$ 60,000	0	LS	$ 60,000	$ -	0	LS	$ 60,000	$ -
68	UV Piping and Valves - 14"	0	LS	$ 10,000	$ -	1	LS	$ 10,000	$ 10,000	0	LS	$ 10,000	$ -	1	LS	$ 10,000	$ 10,000
69	Backwash Piping and Valves - 16"	1	LS	$ 60,000	$ 60,000	1	LS	$ 60,000	$ 60,000	0	LS	$ 60,000	$ -	0	LS	$ 60,000	$ -
70	Backwash Lagoon Return Piping - 4"	100	LF	$ 50	$ 5,000	100	LF	$ 50	$ 5,000	0	LF	$ 50	$ -	0	LF	$ 50	$ -
71	Low Pressure Air Scour Piping - 8"SS	1	LS	$ 40,000	$ 40,000	1	LS	$ 40,000	$ 40,000	0	LS	$ 40,000	$ -	0	LS	$ 40,000	$ -
72	Compressed Air Piping - Small Bore up to 4"SS	1	LS	$ 20,000	$ 20,000	1	LS	$ 20,000	$ 20,000	0	LS	$ 20,000	$ -	0	LS	$ 20,000	$ -
73	Utility Water Piping - Small Bore GS	1	LS	$ 20,000	$ 20,000	1	LS	$ 20,000	$ 20,000	1	LS	$ 20,000	$ 20,000	0	LS	$ 20,000	$ -
74	Chemical Feed Piping - Small Bore CPVC	1	LS	$ 30,000	$ 30,000	0.5	LS	$ 30,000	$ 15,000	0.5	LS	$ 30,000	$ 15,000	0	LS	$ 30,000	$ -

	Client: Walla Walla Basin Watershed Council, Oregon	Direct Granular Media Filtration and Chlorine Disinfection				Direct Granular Media Filtration and UV Disinfection				Bank Filtration and Chlorine Disinfection				Bank Filtration and UV Disinfection			
	Ref: Feasibility Level Cost Estimate for Surface Water Treatment Plant	5 CFS (3.23 MGD, 2250 GPM) Capacity				5 CFS (3.23 MGD, 2250 GPM) Capacity				5 CFS (3.23 MGD, 2250 GPM) Capacity				5 CFS (3.23 MGD, 2250 GPM) Capacity			
	Date: October 8, 2018																
No.	**Description**	**Quantity**	**Unit**	**Unit Price**	**Extension**	**Quantity**	**Unit**	**Unit Price**	**Extension**	**Quantity**	**Unit**	**Unit Price**	**Extension**	**Quantity**	**Unit**	**Unit Price**	**Extension**
75	Treated Water Piping - 8" & 14"	1	LS	$ 120,000	$ 120,000	1	LS	$ 120,000	$ 120,000	1	LS	$ 120,000	$ 120,000	1	LS	$ 120,000	$ 120,000
76	Pipe Supports	5%	%	$ 475,000	$ 23,800	5%	%	$ 470,000	$ 23,500	5%	%	$ 275,000	$ 13,800	5%	%	$ 250,000	$ 12,500
77	Piping Installation	35%	%	$ 498,800	$ 174,600	35%	%	$ 493,500	$ 172,800	35%	%	$ 288,800	$ 101,100	35%	%	$ 262,500	$ 91,900
78	Water Treatment Building, CMU, Stairs, Rails, Fire Supp, HVAC, Plumbing, Lighting	8000	SQFT	$ 180	$ 1,440,000	8000	SQFT	$ 180	$ 1,440,000	2000	SQFT	$ 180	$ 360,000	2000	SQFT	$ 180	$ 360,000
79	SCADA Software, Hardware, and Programming	5%	%	$ 2,418,400	$ 121,000	5%	%	$ 2,912,400	$ 145,700	5%	%	$ 734,900	$ 36,800	5%	%	$ 1,441,000	$ 72,100
80	Electrical Feeders and Distribution	10%	%	$ 6,378,100	$ 637,900	10%	%	$ 6,080,900	$ 608,100	10%	%	$ 2,715,700	$ 271,600	10%	%	$ 2,644,600	$ 264,500
81	Control Center, Panels, and Instrumentation	10%	%	$ 6,378,100	$ 637,900	10%	%	$ 6,080,900	$ 608,100	10%	%	$ 2,715,700	$ 271,600	10%	%	$ 2,644,600	$ 264,500
82	Mobilization	5%	%	$ 7,774,900	$ 388,800	5%	%	$ 7,442,800	$ 372,200	5%	%	$ 3,295,700	$ 164,800	5%	%	$ 3,245,700	$ 162,300
83	General Requirements/Demobilization - Project Ongoing	3%	%	$ 7,774,900	$ 233,300	3%	%	$ 7,442,800	$ 223,300	3%	%	$ 3,295,700	$ 98,900	3%	%	$ 3,245,700	$ 97,400
84	Contract Close-Out Requirements	2%	%	$ 7,774,900	$ 155,500	2%	%	$ 7,442,800	$ 148,900	2%	%	$ 3,295,700	$ 66,000	2%	%	$ 3,245,700	$ 65,000
85	Contractor Overhead and Profit and Bonding	12.50%	%	$ 7,774,900	$ 971,900	12.50%	%	$ 7,442,800	$ 930,400	12.50%	%	$ 3,295,700	$ 412,000	12.50%	%	$ 3,245,700	$ 405,800
86	Sales Tax - Milton-Freewater, OR	0.00%	%	$ 9,524,400	$ -	0.00%	%	$ 9,117,600	$ -	0.00%	%	$ 4,037,400	$ -	0.00%	%	$ 3,976,200	$ -
87	**Subtotal Contract Cost**				**$ 9,525,000**				**$ 9,118,000**				**$ 4,038,000**				**$ 3,977,000**
88	Land Acquisition & Easements - Next to Walla Walla River	1	ACRE	$ 25,000	$ 25,000	1	ACRE	$ 25,000	$ 25,000	1	ACRE	$ 25,000	$ 25,000	1	ACRE	$ 25,000	$ 25,000
89	Engineering - Pilot and Bench Scale Studies	1	LS	$ 100,000	$ 100,000	1	LS	$ 100,000	$ 100,000	1	LS	$ 100,000	$ 100,000	1	LS	$ 100,000	$ 100,000
90	Engineering - Planning and Design	10%	%	$ 9,525,000	$ 953,000	10%	%	$ 9,118,000	$ 912,000	10%	%	$ 4,038,000	$ 404,000	10%	%	$ 3,977,000	$ 398,000
91	Engineering - Construction and Contract Administration	12%	%	$ 9,525,000	$ 1,143,000	12%	%	$ 9,118,000	$ 1,095,000	12%	%	$ 4,038,000	$ 485,000	12%	%	$ 3,977,000	$ 478,000
92	**Subtotal Project Capital Cost**				**$ 11,746,000**				**$ 11,250,000**				**$ 5,052,000**				**$ 4,978,000**
93	Contingency	35%	%	$ 11,746,000	$ 4,112,000	35%	%	$ 11,250,000	$ 3,938,000	35%	%	$ 5,052,000	$ 1,769,000	35%	%	$ 4,978,000	$ 1,743,000
94	**TOTAL ESTIMATED CAPITAL COST WITH CONTINGENCY**				**$ 15,858,000**				**$ 15,188,000**				**$ 6,821,000**				**$ 6,721,000**

APPENDIX B

	Client: Walla Walla Basin Watershed Council, Oregon	Direct Granular Media Filtration and Chlorine Disinfection				Direct Granular Media Filtration and UV Disinfection				Bank Filtration and Chlorine Disinfection				Bank Filtration and UV Disinfection			
	Ref: Feasibility Level Cost Estimate for Surface Water Treatment Plant	5 CFS (3.23 MGD, 2250 GPM) Capacity				5 CFS (3.23 MGD, 2250 GPM) Capacity				5 CFS (3.23 MGD, 2250 GPM) Capacity				5 CFS (3.23 MGD, 2250 GPM) Capacity			
	Date: October 8, 2018																
No.	**Description**	**Quantity**	**Unit**	**Unit Price**	**Extension**	**Quantity**	**Unit**	**Unit Price**	**Extension**	**Quantity**	**Unit**	**Unit Price**	**Extension**	**Quantity**	**Unit**	**Unit Price**	**Extension**
1	Labor and Associated Costs - 122 Days																
	Operator Labor	1952	HR	$ 22.19	$ 43,320	1952	HR	$ 22.19	$ 43,320	976	HR	$ 22.19	$ 21,660	976	HR	$ 22.19	$ 21,660
	Payroll Taxes, Insurance, and Benefits	50%	%	$ 43,320	$ 21,660	50%	%	$ 43,320	$ 21,660	50%	%	$ 21,660	$ 10,830	50%	%	$ 21,660	$ 10,830
2	Power - 122 Days				$ -				$ -				$ -				$ -
	Raw Water Pumps 2 @ 20 HP each	98,498	KWH	$ 0.07	$ 6,900	98,498	KWH	$ 0.07	$ 6,900	98,498	KWH	$ 0.07	$ 6,900	98,498	KWH	$ 0.07	$ 6,900
	Flash Mix and Flocculators 5 @ 1/2HP	6,067	KWH	$ 0.07	$ 430	6,067	KWH	$ 0.07	$ 430	0	KWH	$ 0.07	$ -	0	KWH	$ 0.07	$ -
	Filter Backwash Pump 15 HP 20 min/day x 2 filters	821	KWH	$ 0.07	$ 60	821	KWH	$ 0.07	$ 60	0	KWH	$ 0.07	$ -	0	KWH	$ 0.07	$ -
	Filter Air Scour Blower 30 HP 10 min/day x 2 filters	1,011	KWH	$ 0.07	$ 80	1,011	KWH	$ 0.07	$ 80	0	KWH	$ 0.07	$ -	0	KWH	$ 0.07	$ -
	Filter Instrument Air Compressor 15 HP 12 hrs/day	18,202	KWH	$ 0.07	$ 1,280	18,202	KWH	$ 0.07	$ 1,280	0	KWH	$ 0.07	$ -	0	KWH	$ 0.07	$ -
	Backwash Return Pump 5 HP	5,472	KWH	$ 0.07	$ 390	5,472	KWH	$ 0.07	$ 390	0	KWH	$ 0.07	$ -	0	KWH	$ 0.07	$ -
	Finished Water Pumps 2 @ 100 HP	454,605	KWH	$ 0.07	$ 31,830	454,605	KWH	$ 0.07	$ 31,830	454,605	KWH	$ 0.07	$ 31,830	454,605	KWH	$ 0.07	$ 31,830
	Utility Water Pump 20 HP 4 hrs/day	8,090	KWH	$ 0.07	$ 570	8,090	KWH	$ 0.07	$ 570	8,090	KWH	$ 0.07	$ 570	0	KWH	$ 0.07	$ -
	Building Drain Pump 2 HP 4 hrs/day	809	KWH	$ 0.07	$ 60	809	KWH	$ 0.07	$ 60	809	KWH	$ 0.07	$ 60	809	KWH	$ 0.07	$ 60
	Heating 8W per SQFT	276,480	KWH	$ 0.07	$ 19,360	276,480	KWH	$ 0.07	$ 19,360	69,120	KWH	$ 0.07	$ 4,840	69,120	KWH	$ 0.07	$ 4,840
	Lighting 2W per SQFT	70,080	KWH	$ 0.07	$ 4,910	70,080	KWH	$ 0.07	$ 4,910	17,520	KWH	$ 0.07	$ 1,230	17,520	KWH	$ 0.07	$ 1,230
	UV Disinfection 8 kW per module	0	KWH	$ 0.07	$ -	140,544	KWH	$ 0.07	$ 9,840	0	KWH	$ 0.07	$ -	187,392	KWH	$ 0.07	$ 13,120
3	Chemicals and Consumables - 122 Days				$ -				$ -				$ -				$ -
	Aluminum Chlorohydrate (ACH) - 5 CFS @ 6 mg/L	19,700	Lbs	$ 0.61	$ 11,920	19,700	Lbs	$ 0.61	$ 11,920	0	Lbs	$ 0.61	$ -	0	Lbs	$ 0.61	$ -
	Sodium Hydroxide - 5 CFS @ 5.5 mg/L	18,100	Lbs	$ 0.35	$ 6,350	18,100	Lbs	$ 0.35	$ 6,350	0	Lbs	$ 0.35	$ -	0	Lbs	$ 0.35	$ -
	Chlorine - 5 CFS @ 2.0 mg/L	6,600	Lbs	$ 2.00	$ 13,200	0	Lbs	$ 2.00	$ -	6,600	Lbs	$ 2.00	$ 13,200	0	Lbs	$ 2.00	$ -
	Sulfur Dioxide - 5 CFS @ 1.8 mg/L	5,900	Lbs	$ 2.33	$ 13,750	0	Lbs	$ 2.33	$ -	5,900	Lbs	$ 2.33	$ 13,750	0	Lbs	$ 2.33	$ -
	UV Lamp Replacement 12 lamps per module, 14,000 hours per lamp	0	Lamp	$ 500	$ -	15	Lamp	$ 500	$ 7,530	0	Lamp	$ 500	$ -	20	Lamp	$ 500	$ 10,040
4	Treatment Equipment Maintenance, Supplies, Replacement 20-Years (122 Days/Year)	1.7%	%	$ 2,418,400	$ 40,420	1.7%	%	$ 2,912,400	$ 48,680	1.7%	%	$ 734,900	$ 12,290	1.7%	%	$ 1,441,000	$ 24,090
5	Overall Treatment Plant Maintenance, Supplies, and Replacement 40-Year Life	2.5%	%	$ 7,106,600	$ 177,670	2.5%	%	$ 6,205,600	$ 155,140	2.5%	%	$ 3,303,100	$ 82,580	2.5%	%	$ 2,536,000	$ 63,400
6	Laboratory Tests - 122 Days				$ -				$ -				$ -				$ -
	Coliform	4	EA	$ 40	$ 160	4	EA	$ 40	$ 160	4	EA	$ 40	$ 160	4	EA	$ 40	$ 160
	E. Coli	8	EA	$ 40	$ 320	0	EA	$ 40	$ -	8	EA	$ 40	$ 320	0	EA	$ 40	$ -
	Cryptosporidium	8	EA	$ 200	$ 1,600	0	EA	$ 200	$ -	8	EA	$ 200	$ 1,600	0	EA	$ 200	$ -
	Giardia	18	EA	$ 200	$ 3,600	0	EA	$ 200	$ -	18	EA	$ 200	$ 3,600	0	EA	$ 200	$ -
	TTHM and HAA5	1	EA	$ 200	$ 200	0	EA	$ 200	$ -	1	EA	$ 200	$ 200	0	EA	$ 200	$ -
	TOC	8	EA	$ 40	$ 320	0	EA	$ 40	$ -	8	EA	$ 40	$ 320	0	EA	$ 40	$ -
	SOC/VOC	2	EA	$ 1,125	$ 2,250	2	EA	$ 1,125	$ 2,250	2	EA	$ 1,125	$ 2,250	2	EA	$ 1,125	$ 2,250
	Radionuclides	2	EA	$ 110	$ 220	2	EA	$ 110	$ 220	2	EA	$ 110	$ 220	2	EA	$ 110	$ 220
	Arsenic	1	EA	$ 40	$ 40	1	EA	$ 40	$ 40	1	EA	$ 40	$ 40	1	EA	$ 40	$ 40
	Asbestos	1	EA	$ 450	$ 450	1	EA	$ 450	$ 450	1	EA	$ 450	$ 450	1	EA	$ 450	$ 450
	Lead and Copper	5	EA	$ 40	$ 200	5	EA	$ 40	$ 200	5	EA	$ 40	$ 200	5	EA	$ 40	$ 200
	Nitrate and Nitrite	2	EA	$ 25	$ 50	2	EA	$ 25	$ 50	2	EA	$ 25	$ 50	2	EA	$ 25	$ 50
	Inorganic Compounds and Metals	2	EA	$ 300	$ 600	2	EA	$ 300	$ 600	2	EA	$ 300	$ 600	2	EA	$ 300	$ 600
	Sodium	1	EA	$ 40	$ 40	1	EA	$ 40	$ 40	1	EA	$ 40	$ 40	1	EA	$ 40	$ 40
	Color	1	EA	$ 10	$ 10	1	EA	$ 10	$ 10	1	EA	$ 10	$ 10	1	EA	$ 10	$ 10
	Odor	1	EA	$ 10	$ 10	1	EA	$ 10	$ 10	1	EA	$ 10	$ 10	1	EA	$ 10	$ 10
	Conductivity	4	EA	$ 10	$ 40	4	EA	$ 10	$ 40	4	EA	$ 10	$ 40	4	EA	$ 10	$ 40
	TDS	4	EA	$ 20	$ 80	4	EA	$ 20	$ 80	4	EA	$ 20	$ 80	4	EA	$ 20	$ 80
	Alkalinity	4	EA	$ 20	$ 80	4	EA	$ 20	$ 80	4	EA	$ 20	$ 80	4	EA	$ 20	$ 80
	Hardness	4	EA	$ 42	$ 170	4	EA	$ 42	$ 170	4	EA	$ 42	$ 170	4	EA	$ 42	$ 170
	Langlier Index	4	EA	$ 80	$ 320	4	EA	$ 80	$ 320	4	EA	$ 80	$ 320	4	EA	$ 80	$ 320
7	Permits and Fees - CCC Fee and Operator Certification	1	LS	$ 560	$ 560	1	LS	$ 560	$ 560	1	LS	$ 560	$ 560	1	LS	$ 560	$ 560
8	Utilities - Garbage, Sewer, Telephone, Internet, Postage	4	MONTH	$ 500	$ 2,000	4	MONTH	$ 500	$ 2,000	4	MONTH	$ 500	$ 2,000	4	MONTH	$ 500	$ 2,000
9	Vehicles	200	MILE	$ 0.55	$ 110	200	MILE	$ 0.55	$ 110	200	MILE	$ 0.55	$ 110	200	MILE	$ 0.55	$ 110
10	Insurance - Property and Liability	0.25%	%	$ 9,525,000	$ 23,820	0.25%	%	$ 9,118,000	$ 22,800	0.25%	%	$ 4,038,000	$ 10,100	0.25%	%	$ 3,977,000	$ 9,950
11	Property Taxes	1.50%	%	$ 25,000	$ 380	1.50%	%	$ 25,000	$ 380	1.50%	%	$ 25,000	$ 380	1.50%	%	$ 25,000	$ 380
12	**TOTAL ESTIMATED ANNUAL OPERATION AND MAINTENANCE COST (2018$)**				$ 431,790				$ 400,880				$ 223,650				$ 205,720
13	**TOTAL PRESENT WORTH OF OPERATION AND MAINTENANCE COST (2018$)**	40	Years	5%	**$7,410,000**	40	Years	5%	**$6,879,000**	40	Years	5%	**$3,838,000**	40	Years	5%	**$3,530,000**
	TOTAL PRESENT WORTH OF PROJECT COST (2018$)				**$ 23,268,000**				**$ 22,067,000**				**$ 10,659,000**				**$ 10,251,000**

Appendix H
Water Quality Results and Lab Analytical Documentation, Summer 2018

Table H1a — On-Farm ASR / ARR Analytical Results for Eastside and Westside Milton-Freewater Basalt ASR Receiving Waters

			Eastside Milton-Freewater			Westside Milton-Freewater			Westside Milton-Freewater		
			Sample 180717008-001 / 5227			*Sample 180717034-001 / 50939*			*Sample 180717035-001 / 5330*		
			Collected 07/12/2018 1:00PM			*Collected 07/12/2018 2:20PM*			*Collected 07/12/2018 3:30PM*		
Analyte Group / Analyte	Units	Drinking Water Standard MCL/SMCL	MDL	RDL	Result	MDL	RDL	Result	MDL	RDL	Result
GENERAL CHEMISTRY											
Alkalinity	mg CaCO3/L	--	2	2	104	2	2	104	2	2	106
Bicarbonate	mg CaCO3/L	--	2	2	104	2	2	104	2	2	106
Chloride	mg/L	250	0.01	0.1	7.19	0.01	0.1	3.59	0.01	0.1	6.71
Corrosivity	--	--	--	--	-0.0464	--	--	-0.0996	--	--	-0.103
Cyanide	mg/L	0.2	0.002	0.01	ND	0.002	0.01	ND	0.002	0.01	ND
Fluoride	mg/L	4	0.071	0.1	0.627	0.071	0.1	0.432	0.071	0.1	0.421
Hardness	mg CaCO3/L	--	0.1	1	44.7	0.1	1	65.8	0.1	1	71.5
NO2-N	mg/L	1	0.063	0.1	ND	0.076	0.1	ND	0.063	0.1	ND
NO3-N	mg/L	10	0.076	0.1	ND	0.063	0.1	ND	0.076	0.1	ND
ORP, field	mV	--	--	--	139.8	--	--	102.4	--	--	107.7
pH	S. U.	--	1	--	7.85	1	--	7.80	1	--	7.80
pH, field	S. U.	--	--	--	8.02	--	--	7.52	--	--	7.77
PO4-P	mg/L	--	0.042	0.1	ND	0.042	0.1	ND	0.042	0.1	ND
Silica (as SiO2)	mg/L	--	0.1	0.1	65.3	0.1	0.1	63.1	0.1	0.1	66.3
Silicon	mg/L	--	0.1	0.1	30.5	0.1	0.1	29.5	0.1	0.1	31.0
Specific Conductance, field	µS/cm	--	--	--	229,9	--	--	222.1	--	--	243.5
Sulfate	mg/L	250	0.057	0.1	0.780	0.057	0.1	4.38	0.057	0.1	6.57
TDS	mg/L	500	30	50	170	30	50	175	30	50	193
Temperature, field	degrees C	--	--	--	23.8	--	--	19.2	--	--	23.6
TKN	mg/L	--	0.464	0.5	ND	0.464	0.5	ND	0.464	0.5	ND
TOC	mg/L	--	0.04	0.1	0.171	0.04	0.1	0.140	0.04	0.1	0.158
Turbidity, field	NTU	--	--	--	0.86	--	--	0.93	--	--	0.85
TOTAL METALS											
Antimony	mg/L	0.006	0.001	0.001	ND	0.001	0.001	ND	0.001	0.001	ND
Arsenic	mg/L	0.01	0.001	0.001	ND	0.001	0.001	ND	0.001	0.001	ND
Barium	mg/L	2	0.001	0.001	0.0185	0.001	0.001	0.0437	0.001	0.001	0.0403
Beryllium	mg/L	0.004	0.0003	0.0003	ND	0.0003	0.0003	ND	0.0003	0.0003	ND
Cadmium	mg/L	0.005	0.001	0.001	ND	0.001	0.001	ND	0.001	0.001	ND
Calcium	mg/L	--	0.01	0.1	12.0	0.01	0.1	16.3	0.01	0.1	17.5
Calcium	mg CaCO3/L		0.03	0.1	12.0	0.03	0.1	16.3	0.03	0.1	17.5
Chromium	mg/L	0.1	0.001	0.001	ND	0.001	0.001	ND	0.001	0.001	ND
Iron	mg/L	0.3	0.0018	0.01	ND	0.0018	0.01	0.0549	0.0018	0.01	0.0293
Magnesium	mg CaCO3/L		0.001	0.1	3.58	0.001	0.1	6.07	0.001	0.1	6.74
Magnesium	mg/L	--	0.01	0.1	3.58	0.01	0.1	6.07	0.01	0.1	6.74

Table H1a — On-Farm ASR / ARR Analytical Results for Eastside and Westside Milton-Freewater Basalt ASR Receiving Waters

			Eastside Milton-Freewater			Westside Milton-Freewater			Westside Milton-Freewater		
			Sample 180717008-001 / 5227			*Sample 180717034-001 / 50939*			*Sample 180717035-001 / 5330*		
			Collected 07/12/2018 1:00PM			*Collected 07/12/2018 2:20PM*			*Collected 07/12/2018 3:30PM*		
Analyte Group / Analyte	Units	Drinking Water Standard MCL/SMCL	MDL	RDL	Result	MDL	RDL	Result	MDL	RDL	Result
Manganese	mg/L	0.05	0.001	0.001	0.0110	0.001	0.001	0.0261	0.001	0.001	0.0122
Mercury-ICPMS	mg/L	0.002	0.00001	0.0001	ND	0.00001	0.0001	ND	0.00001	0.0001	ND
Nickel	mg/L	0.1	0.001	0.001	ND	0.001	0.001	ND	0.001	0.001	ND
Potassium	mg/L	--	0.05	0.1	5.67	0.05	0.1	4.86	0.05	0.1	5.05
Selenium	mg/L	0.05	0.001	0.001	ND	0.001	0.001	ND	0.001	0.001	ND
Sodium	mg/L	--	0.05	0.1	27.5	0.05	0.1	17.4	0.05	0.1	19.2
Thallium	mg/L	0.002	0.001	0.001	ND	0.001	0.001	ND	0.001	0.001	ND
Zinc	mg/L	5	0.001	0.001	0.00104	0.001	0.001	ND	0.001	0.001	0.00408
BACTERIOLOGICAL											
E. coli	MPN per 100 ml	0	--	0	0	--	0	0	--	0	0
Heterotrophic Plate Count	colonies per 1 ml	--	--	<1.0	<1.0	--	<1.0	<1.0	--	<1.0	<1.0
Total Coliform	MPN per 100 ml	0	--	0	0	--	0	4	--	0	0
RADIOLOGICAL											
Gross Alpha	pCi/L	15	1	1	1.49	--	--	--	--	--	--
Gross Beta	pCi/L	50	1	1	4.53	--	--	--	--	--	--
Radium 226	pCi/L	5	1	1	<0.4521	--	--	--	--	--	--
Radium 228	pCi/L	5	1	1	0.478	--	--	--	--	--	--
Total Radium	pCi/L	5	-1	--	0.692	--	--	--	--	--	--
SYNTHETIC ORGANIC COMPOUNDS											
2,4,5-TP (Silvex)	mg/L	0.05	0.000011	0.0002	ND	0.000011	0.0002	ND	--	--	--
2,4-D	mg/L	0.07	0.000179	0.0001	ND	0.000179	0.0001	ND	--	--	--
Alachlor	mg/L	0.002	0.000016	0.0004	ND	0.000016	0.0004	ND	--	--	--
Atrazine	mg/L	0.003	0.000041	0.0002	ND	0.000041	0.0002	ND	--	--	--
Benzo[a]pyrene	mg/L	0.0002	0.000003	0.00002	ND	0.000003	0.00002	ND	--	--	--
bis(2-Ethylhexyl)phthalate	mg/L	0.006	0.000490	0.0006	ND	0.000490	0.0006	ND	--	--	--
bis-2(ethylhexyl)adipate	mg/L	0.4	0.000031	0.0002	ND	0.000031	0.0002	ND	--	--	--
Carbofuran	mg/L	0.04	0.000466	0.002	ND	0.000466	0.002	ND	--	--	--
Chlordane	mg/L	0.002	0.000029	0.0004	ND	0.000029	0.0004	ND	--	--	--
Dalapon	mg/L	0.2	0.000201	0.001	ND	0.000201	0.001	ND	--	--	--
Dinoseb	mg/L	0.007	0.000096	0.0002	ND	0.000096	0.0002	ND	--	--	--
Diquat	mg/L	0.02	0.000300	0.0008	ND	0.000300	0.0008	ND	--	--	--
Endothall	mg/L	0.1	0.0022	0.01	ND	0.0022	0.01	ND	--	--	--
Endrin	mg/L	0.002	0.000002	0.00002	ND	0.000002	0.00002	ND	--	--	--
gamma-BHC (Lindane)	mg/L	0.0002	0.000008	0.00004	ND	0.000008	0.00004	ND	--	--	--
Glyphosate	mg/L	0.7	0.0026	0.01	ND	0.0026	0.01	ND	--	--	--

Table H1a — On-Farm ASR / ARR Analytical Results for Eastside and Westside Milton-Freewater Basalt ASR Receiving Waters

			Eastside Milton-Freewater			Westside Milton-Freewater			Westside Milton-Freewater		
			Sample 180717008-001 / 5227			*Sample 180717034-001 / 50939*			*Sample 180717035-001 / 5330*		
			Collected 07/12/2018 1:00PM			*Collected 07/12/2018 2:20PM*			*Collected 07/12/2018 3:30PM*		
Analyte Group / Analyte	Units	Drinking Water Standard MCL/SMCL	MDL	RDL	Result	MDL	RDL	Result	MDL	RDL	Result
Heptachlor	mg/L	0.0004	0.0000064	0.00008	ND	0.0000064	0.00008	ND	--	--	--
Heptachlor epoxide	mg/L	0.0002	0.0000027	0.00004	ND	0.0000027	0.00004	ND	--	--	--
Hexachlorobenzene	mg/L	0.001	0.000022	0.0002	ND	0.000022	0.0002	ND	--	--	--
Hexachlorocyclopentadiene	mg/L	0.05	0.0000197	0.0002	ND	0.0000197	0.0002	ND	--	--	--
Methoxychlor	mg/L	0.04	0.000008	0.0002	ND	0.000008	0.0002	ND	--	--	--
Oxamyl	mg/L	0.2	0.00026	0.004	ND	0.00026	0.004	ND	--	--	--
PCBs	mg/L	0.0005	0.000095	0.0005	ND	0.000095	0.0005	ND	--	--	--
Pentachlorophenol	mg/L	0.001	0.000005	0.00004	ND	0.000005	0.00004	ND	--	--	--
Picloram	mg/L	0.5	0.000037	0.0001	ND	0.000037	0.0001	ND	--	--	--
Simazine	mg/L	0.004	0.0000567	0.00015	ND	0.0000567	0.00015	ND	--	--	--
Toxaphene	mg/L	0.003	0.00012	0.002	ND	0.00012	0.002	ND	--	--	--

Notes:
MCL = Maxiumim Contaminant Level
SMCL = Secondary Maximum Contaminant Level
MDL = Method Detection Limit
RDL = Reporting Detection Limit
pCi/L = Picocuries per liter
µg/L = Micrograms per liter
µS/cm = Micro-Siemens per centimeter
mg/L = Milligrams per liter
NTU = Nephelometric turbidity unit
mV = Millivolts
ND = Not detected
-- = Not tested

Table H1b – On-Farm ASR / ARR Analytical Results, Eastside Milton-Freewater Receiving & Test Water Samples

			Receiving Water for Alluvial ARR			Receiving Water for Alluvial ARR			Potential Source Testing Water for Basalt ASR		
			18017033-001 / 5239			*180813007-001 / 160*			*180830054-001 / GW_09*		
			8/9/2018 10:45AM			*08/09/2018 09:45AM*			*8/29/2018 ~09:30AM*		
Analyte Group / Analyte	Units	Drinking Water Standard MCL/SMCL	MDL	RDL	Result	MDL	RDL	Result	MDL	RDL	Result
GENERAL CHEMISTRY											
Alkalinity	mg CaCO3/L	--	--	--	--	2	2	39.7	2	2	198
Bicarbonate	mg CaCO3/L	--	2	2	121	2	2	39.7	2	2	198
Chloride	mg/L	250	0.01	0.1	4.38	0.01	0.1	1.18	0.01	0.1	0.575
Cyanide	mg/L	0.2	0.002	0.01	ND	0.002	0.01	ND	0.002	0.01	ND
Fluoride	mg/L	4	0.071	0.1	ND	0.071	0.1	ND	0.071	0.1	ND
Hardness	mg CaCO3/L	--	--	--	--	0.1	1	38.1	0.1	1	29.4
NH3-N	mg/L	--	--	--	--	0.0082	0.05	ND	0.0082	0.05	ND
NO2-N	mg/L	1	0.063	0.1	ND	0.063	0.1	ND	0.063	0.1	ND
NO3-N	mg/L	10	0.076	0.1	3.20	0.076	0.1	1.64	0.076	0.1	ND
ORP, field	mV	--	--	--	50.8	--	--	43.40	--	--	--
pH	S. U.	--	--	--	--	1	--	6.51	1	--	7.19
pH, field	S. U.	--	--	--	6.24	--	--	6.10	--	--	6.41
PO4-P	mg/L	--	--	--	--	0.042	0.1	ND	0.042	0.1	ND
Silica (as SiO2)	mg/L	--	0.1	0.1	38.5	0.1	0.1	35.1	0.1	0.1	34.7
Silicon	mg/L	--	0.1	0.1	18.0	0.1	0.1	16.4	0.1	0.1	16.2
Sulfate	mg/L	250	0.057	0.1	12.8	0.057	0.1	2.71	0.057	0.1	0.747
TDS	mg/L	500	30	50	214	30	50	310	30	50	ND
Temperature, field	degrees C	--	--	--	13.9	--	--	12.0	--	--	15.5
TKN	mg/L	--	--	--	--	0.464	0.5	ND	0.464	0.5	ND
TOC	mg/L	--	0.04	0.1	0.455	0.04	0.1	0.549	0.04	0.1	0.538
Total P	mg/L	--				0.00505	0.01	0.0458	0.00505	0.01	0.0241
Turbidity	NTU	--	0.01	0.1	ND	0.01	0.1	0.29	0.01	0.1	0.67
Turbidity, field	NTU	--	--	--	0.57	--	--	0.61	--	--	0.02
TOTAL METALS											
Aluminum	mg/L	0.200	--	--	--	0.01	0.01	0.0292	0.01	0.01	0.0316
Antimony	mg/L	0.006	0.001	0.001	ND	0.001	0.001	ND	0.001	0.001	ND
Arsenic	mg/L	0.01	0.001	0.001	ND	0.001	0.001	ND	0.001	0.001	ND
Barium	mg/L	2	0.001	0.001	0.0400	0.001	0.001	0.00825	0.001	0.001	0.00962
Beryllium	mg/L	0.004	0.0003	0.0003	ND	0.0003	0.0003	ND	0.0003	0.0003	ND
Cadmium	mg/L	0.005	0.001	0.001	ND	0.001	0.001	ND	0.001	0.001	ND
Calcium	mg/L	--	0.01	0.1	31.0	0.01	0.1	9.36	0.01	0.1	7.34

Table H1b — On-Farm ASR / ARR Analytical Results, Eastside Milton-Freewater Receiving & Test Water Samples

Analyte Group / Analyte	Units	Drinking Water Standard MCL/SMCL	Receiving Water for Alluvial ARR *18017033-001 / 5239* *8/9/2018 10:45AM*			Receiving Water for Alluvial ARR *180813007-001 / 160* *08/09/2018 09:45AM*			Potential Source Testing Water for Basalt ASR *180830054-001 / GW_09* *8/29/2018 ~09:30AM*		
			MDL	RDL	Result	MDL	RDL	Result	MDL	RDL	Result
Chromium	mg/L	0.1	0.001	0.001	0.00117	0.001	0.001	ND	0.001	0.001	ND
Copper	mg/L	1.3	--	--	--	0.00007	0.001	ND	0.00007	0.001	ND
Iron	mg/L	0.3	0.0018	0.01	ND	0.0018	0.01	0.0281	0.0018	0.01	0.0541
Lead	mg/L	0.015	--	--	--	0.00009	0.001	ND	0.00009	0.001	ND
Magnesium	mg/L	--	0.01	0.1	11.8	0.01	0.1	3.57	0.01	0.1	2.68
Manganese	mg/L	--	0.01	0.01	ND	0.01	0.01	ND	0.01	0.01	ND
Mercury-ICPMS	mg/L	0.002	0.00001	0.0001	ND	0.00001	0.0001	ND	0.00001	0.0001	ND
Nickel	mg/L	0.1	0.001	0.001	ND	0.001	0.001	ND	0.001	0.001	ND
Potassium	mg/L	--	0.05	0.1	4.41	0.05	0.1	2.45	0.05	0.1	2.04
Selenium	mg/L	0.05	0.001	0.001	ND	0.001	0.001	ND	0.001	0.001	ND
Sodium	mg/L	--	0.05	0.1	10.9	0.05	0.1	3.10	0.05	0.1	3.0
Thallium	mg/L	0.002	0.001	0.001	ND	0.001	0.001	ND	0.001	0.001	ND
Zinc	mg/L	5	--	--	--	0.001	0.001	0.00521	0.001	0.001	ND

Table H1b — On-Farm ASR / ARR Analytical Results, Eastside Milton-Freewater Receiving & Test Water Samples

Analyte Group / Analyte	Units	Drinking Water Standard MCL/SMCL	Receiving Water for Alluvial ARR *18017033-001 / 5239* *8/9/2018 10:45AM*			Receiving Water for Alluvial ARR *180813007-001 / 160* *08/09/2018 09:45AM*			Potential Source Testing Water for Basalt ASR *180830054-001 / GW_09* *8/29/2018 ~09:30AM*		
			MDL	RDL	Result	MDL	RDL	Result	MDL	RDL	Result
BACTERIOLOGICAL											
E. coli	MPN per 100 ml	0	--	0	0	--	0	0	--	0	0
Heterotrophic Plate Count (HPC)	colonies per 1 ml	--	--	<1.0	74.5	--	<1.0	71	--	<1.0	9.0
Total Coliform	MPN per 100 ml	0	--	0	84	--	0	37	--	0	13
RADIOLOGICAL											
Gross Alpha	pCi/L	15	--	--	--	1	1	<0.412	1	1	1.85
Gross Beta	pCi/L	50	--	--	--	1	1	2.3	1	1	3.32
Radium 226	pCi/L	5	--	--	--	1	1	<0.221	1	1	<0.425
Radium 228	pCi/L	5	--	--	--	1	1	0.19	1	1	<0.186
Total Radium	pCi/L	5	--	--	--	-1	--	<0.411	-1	--	<0.611
Uranium	mg/L	0.03	--	--	--	0.001	0.001	ND	0.001	0.001	ND
Uranium Activity	pCi/L	20	--	--	--	0.67	0.67	ND	0.67	0.67	ND
SYNTHETIC ORGANIC COMPOUNDS											
1,2-Dibromo-3-chloropropane(DBCP)	mg/L	0.0002	--	--	--	--	--	--	0.0000033	0.00004	ND
1,2-Dibromoethane (EDB)	mg/L	0.00005	--	--	--	--	--	--	0.00001	0.00002	ND
2,4,5-T	ug/L	--	--	--	--	0.1	0.1	ND	0.1	0.1	ND
2,4,5-TP (Silvex)	ug/L	50	--	--	--	0.2	0.2	ND	0.2	0.2	ND
2,4-D	ug/L	70	--	--	--	0.1	0.1	ND	0.1	0.1	ND
2,4-DB	ug/L	--	--	--	--	1	1	ND	1	1	ND
3,5-Dichlorobenzoic Acid	ug/L	--	--	--	--	0.5	0.5	ND	0.5	0.5	ND
3-Hydroxycarbofuran	ug/L	--	--	--	--	--	--	--	0.304	2	ND
4,4-DDD	ug/L	--	--	--	--	--	--	--	0.0017	0.1	ND
4,4-DDE	ug/L	--	--	--	--	--	--	--	0.0032	0.1	ND
4,4-DDT	ug/L	--	--	--	--	--	--	--	0.0041	0.1	ND
Acenaphthene	ug/L	--	--	--	--	0.1	0.2	ND	0.1	0.2	ND
Acenaphthylene	ug/L	--	--	--	--	0.0047	0.2	ND	0.0047	0.2	ND
Acetamiprid	ug/L	--	--	--	--	--	--	--	0.1	0.1	ND
a-Chlordane	ug/L	--	--	--	--	--	--	--	0.0194	0.1	ND
Acifluorofen	ug/L	--	--	--	--	0.2	2	ND	0.2	2	ND
Alachlor	ug/L	2	--	--	--	0.0099	0.2	ND	0.0099	0.2	ND
Aldicarb	ug/L	3	--	--	--	--	--	--	0.333	0.5	ND
Aldicarb	ug/L	3	--	--	--	--	--	--	0.333	0.5	ND

Table H1b — On-Farm ASR / ARR Analytical Results, Eastside Milton-Freewater Receiving & Test Water Samples

			Receiving Water for Alluvial ARR			Receiving Water for Alluvial ARR			Potential Source Testing Water for Basalt ASR		
			18017033-001 / 5239			*180813007-001 / 160*			*180830054-001 / GW_09*		
			8/9/2018 10:45AM			*08/09/2018 09:45AM*			*8/29/2018 ~09:30AM*		
Analyte Group / Analyte	Units	Drinking Water Standard MCL/SMCL	MDL	RDL	Result	MDL	RDL	Result	MDL	RDL	Result
Aldicarb Sulfone	ug/L	2	--	--	--	--	--	--	0.226	1	ND
Aldicarb Sulfoxide	ug/L	4	--	--	--	--	--	--	0.354	1	ND
Aldrin	ug/L	--	--	--	--	--	--	--	0.052	0.1	ND
alpha-BHC	ug/L	--	--	--	--	--	--	--	0.0047	0.1	ND
Anthracene	ug/L	--	--	--	--	0.0183	0.2	ND	0.0183	0.2	ND
Aroclor 1016 (PCB-1016)	ug/L	--	--	--	--	--	--	--	0.08	0.08	ND
Aroclor 1221 (PCB-1221)	ug/L	--	--	--	--	--	--	--	0.5	1	ND
Aroclor 1232 (PCB-1232)	ug/L	--	--	--	--	--	--	--	0.1	0.5	ND
Aroclor 1242 (PCB-1242)	ug/L	--	--	--	--	--	--	--	0.1	0.3	ND
Aroclor 1248 (PCB-1248)	ug/L	--	--	--	--	--	--	--	0.1	0.1	ND
Aroclor 1254 (PCB-1254)	ug/L	--	--	--	--	--	--	--	0.1	0.1	ND
Aroclor 1260 (PCB-1260)	ug/L	--	--	--	--	--	--	--	0.1	0.2	ND
Atrazine	ug/L	3	--	--	--	0.0133	0.1	ND	0.0133	0.1	ND
Azinphos-methyl	ug/L	--	--	--	--	--	--	--	0.1	0.1	ND
Baygon	ug/L	--	--	--	--	--	--	--	0.311	1	ND
Bentazon	ug/L	--	--	--	--	0.5	0.5	ND	0.5	0.5	ND
Benzo(ghi)perylene	ug/L	--	--	--	--	0.009	0.2	ND	0.009	0.2	ND
Benzo[a]anthracene	ug/L	--	--	--	--	0.0066	0.2	ND	0.0066	0.2	ND
Benzo[a]pyrene	ug/L	0.2	--	--	--	0.01	0.02	ND	0.01	0.02	ND
Benzo[b]fluoranthene	ug/L	--	--	--	--	0.0112	0.2	ND	0.0112	0.2	ND
Benzo[k]fluoranthene	ug/L	--	--	--	--	0.0136	0.2	ND	0.0136	0.2	ND
beta-BHC	ug/L	--	--	--	--	--	--	--	0.0038	0.1	ND
bis(2-Ethylhexyl)phthalate	ug/L	6	--	--	--	0.0994	0.6	ND	0.0994	0.6	ND
bis-2(ethylhexyl)adipate	ug/L	400	--	--	--	0.016	0.2	ND	0.016	0.2	ND
Bromacil	ug/L	--	--	--	--	0.0209	0.1	ND	0.0209	0.1	ND
Bromoxynil	ug/L	--	--	--	--	0.1	0.2	ND	0.1	0.2	ND
Butachlor	ug/L	--	--	--	--	0.0409	0.1	ND	0.0409	0.1	ND
Butylbenzylphthalate	ug/L	--	--	--	--	0.0145	1	ND	0.0145	1	ND
Carbaryl	ug/L	--	--	--	--	--	--	--	0.185	2	ND
Carbofuran	ug/L	40	--	--	--	--	--	--	0.466	0.9	ND
Chloramben	ug/L	--	--	--	--	0.2	0.2	ND	0.2	0.2	ND
Chlordane	mg/L	0.002	--	--	--	0.0000288	0.0004	ND	0.0288	0.2	ND

Table H1b — On-Farm ASR / ARR Analytical Results, Eastside Milton-Freewater Receiving & Test Water Samples

Analyte Group / Analyte	Units	Drinking Water Standard MCL/SMCL	Receiving Water for Alluvial ARR *18017033-001 / 5239* *8/9/2018 10:45AM*			Receiving Water for Alluvial ARR *180813007-001 / 160* *08/09/2018 09:45AM*			Potential Source Testing Water for Basalt ASR *180830054-001 / GW_09* *8/29/2018 ~09:30AM*		
			MDL	RDL	Result	MDL	RDL	Result	MDL	RDL	Result
Chlorpyrifos	ug/L	--	--	--	--	0.0165	0.2	ND	0.0165	0.2	ND
Chrysene	ug/L	--	--	--	--	0.0073	0.2	ND	0.0073	0.2	ND
Cyanizine	ug/L	--	--	--	--	0.0219	0.2	ND	0.0219	0.2	ND
Dacthal	ug/L	--	--	--	--	0.02	0.02	ND	0.02	0.02	ND
Dalapon	ug/L	--	--	--	--	1	1	ND	1	1	ND
DEET	ug/L	--	--	--	--	--	--	--	0.1	0.1	ND
delta-BHC	ug/L	--	--	--	--	--	--	--	0.0035	0.1	ND
Diazinon	ug/L	--	--	--	--	0.0172	0.2	ND	0.0172	0.2	ND
Dibenz[a,h]anthracene	ug/L	--	--	--	--	0.0117	0.2	ND	0.0117	0.2	ND
Dicamba	ug/L	--	--	--	--	0.2	0.2	ND	0.2	0.2	ND
Dichloroprop	ug/L	--	--	--	--	0.1	0.1	ND	0.1	0.1	ND
Dieldrin	ug/L	--	--	--	--	--	--	--	0.0048	0.1	ND
Diethylphthalate	ug/L	--	--	--	--	0.0174	1	ND	0.0174	1	ND
Dimethoate	ug/L	--	--	--	--	--	--	--	0.1	0.1	ND
Dimethylphthalate	ug/L	--	--	--	--	0.0093	1	ND	0.0093	1	ND
Di-n-butylphthalate	ug/L	--	--	--	--	0.022	1	ND	0.022	1	ND
Dinoseb	ug/L	7	--	--	--	0.2	0.2	ND	0.2	0.2	ND
Diquat	mg/L	0.02	--	--	--	0.0003	0.0008	ND	0.0003	0.0008	ND
Diuron	ug/L	--	--	--	--	--	--	--	0.05	0.05	ND
Endosulfan I	ug/L	--	--	--	--	--	--	--	0.003	0.1	ND
Endosulfan II	ug/L	--	--	--	--	--	--	--	0.0048	0.1	ND
Endosulfan sulfate	ug/L	--	--	--	--	--	--	--	0.0015	0.1	ND
Endothall	mg/L	0.1	--	--	--	0.0022	0.01	ND	0.0022	0.01	ND
Endrin	mg/L	0.002	--	--	--	0.0000022	0.00002	ND	0.0022	0.01	ND
Endrin aldehyde	ug/L	--	--	--	--	--	--	--	0.0028	0.1	ND
Endrin ketone	ug/L	--	--	--	--	--	--	--	0.0036	0.1	ND
EPTC	ug/L	--	--	--	--	0.0095	0.1	ND	0.0095	0.1	ND
Ethyl parathion	ug/L	--	--	--	--	0.1	0.2	ND	0.1	0.2	ND
Fluoranthene	ug/L	--	--	--	--	0.0054	0.2	ND	0.0054	0.2	ND
Fluorene	ug/L	--	--	--	--	0.0077	0.2	ND	0.0077	0.2	ND
Fluridone	ug/L	--	--	--	--	--	--	--	0.1	0.1	ND
gamma-BHC (Lindane)	mg/L	0.0002	--	--	--	0.0000076	0.00004	ND	0.0076	0.02	ND

Table H1b — On-Farm ASR / ARR Analytical Results, Eastside Milton-Freewater Receiving & Test Water Samples

			Receiving Water for Alluvial ARR			Receiving Water for Alluvial ARR			Potential Source Testing Water for Basalt ASR		
			18017033-001 / 5239			*180813007-001 / 160*			*180830054-001 / GW_09*		
			8/9/2018 10:45AM			*08/09/2018 09:45AM*			*8/29/2018 ~09:30AM*		
Analyte Group / Analyte	Units	Drinking Water Standard MCL/SMCL	MDL	RDL	Result	MDL	RDL	Result	MDL	RDL	Result
g-Chlordane	ug/L	--	--	--	--	--	--	--	0.0136	0.2	ND
Glyphosate	mg/L	0.7	--	--	--	0.0026	0.01	ND	0.0026	0.01	ND
Heptachlor	mg/L	0.0004	--	--	--	0.0000064	0.00008	ND	0.0064	0.04	ND
Heptachlor epoxide	mg/L	0.0002	--	--	--	0.0000027	0.00004	ND	0.0027	0.02	ND
Hexachlorobenzene	ug/L	1	--	--	--	--	--	--	0.0066	0.1	ND
Hexachlorocyclopentadiene	ug/L	50	--	--	--	0.011	0.1	ND	0.011	0.1	ND
Hexazinone	ug/L	--	--	--	--	--	--	--	0.1	0.1	ND
Imidacloprid	ug/L	--	--	--	--	--	--	--	0.1	0.1	ND
Indeno[1,2,3-cd]pyrene	ug/L	--	--	--	--	--	--	--	0.0092	0.2	ND
Malathion	ug/L	--	--	--	--	0.1	0.2	ND	0.1	0.2	ND
MCPA	ug/L	--	--	--	--	--	--	--	0.1	0.2	ND
Methiocarb	ug/L	--	--	--	--	--	--	--	0.618	1	ND
Methomyl	ug/L	--	--	--	--	--	--	--	0.143	1	ND
Methoxychlor	mg/L	0.04	--	--	--	0.000008	0.0002	ND	0.008	0.1	ND
Methoxychlor	ug/L	--	--	--	--	0.0177	0.2	ND	0.0177	0.2	ND
Metolachlor	ug/L	--	--	--	--	0.0049	0.1	ND	0.0049	0.1	ND
Metribuzin	ug/L	--	--	--	--	0.0214	0.1	ND	0.0214	0.1	ND
Molinate	ug/L	--	--	--	--	0.1	0.1	ND	0.1	0.1	ND
Naphthalene	ug/L	--	--	--	--	0.0056	0.2	ND	0.0056	0.2	ND
Norflorazon	ug/L	--	--	--	--	--	--	--	0.1	0.1	ND
Oxamyl	ug/L	200	--	--	--	--	--	--	0.26	2	ND
Parathion	ug/L	--	--	--	--	0.1	0.2	ND	0.1	0.2	ND
PCBs	mg/L	0.0005	--	--	--	0.000095	0.0005	ND	0.095	0.5	ND
Pendimethalin	ug/L	--	--	--	--	0.1	0.2	ND	0.1	0.2	ND
Pentachlorophenol	ug/L	1	--	--	--	0.04	0.04	ND	0.04	0.04	ND
Permethrin	ug/L	--	--	--	--	0.1	0.2	ND	0.1	0.2	ND
Phenanthrene	ug/L	--	--	--	--	0.006	0.2	ND	0.006	0.2	ND
Picloram	ug/L	500	--	--	--	0.1	0.1	ND	0.1	0.1	ND
Prometon	ug/L	--	--	--	--	0.0299	0.2	ND	0.0299	0.2	ND
Pronamide	ug/L	--	--	--	--	0.1	0.2	ND	0.1	0.2	ND
Propachlor	ug/L	--	--	--	--	0.0077	0.1	ND	0.0077	0.1	ND
Propiconazole	ug/L	--	--	--	--	--	--	--	0.1	0.1	ND

Table H1b — On-Farm ASR / ARR Analytical Results, Eastside Milton-Freewater Receiving & Test Water Samples

Analyte Group / Analyte	Units	Drinking Water Standard MCL/SMCL	Receiving Water for Alluvial ARR *18017033-001 / 5239* *8/9/2018 10:45AM*			Receiving Water for Alluvial ARR *180813007-001 / 160* *08/09/2018 09:45AM*			Potential Source Testing Water for Basalt ASR *180830054-001 / GW_09* *8/29/2018 ~09:30AM*		
			MDL	RDL	Result	MDL	RDL	Result	MDL	RDL	Result
Propoxur	ug/L	--	--	--	--	--	--	--	0.311	1	ND
Pyraclostrobin	ug/L	--	--	--	--	--	--	--	0.1	0.1	ND
Pyrene	ug/L	--	--	--	--	0.009	0.2	ND	0.009	0.2	ND
Silver	mg/L	0.1	--	--	--	0.001	0.001	ND	0.001	0.001	ND
Simazine	ug/L	4	--	--	--	0.0174	0.07	ND	0.0174	0.07	ND
Terbacil	ug/L	--	--	--	--	0.0644	0.1	ND	0.0644	0.1	ND
Total Dacthal	ug/L	--	--	--	--	0.02	0.02	ND	0.02	0.02	ND
Toxaphene	mg/L	0.003	--	--	--	0.00012	0.002	ND	0.12	1	ND
trans-Nonachlor	ug/L	--	--	--	--	--	--	--	0.0252	0.2	ND
Triademefon	ug/L	--	--	--	--	0.1	0.2	ND	0.1	0.2	ND
Trifluralin	ug/L	--	--	--	--	0.0112	0.1	ND	0.0112	0.1	ND
VOLATILE ORGANIC COMPOUNDS											
1,1,1-Trichloroethane	mg/L	0.200	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
1,1,1-Trichloroethane	mg/L	0.200	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
1,1,2-Trichloroethane	mg/L	0.005	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
1,1-Dichloroethene	mg/L	0.007	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
1,2,4-Trichlorobenzene	mg/L	0.070	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
1,2,4-Trichlorobenzene	mg/L	0.070	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
1,2-Dichlorobenzene	mg/L	0.600	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
1,2-Dichloroethane	mg/L	0.005	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
1,2-Dichloroethane	mg/L	0.005	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
1,2-Dichloropropane	mg/L	0.005	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
1,4-Dichlorobenzene	mg/L	0.075	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
Benzene	mg/L	0.005	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
Bromodichloromethane	mg/L	--	--	--	--	0.0005	0.0005	ND	--	--	--
Bromoform	mg/L	--	--	--	--	0.0005	0.0005	ND	--	--	--
Carbon Tetrachloride	mg/L	0.005	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
Chlorobenzene	mg/L	0.100	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
Chloroform	mg/L	--	--	--	--	0.0005	0.0005	ND	--	--	--
cis-1,2-dichloroethene	mg/L	0.070	--	--	--	0.0004	0.0005	ND	0.0004	0.0005	ND
Dibromochloromethane	mg/L	--	--	--	--	0.0005	0.0005	ND	--	--	--
Dichloroacetic acid	mg/L	--	--	--	--	0.001	0.001	ND	--	--	--

Table H1b — On-Farm ASR / ARR Analytical Results, Eastside Milton-Freewater Receiving & Test Water Samples

Analyte Group / Analyte	Units	Drinking Water Standard MCL/SMCL	Receiving Water for Alluvial ARR *18017033-001 / 5239* *8/9/2018 10:45AM*			Receiving Water for Alluvial ARR *180813007-001 / 160* *08/09/2018 09:45AM*			Potential Source Testing Water for Basalt ASR *180830054-001 / GW_09* *8/29/2018 ~09:30AM*		
			MDL	RDL	Result	MDL	RDL	Result	MDL	RDL	Result
Ethylbenzene	mg/L	0.700	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
Hexachlorobenzene	ug/L	1.000	--	--	--	0.0066	0.1	ND	--	--	--
Indeno[1,2,3-cd]pyrene	ug/L	--	--	--	--	0.0092	0.2	ND	--	--	--
Methylene chloride	mg/L	0.005	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
Methylene chloride	mg/L	0.005	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
Monochloroacetic acid	mg/L	--	--	--	--	0.001	0.002	ND	--	--	--
Styrene	mg/L	0.100	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
Tetrachloroethene	mg/L	0.005	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
Toluene	mg/L	1.000	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
Total HAA5	mg/L	0.060	--	--	--	0.001	0.001	ND	--	--	--
Total Trihalomethane	mg/L	0.080	--	--	--	0.0005	0.0005	ND	--	--	--
Total Xylene	mg/L	10.000	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
trans-1,2-Dichloroethene	mg/L	0.100	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
Trichloroacetic acid	mg/L	--	--	--	--	0.001	0.001	ND	--	--	--
Trichloroethene	mg/L	0.005	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND
Vinyl Chloride	mg/L	0.002	--	--	--	0.0005	0.0005	ND	0.0005	0.0005	ND

Table H1b — On-Farm ASR / ARR Analytical Results, Eastside Milton-Freewater Receiving & Test Water Samples

Analyte Group / Analyte	Units	Drinking Water Standard MCL/SMCL	Receiving Water for Alluvial ARR *18017033-001 / 5239* *8/9/2018 10:45AM*			Receiving Water for Alluvial ARR *180813007-001 / 160* *08/09/2018 09:45AM*			Potential Source Testing Water for Basalt ASR *180830054-001 / GW_09* *8/29/2018 ~09:30AM*		
			MDL	RDL	Result	MDL	RDL	Result	MDL	RDL	Result

Notes:
MCL = Maxiumim Contaminant Level
SMCL = Secondary Maximum Contaminant Level
MDL = Method Detection Limit
RDL = Reporting Detection Limit
pCi/L = Picocuries per liter
µg/L = Micrograms per liter
µS/cm = Micro-Siemens per centimeter
mg/L = Milligrams per liter
NTU = Nephelometric turbidity unit
mV = Millivolts
ND = Not detected
-- = Not tested

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Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn:

Batch #: 180717008
Project Name: SOC & VOC

Analytical Results Report

Sample Number 180717008-001
Client Sample ID 5227
Matrix Drinking Water
Comments

Sampling Date 7/12/2018
Sampling Time 1:00 PM

Date/Time Received 7/13/2018 8:54 AM

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Alkalinity	104	mg CaCO3/L	2	7/20/2018 12:30:00 PM	RPU	SM2320B	
Antimony	ND	mg/L	0.001	7/23/2018 1:54:00 PM	HSW	EPA 200.8	
Arsenic	ND	mg/L	0.001	7/23/2018 1:54:00 PM	HSW	EPA 200.8	
Barium	0.0185	mg/L	0.001	7/23/2018 1:54:00 PM	HSW	EPA 200.8	
Beryllium	ND	mg/L	0.0003	7/23/2018 1:54:00 PM	HSW	EPA 200.8	
Bicarbonate	104	mg CaCO3/L	2	7/20/2018 12:30:00 PM	RPU	SM2320B	
Cadmium	ND	mg/L	0.001	7/23/2018 1:54:00 PM	HSW	EPA 200.8	
Calcium	12.0	mg/L	0.1	7/27/2018 5:18:00 PM	SDR	EPA 200.7	
Carbofuran	ND	mg/L	0.002	7/27/2018 6:14:00 AM	MER	EPA 531.2	
Oxamyl	ND	mg/L	0.004	7/27/2018 6:14:00 AM	MER	EPA 531.2	
Chloride	7.19	mg/L	0.1	7/13/2018 11:44:00 PM	MER	EPA 300.0	
Chromium	ND	mg/L	0.001	7/23/2018 1:54:00 PM	HSW	EPA 200.8	
Corrosivity	-0.0464			8/6/2018 8:45:00 AM	ETL	Calculation	
Cyanide	ND	mg/L	0.01	7/23/2018 1:30:00 PM	RPU	EPA 335.4	
Diquat	ND	mg/L	0.0008	7/17/2018 12:38:00 PM	MER	EPA 549.2	
Endothall	ND	mg/L	0.01	7/19/2018 9:36:00 PM	GPB	EPA 548.1	
Fluoride	0.627	mg/L	0.1	7/13/2018 11:44:00 PM	MER	EPA 300.0	
Glyphosate	ND	mg/L	0.01	7/23/2018 7:16:00 PM	MER	EPA 547	
Gross Alpha	1.49 ± 1.11	pCi/L	0.952	9/5/2018 11:03:00 AM	GPB	EPA 900.0	
Gross Beta	4.53 ± 0.863	pCi/L	0.484	9/5/2018 11:03:00 AM	GPB	EPA 900.0	
Calcium	12.0	mg CaCO3/L	0.1	7/27/2018 5:18:00 PM	SDR	EPA 200.7	
Hardness	44.7	mg CaCO3/L	1	7/27/2018 5:18:00 PM	SDR	EPA 200.7	
Magnesium	3.58	mg CaCO3/L	0.1	7/27/2018 5:18:00 PM	SDR	EPA 200.7	
2,4,5-TP (Silvex)	ND	mg/L	0.0002	7/25/2018 1:14:00 PM	MAH	EPA 515.4	
2,4-D	ND	mg/L	0.0001	7/25/2018 1:14:00 PM	MAH	EPA 515.4	
Dalapon	ND	mg/L	0.001	7/25/2018 1:14:00 PM	MAH	EPA 515.4	
Dinoseb	ND	mg/L	0.0002	7/25/2018 1:14:00 PM	MAH	EPA 515.4	
Pentachlorophenol	ND	mg/L	4e-005	7/25/2018 1:14:00 PM	MAH	EPA 515.4	
Picloram	ND	mg/L	0.0001	7/25/2018 1:14:00 PM	MAH	EPA 515.4	
Iron	ND	mg/L	0.01	8/8/2018 1:46:00 PM	SDR	EPA 200.7	
Magnesium	3.58	mg/L	0.1	7/27/2018 5:18:00 PM	SDR	EPA 200.7	
Manganese	0.0110	mg/L	0.001	7/23/2018 1:54:00 PM	HSW	EPA 200.8	
Mercury-ICPMS	ND	mg/L	0.0001	7/23/2018 1:54:00 PM	HSW	EPA 200.8	
Nickel	ND	mg/L	0.001	7/23/2018 1:54:00 PM	HSW	EPA 200.8	

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Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn:

Batch #: 180717008
Project Name: SOC & VOC

Analytical Results Report

Sample Number 180717008-001
Client Sample ID 5227
Matrix Drinking Water
Comments

Sampling Date 7/12/2018
Sampling Time 1:00 PM

Date/Time Received 7/13/2018 8:54 AM

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
NO3/N	ND	mg/L	0.1	7/13/2018 11:44:00 PM	MER	EPA 300.0	
NO2/N	ND	mg/L	0.1	7/13/2018 11:44:00 PM	MER	EPA 300.0	
Chlordane	ND	mg/L	0.0004	7/24/2018 3:31:00 AM	GPB	EPA 505	
Endrin	ND	mg/L	2e-005	7/24/2018 3:31:00 AM	GPB	EPA 505	
gamma-BHC (Lindane)	ND	mg/L	4e-005	7/24/2018 3:31:00 AM	GPB	EPA 505	
Heptachlor	ND	mg/L	8e-005	7/24/2018 3:31:00 AM	GPB	EPA 505	
Heptachlor epoxide	ND	mg/L	4e-005	7/24/2018 3:31:00 AM	GPB	EPA 505	
Methoxychlor	ND	mg/L	0.0002	7/24/2018 3:31:00 AM	GPB	EPA 505	
PCBs	ND	mg/L	0.0005	7/24/2018 3:31:00 AM	GPB	EPA 505	
Toxaphene	ND	mg/L	0.002	7/24/2018 3:31:00 AM	GPB	EPA 505	
pH	7.85	ph Units		7/20/2018 12:30:00 PM	RPU	SM 4500pH-B	
PO4/P	ND	mg/L	0.1	7/13/2018 11:44:00 PM	MER	EPA 300.0	
Potassium	5.67	mg/L	0.1	7/27/2018 5:18:00 PM	SDR	EPA 200.7	
Barium Carrier	91.4	%		9/10/2018 2:50:00 PM	HSW	EPA 903.0	
Radium 226	<0.452 ± 0.361	pCi/L	0.452	9/10/2018 2:50:00 PM	HSW	EPA 903.0	U1, R13
Barium Carrier	84.2	%		9/5/2018 1:41:00 PM	HSW	EPA 904.0	
Radium 228	0.478 ± 0.193	pCi/L	0.186	9/5/2018 1:41:00 PM	HSW	EPA 904.0	
Total Radium	0.692 ± 0.554	pCi/L		9/12/2018 5:28:00 PM	HSW	Calculation	
Selenium	ND	mg/L	0.001	7/23/2018 1:54:00 PM	HSW	EPA 200.8	
Alachlor	ND	mg/L	0.0004	7/25/2018 6:33:00 AM	BMM	EPA 525.2	
Atrazine	ND	mg/L	0.0002	7/25/2018 6:33:00 AM	BMM	EPA 525.2	
Benzo[a]pyrene	ND	mg/L	2e-005	7/25/2018 6:33:00 AM	BMM	EPA 525.2	
bis(2-Ethylhexyl)phthalate	ND	mg/L	0.0006	7/25/2018 6:33:00 AM	BMM	EPA 525.2	
bis-2(ethylhexyl)adipate	ND	mg/L	0.0002	7/25/2018 6:33:00 AM	BMM	EPA 525.2	
Hexachlorobenzene	ND	mg/L	0.0002	7/25/2018 6:33:00 AM	BMM	EPA 525.2	
Hexachlorocyclopentadiene	ND	mg/L	0.0002	7/25/2018 6:33:00 AM	BMM	EPA 525.2	
Simazine	ND	mg/L	0.00015	7/25/2018 6:33:00 AM	BMM	EPA 525.2	
Silica (as SiO2)	65.3	mg/L	0.1	7/27/2018 5:18:00 PM	SDR	EPA 200.7	
Silicon	30.5	mg/L	0.1	7/27/2018 5:18:00 PM	SDR	EPA 200.7	
Sodium	27.5	mg/L	0.1	7/27/2018 5:18:00 PM	SDR	EPA 200.7	
TDS	170	mg/L	50	7/19/2018 4:00:00 PM	RPU	SM 2540C	
Sulfate	0.780	mg/L	0.1	7/19/2018 10:17:00 PM	MER	EPA 300.0	
Thallium	ND	mg/L	0.001	7/23/2018 1:54:00 PM	HSW	EPA 200.8	
TKN	ND	mg/L	0.5	7/24/2018 10:30:00 AM	RPU	SM4500NORGC	
TOC	0.171	mg/L	0.1	7/27/2018 2:09:00 PM	RPR	SM 5310B	

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Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn:

Batch #: 180717008
Project Name: SOC & VOC

Analytical Results Report

Sample Number	180717008-001	**Sampling Date**	7/12/2018	**Date/Time Received**	7/13/2018	8:54 AM
Client Sample ID	5227	**Sampling Time**	1:00 PM			
Matrix	Drinking Water					
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Zinc	0.00104	mg/L	0.001	7/23/2018 1:54:00 PM	HSW	EPA 200.8	

Authorized Signature

Todd Taruscio, Lab Manager

MCL	EPA's Maximum Contaminant Level
ND	Not Detected
PQL	Practical Quantitation Limit
R13	Matrix spike recovery was above method acceptance limits; the associated blank spike recovery and matrix spike duplicate recovery were acceptable.
U1	The analyte was not detected at the calculated detection limit

The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

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Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Login Report

Customer Name: WALLA WALLA BASIN WATERSHED COUNCIL
810 S. MAIN RD
MILTON-FREEWATER OR 97862

Order ID: 180717008
Order Date: 7/17/2018

Contact Name:

Project Name: SOC & VOC

Comment:

Sample #: 180717008-001 **Customer Sample #:** 5227

Recv'd: ☑ **Matrix:** Drinking Water **Collector:** **Date Collected:** 7/12/2018

Quantity: 15 **Date Received:** 7/13/2018 8:54:00 AM **Time Collected:** 1:00 PM

Comment:

Test	Lab	Method	Due Date	Priority
ALKALINITY	M	SM2320B	7/25/2018	***Normal (~10 Days)***
BICARBONATE	M	SM2320B	7/25/2018	***Normal (~10 Days)***
CALCIUM ICP	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
CARBAMATE 531.2 OR	M	EPA 531.2	7/25/2018	***Normal (~10 Days)***
CHLORIDE	M	EPA 300.0	7/25/2018	***Normal (~10 Days)***
Corrosivity	M	Calculation	7/25/2018	***Normal (~10 Days)***
HARDNESS by EPA 200.7	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
IRON ICP	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
MAGNESIUM ICP	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
MANGANESE ICP	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
pH	M	SM 4500pH-B	7/25/2018	***Normal (~10 Days)***
PHOSPHATE/P	M	EPA 300.0	7/25/2018	***Normal (~10 Days)***
POTASSIUM ICP	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
SILICON ICP	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
SOLIDS - TDS	M	SM 2540C	7/25/2018	***Normal (~10 Days)***
SULFATE	M	EPA 300.0	7/25/2018	***Normal (~10 Days)***
TKN	M	SM4500NORGC	7/25/2018	***Normal (~10 Days)***
ZINC	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
ANTIMONY	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
ARSENIC	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
BARIUM	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
BERYLLIUM	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
CADMIUM	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***

Customer Name: WALLA WALLA BASIN WATERSHED COUNCIL **Order ID:** 180717008

810 S. MAIN RD **Order Date:** 7/17/2018

MILTON-FREEWATER OR 97862

Contact Name: **Project Name:** SOC & VOC

Comment:

CHROMIUM	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
CYANIDE IN DW MOSCOW EPA	M	EPA 335.4	7/25/2018	***Normal (~10 Days)***
FLUORIDE	M	EPA 300.0	7/25/2018	***Normal (~10 Days)***
MERCURY-ICPMS	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
NICKEL	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
NITRATE/N	M	EPA 300.0	7/25/2018	***Normal (~10 Days)***
NITRITE/N	M	EPA 300.0	7/25/2018	***Normal (~10 Days)***
OR IOC	M	N/A	7/25/2018	***Normal (~10 Days)***
SELENIUM	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
SODIUM ICP	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
THALLIUM	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
HERBICIDES 515.4 OR	M	EPA 515.4	7/25/2018	***Normal (~10 Days)***
OR Phase II SOC	M	N/A	7/25/2018	***Normal (~10 Days)***
PESTICIDES 505 OR	M	EPA 505	7/25/2018	***Normal (~10 Days)***
SEMIVOLATILES 525.2 OR	M	EPA 525.2	7/25/2018	***Normal (~10 Days)***
DIQUAT 549.2 OR	M	EPA 549.2	7/25/2018	***Normal (~10 Days)***
ENDOTHALL 548.1 OR	M	EPA 548.1	7/25/2018	***Normal (~10 Days)***
GLYPHOSATE 547 OR	M	EPA 547	7/25/2018	***Normal (~10 Days)***
OR Phase V SOC	M	N/A	7/25/2018	***Normal (~10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	11
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	No
Are VOC samples free of headspace?	N/A
Is there a trip blank to accompany VOC samples?	N/A
Labels and chain agree?	Yes

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State of Oregon Drinking Water Chain of Custody Record

(fill in shaded areas below)

180717 008 WWBW Last Due 7/25/2018
1st SAMP 7/12/2018 1st RCVD 7/13/2018
SOC & VOC

Water System: NA	Send Bill or Receipt To: ☐ Same as Water System Info Attn: MARIE COBB
System ID#: 11	Name: WALLA WALLA BASIN WATERSHED COUNCIL
Address:	Address: 810 S. Main St
City: State: Zip:	City: Milton-Freewater State: OR Zip: 97862
Phone:	Purchase Order #:
Fax:	Email: jim@nlwinc.com

Return Results By
☐ Phone ☐ Mail
☐ Fax ☑ Email

Rush Samples - Results Needed By
Date:
Time:

Sample Identification

Sampled At: Hose bib on wellhead dis-charge Sampled By: Patten / Mathis
Date Collected: 7/12/18 Time Collected: 13:00
Entry Point or Source ID: NA
Source Name(s): 5227

Sample Composition

Location: ☐ Source ☐ Distribution
Type: ☑ Raw ☐ Treated

Note: Composited samples will not be accepted for analyses.

Check Desired Analyses

- ☐ **Phase II SOC (all 5 listed below)**
  - ☐ Semivolatiles (525.2) x2
  - ☐ Herbicides (515.4) x1
  - ☐ Carbamates (531.2) x1
  - ☐ Pesticides (505) x2
  - ☐ EDB (504.1)
- ☐ **Phase V SOC (all 3 listed below)**
  - ☐ Diquat (549.2) x1
  - ☐ Endothall (548.1)
  - ☐ Glyphosate (547) x1
- ☐ **Disinfection Biproducts (2 below)**
  - ☐ TTHM (524.3) x2
  - ☐ HAA5 (SM6251B) x2
- ☐ **VOC (524.3)**

IOC's

- ☑ Nitrate
- ☐ Pb/Cu
- ☑ Full IOC, include Alkalinity, Corrosivity
- ☑ TOC
- ☐ Asbestos
- ☑ Gross Alpha } x1
- ☑ Gross Beta
- ☐ Radium 226 x1
- ☐ Radium 228 x1
- ☐ Total Radium (226 + 228)
- ☐ Uranium

Inspection Checklist (Anatek Use Only)

Preservative:			Sample Condition:		
Semivolatiles (525.2)	NaSulfite	☒ Yes ○ No	Received Intact?	Yes	No
Herbicides (515.4)	NaThiosulfate	○ Yes ☒ No	Labels & Chains Agree?	Yes	No
Carbamates (531.2)	$Na_2S_2O_3$ - $C_6H_7KO_7$	○ Yes ○ No	Containers Sealed?	Yes	No
Pesticides (505)	NaThiosulfate	☒ Yes ○ No	VOC Headspace?	Yes	No
EDB (504.1)	NaThiosulfate	○ Yes ○ No	Temperature (°C)		
Diquat (549.2)	NaThiosulfate	☒ Yes ○ No			
Endothall (548.1)	NaThiosulfate	☒ Yes ○ No	Date & Time:		
Glyphosate (547)	NaThiosulfate	☒ Yes ○ No			
THM's (524.3)	Maleic/Ascorbic Acid	☒ Yes ○ No	Inspected By:		
HAA5 (SM6251B)	NH_4Cl	☒ Yes ○ No			

OTHER:

☐ **DIOXIN** x1

Comments:
temp. 11.0 ice present IR1

Will instruct on 7/16/18

Customer:	Date/Time	Received By:	Date/Time	Shipped By:	Date/Time	Received By:
Jana Mathis	7/13/18 08:54	Julie Moore	08:54 7-13-18			

Samples submitted to Anatek Labs may be subcontacted to other accredited labs if necessary.
This message serves as notice of this possibility. Subcontracted analyses will be clearly noted on the analytical report.

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn:

Batch #: 180717034
Project Name: SOC & VOC

Analytical Results Report

Sample Number 180717034-001
Client Sample ID 50939
Matrix Drinking Water
Comments

Sampling Date 7/12/2018
Sampling Time 2:20 PM

Date/Time Received 7/13/2018 8:54 AM

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Alkalinity	104	mg CaCO3/L	2	7/20/2018 12:30:00 PM	RPU	SM2320B	
Antimony	ND	mg/L	0.001	7/23/2018 1:58:00 PM	HSW	EPA 200.8	
Arsenic	ND	mg/L	0.001	7/23/2018 1:58:00 PM	HSW	EPA 200.8	
Barium	0.0437	mg/L	0.001	7/23/2018 1:58:00 PM	HSW	EPA 200.8	
Beryllium	ND	mg/L	0.0003	7/23/2018 1:58:00 PM	HSW	EPA 200.8	
Bicarbonate	104	mg CaCO3/L	2	7/20/2018 12:30:00 PM	RPU	SM2320B	
Cadmium	ND	mg/L	0.001	7/23/2018 1:58:00 PM	HSW	EPA 200.8	
Calcium	16.3	mg/L	0.1	7/27/2018 5:15:00 PM	SDR	EPA 200.7	
Carbofuran	ND	mg/L	0.002	7/27/2018 7:10:00 AM	MER	EPA 531.2	
Oxamyl	ND	mg/L	0.004	7/27/2018 7:10:00 AM	MER	EPA 531.2	
Chloride	3.59	mg/L	0.1	7/14/2018 12:27:00 AM	MER	EPA 300.0	
Chromium	ND	mg/L	0.001	7/23/2018 1:58:00 PM	HSW	EPA 200.8	
Corrosivity	-0.0996			8/6/2018 8:51:00 AM	ETL	Calculation	
Cyanide	ND	mg/L	0.01	7/23/2018 1:30:00 PM	RPU	EPA 335.4	
Diquat	ND	mg/L	0.0008	7/17/2018 12:31:00 PM	MER	EPA 549.2	
Endothall	ND	mg/L	0.01	7/19/2018 9:53:00 PM	GPB	EPA 548.1	
Fluoride	0.432	mg/L	0.1	7/14/2018 12:27:00 AM	MER	EPA 300.0	
Glyphosate	ND	mg/L	0.01	7/23/2018 7:40:00 PM	MER	EPA 547	
Calcium	16.3	mg CaCO3/L	0.1	7/27/2018 5:15:00 PM	SDR	EPA 200.7	
Hardness	65.8	mg CaCO3/L	1	7/27/2018 5:15:00 PM	SDR	EPA 200.7	
Magnesium	6.07	mg CaCO3/L	0.1	7/27/2018 5:15:00 PM	SDR	EPA 200.7	
2,4,5-TP (Silvex)	ND	mg/L	0.0002	7/25/2018 8:55:00 AM	MAH	EPA 515.4	
2,4-D	ND	mg/L	0.0001	7/25/2018 8:55:00 AM	MAH	EPA 515.4	
Dalapon	ND	mg/L	0.001	7/25/2018 8:55:00 AM	MAH	EPA 515.4	
Dinoseb	ND	mg/L	0.0002	7/25/2018 8:55:00 AM	MAH	EPA 515.4	
Pentachlorophenol	ND	mg/L	4e-005	7/25/2018 8:55:00 AM	MAH	EPA 515.4	
Picloram	ND	mg/L	0.0001	7/25/2018 8:55:00 AM	MAH	EPA 515.4	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn:

Batch #: 180717034
Project Name: SOC & VOC

Analytical Results Report

Sample Number 180717034-001
Client Sample ID 50939
Matrix Drinking Water
Comments

Sampling Date 7/12/2018
Sampling Time 2:20 PM

Date/Time Received 7/13/2018 8:54 AM

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Iron	0.0549	mg/L	0.01	8/8/2018 1:48:00 PM	SDR	EPA 200.7	
Magnesium	6.07	mg/L	0.1	7/27/2018 5:15:00 PM	SDR	EPA 200.7	
Manganese	0.0261	mg/L	0.001	7/23/2018 1:58:00 PM	HSW	EPA 200.8	
Mercury-ICPMS	ND	mg/L	0.0001	7/23/2018 1:58:00 PM	HSW	EPA 200.8	
Nickel	ND	mg/L	0.001	7/23/2018 1:58:00 PM	HSW	EPA 200.8	
NO3/N	ND	mg/L	0.1	7/14/2018 12:27:00 AM	MER	EPA 300.0	
NO2/N	ND	mg/L	0.1	7/14/2018 12:27:00 AM	MER	EPA 300.0	
Chlordane	ND	mg/L	0.0004	7/24/2018 3:50:00 AM	GPB	EPA 505	
Endrin	ND	mg/L	2e-005	7/24/2018 3:50:00 AM	GPB	EPA 505	
gamma-BHC (Lindane)	ND	mg/L	4e-005	7/24/2018 3:50:00 AM	GPB	EPA 505	
Heptachlor	ND	mg/L	8e-005	7/24/2018 3:50:00 AM	GPB	EPA 505	
Heptachlor epoxide	ND	mg/L	4e-005	7/24/2018 3:50:00 AM	GPB	EPA 505	
Methoxychlor	ND	mg/L	0.0002	7/24/2018 3:50:00 AM	GPB	EPA 505	
PCBs	ND	mg/L	0.0005	7/24/2018 3:50:00 AM	GPB	EPA 505	
Toxaphene	ND	mg/L	0.002	7/24/2018 3:50:00 AM	GPB	EPA 505	
pH	7.80	ph Units		7/20/2018 12:30:00 PM	RPU	SM 4500pH-B	
PO4/P	ND	mg/L	0.1	7/14/2018 12:27:00 AM	MER	EPA 300.0	
Potassium	4.86	mg/L	0.1	7/27/2018 5:15:00 PM	SDR	EPA 200.7	
Selenium	ND	mg/L	0.001	7/23/2018 1:58:00 PM	HSW	EPA 200.8	
Alachlor	ND	mg/L	0.0004	7/25/2018 7:05:00 AM	BMM	EPA 525.2	
Atrazine	ND	mg/L	0.0002	7/25/2018 7:05:00 AM	BMM	EPA 525.2	
Benzo[a]pyrene	ND	mg/L	2e-005	7/25/2018 7:05:00 AM	BMM	EPA 525.2	
bis(2-Ethylhexyl)phthalate	ND	mg/L	0.0006	7/25/2018 7:05:00 AM	BMM	EPA 525.2	
bis-2(ethylhexyl)adipate	ND	mg/L	0.0002	7/25/2018 7:05:00 AM	BMM	EPA 525.2	
Hexachlorobenzene	ND	mg/L	0.0002	7/25/2018 7:05:00 AM	BMM	EPA 525.2	
Hexachlorocyclopentadiene	ND	mg/L	0.0002	7/25/2018 7:05:00 AM	BMM	EPA 525.2	
Simazine	ND	mg/L	0.00015	7/25/2018 7:05:00 AM	BMM	EPA 525.2	
Silica (as SiO2)	63.1	mg/L	0.1	7/27/2018 5:15:00 PM	SDR	EPA 200.7	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
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Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn:

Batch #: 180717034
Project Name: SOC & VOC

Analytical Results Report

Sample Number 180717034-001
Client Sample ID 50939
Matrix Drinking Water
Comments

Sampling Date 7/12/2018
Sampling Time 2:20 PM

Date/Time Received 7/13/2018 8:54 AM

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Silicon	29.5	mg/L	0.1	7/27/2018 5:15:00 PM	SDR	EPA 200.7	
Sodium	17.4	mg/L	0.1	7/27/2018 5:15:00 PM	SDR	EPA 200.7	
TDS	175	mg/L	50	7/19/2018 4:00:00 PM	RPU	SM 2540C	
Sulfate	4.38	mg/L	0.1	7/19/2018 10:38:00 PM	MER	EPA 300.0	
Thallium	ND	mg/L	0.001	7/23/2018 1:58:00 PM	HSW	EPA 200.8	
TKN	ND	mg/L	0.5	7/24/2018 10:30:00 AM	RPU	SM4500NORGC	
TOC	0.140	mg/L	0.1	7/27/2018 2:30:00 PM	RPR	SM 5310B	
Zinc	ND	mg/L	0.001	7/23/2018 1:58:00 PM	HSW	EPA 200.8	

Authorized Signature

Todd Taruscio, Lab Manager

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
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Login Report

Customer Name: WALLA WALLA BASIN WATERSHED COUNCIL
810 S. MAIN RD
MILTON-FREEWATER OR 97862

Order ID: 180717034
Order Date: 7/17/2018

Contact Name:

Project Name: SOC & VOC

Comment:

Sample #: 180717034-001 **Customer Sample #:** 50939

Recv'd: ☑ **Matrix:** Drinking Water **Collector:**

Date Collected: 7/12/2018

Quantity: 15 **Date Received:** 7/13/2018 8:54:00 AM

Time Collected: 2:20 PM

Comment:

Test	Lab	Method	Due Date	Priority
ALKALINITY	M	SM2320B	7/25/2018	***Normal (~10 Days)***
BICARBONATE	M	SM2320B	7/25/2018	***Normal (~10 Days)***
CALCIUM ICP	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
CARBAMATE 531.2 OR	M	EPA 531.2	7/25/2018	***Normal (~10 Days)***
CHLORIDE	M	EPA 300.0	7/25/2018	***Normal (~10 Days)***
Corrosivity	M	Calculation	7/25/2018	***Normal (~10 Days)***
HARDNESS by EPA 200.7	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
IRON ICP	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
MAGNESIUM ICP	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
MANGANESE ICP	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
pH	M	SM 4500pH-B	7/25/2018	***Normal (~10 Days)***
PHOSPHATE/P	M	EPA 300.0	7/25/2018	***Normal (~10 Days)***
POTASSIUM ICP	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
SILICON ICP	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
SOLIDS - TDS	M	SM 2540C	7/25/2018	***Normal (~10 Days)***
SULFATE	M	EPA 300.0	7/25/2018	***Normal (~10 Days)***
TKN	M	SM4500NORGC	7/25/2018	***Normal (~10 Days)***
ZINC	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
ANTIMONY	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
ARSENIC	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
BARIUM	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
BERYLLIUM	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
CADMIUM	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***

Customer Name: WALLA WALLA BASIN WATERSHED COUNCIL **Order ID:** 180717034

810 S. MAIN RD **Order Date:** 7/17/2018

MILTON-FREEWATER OR 97862

Contact Name: **Project Name:** SOC & VOC

Comment:

CHROMIUM	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
CYANIDE IN DW MOSCOW EPA	M	EPA 335.4	7/25/2018	***Normal (~10 Days)***
FLUORIDE	M	EPA 300.0	7/25/2018	***Normal (~10 Days)***
MERCURY-ICPMS	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
NICKEL	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
NITRATE/N	M	EPA 300.0	7/25/2018	***Normal (~10 Days)***
NITRITE/N	M	EPA 300.0	7/25/2018	***Normal (~10 Days)***
OR IOC	M	N/A	7/25/2018	***Normal (~10 Days)***
SELENIUM	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
SODIUM ICP	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
THALLIUM	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
HERBICIDES 515.4 OR	M	EPA 515.4	7/25/2018	***Normal (~10 Days)***
OR Phase II SOC	M	N/A	7/25/2018	***Normal (~10 Days)***
PESTICIDES 505 OR	M	EPA 505	7/25/2018	***Normal (~10 Days)***
SEMIVOLATILES 525.2 OR	M	EPA 525.2	7/25/2018	***Normal (~10 Days)***
DIQUAT 549.2 OR	M	EPA 549.2	7/25/2018	***Normal (~10 Days)***
ENDOTHALL 548.1 OR	M	EPA 548.1	7/25/2018	***Normal (~10 Days)***
GLYPHOSATE 547 OR	M	EPA 547	7/25/2018	***Normal (~10 Days)***
OR Phase V SOC	M	N/A	7/25/2018	***Normal (~10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	12
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	N/A
Is there a trip blank to accompany VOC samples?	N/A
Labels and chain agree?	Yes

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State of Oregon Drinking Water Chain of Custody Record

(fill in shaded areas below)

180717 034 WWBW Last Due 7/25/2018
1st SAMP 7/12/2018 1st RCVD 7/13/2018
SOC & VOC

Water System: NA		Send Bill or Receipt To: ☐ Same as Water System Info Attn: Marie Cobb	**Return Results By**
System ID#:		Name: Walla Walla Basin Watershed Council	☐ Phone ☐ Mail ☐ Fax ☑ Email
Address:		Address: 810 S. Main St	
City:	State: Zip:	City: Milton-Freewater State: OR Zip: 97862	**Rush Samples - Results Needed By**
Phone:		Purchase Order #:	Date:
Fax:		Email: jim@nlwinc.com	Time:

Sample Identification

Sampled At: Hose bib on wellhead discharge
Sampled By: Patton/Mathieu
Date Collected: 7/12/18
Time Collected: 14:20
Entry Point or Source ID: NA
Source Name(s): 50939

Sample Composition

Location: ☐ Source ☐ Distribution
Type: ☑ Raw ☐ Treated

Note: Composited samples will not be accepted for analyses.

Check Desired Analyses

- ☐ **Phase II SOC (all 5 listed below)**
  - ☐ Semivolatiles (525.2) x 2
  - ☐ Herbicides (515.4) x 1
  - ☐ Carbamates (531.2)
  - ☐ Pesticides (505) x 2
  - ☐ EDB (504.1)
- ☐ **Phase V SOC (all 3 listed below)**
  - ☐ Diquat (549.2) x 1
  - ☐ Endothall (548.1)
  - ☐ Glyphosate (547) x 1
- ☐ **Disinfection Biproducts (2 below)**
  - ☐ TTHM (524.3) x 2
  - ☐ HAA5 (SM6251B) x 2
- ☐ **VOC (524.3)**

IOC's

- ☑ Nitrate
- ☐ Pb/Cu
- ☑ Full IOC include Alkalinity & Corrosivity
- ☑ TOC
- ☐ Asbestos
- ☑ Gross Alpha
- ☑ Gross Beta
- ☐ Radium 226
- ☐ Radium 228
- ☐ Total Radium (226 + 228)
- ☐ Uranium

Will instruct on 7/16/18

Inspection Checklist (Anatek Use Only)

Preservative:				Sample Condition:		
Semivolatiles (525.2)	NaSulfite	☒ Yes	○ No	Received Intact?	Yes	No
Herbicides (515.4)	NaThiosulfate	○ Yes	☒ No	Labels & Chains Agree?	Yes	No
Carbamates (531.2)	$Na_2S_2O_3$ - $C_6H_7KO_7$	○ Yes	○ No	Containers Sealed?	Yes	No
Pesticides (505)	NaThiosulfate	☒ Yes	○ No	VOC Headspace?	Yes	No
EDB (504.1)	NaThiosulfate	○ Yes	○ No	Temperature (°C)		
Diquat (549.2)	NaThiosulfate	☒ Yes	○ No			
Endothall (548.1)	NaThiosulfate	☒ Yes	○ No	Date & Time:		
Glyphosate (547)	NaThiosulfate	☒ Yes	○ No			
THM's (524.3)	Maleic/Ascorbic Acid	☒ Yes	○ No	Inspected By:		
HAA5 (SM6251B)	NH_4Cl	☒ Yes	○ No			

OTHER:

☐ **DIOXIN**

Comments:
temp. 12.0 ice present IR1

Customer:	Date/Time	Received By:	Date/Time	Shipped By:	Date/Time	Received By:
Jamin Mathieu	7/13/18 8:54	Julie Moore	7-13-18 08:54			

Samples submitted to Anatek Labs may be subcontacted to other accredited labs if necessary.
This message serves as notice of this possibility. Subcontracted analyses will be clearly noted on the analytical report.

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Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn:

Batch #: 180717035
Project Name: IOC

Analytical Results Report

Sample Number 180717035-001
Client Sample ID 5530
Matrix Drinking Water
Comments

Sampling Date 7/12/2018
Sampling Time 3:30 PM

Date/Time Received 7/13/2018 8:54 AM

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Alkalinity	106	mg CaCO3/L	2	7/20/2018 12:30:00 PM	RPU	SM2320B	
Antimony	ND	mg/L	0.001	7/23/2018 1:50:00 PM	HSW	EPA 200.8	
Arsenic	ND	mg/L	0.001	7/23/2018 1:50:00 PM	HSW	EPA 200.8	
Barium	0.0403	mg/L	0.001	7/23/2018 1:50:00 PM	HSW	EPA 200.8	
Beryllium	ND	mg/L	0.0003	7/23/2018 1:50:00 PM	HSW	EPA 200.8	
Bicarbonate	106	mg CaCO3/L	2	7/20/2018 12:30:00 PM	RPU	SM2320B	
Cadmium	ND	mg/L	0.001	7/23/2018 1:50:00 PM	HSW	EPA 200.8	
Calcium	17.5	mg/L	0.1	7/27/2018 5:08:00 PM	SDR	EPA 200.7	
Chloride	6.71	mg/L	0.1	7/14/2018 12:06:00 AM	MER	EPA 300.0	
Chromium	ND	mg/L	0.001	7/23/2018 1:50:00 PM	HSW	EPA 200.8	
Corrosivity	-0.103			8/6/2018 8:48:00 AM	ETL	Calculation	
Cyanide	ND	mg/L	0.01	7/23/2018 1:30:00 PM	RPU	EPA 335.4	
Fluoride	0.421	mg/L	0.1	7/14/2018 12:06:00 AM	MER	EPA 300.0	
Calcium	17.5	mg CaCO3/L	0.1	7/27/2018 5:08:00 PM	SDR	EPA 200.7	
Hardness	71.5	mg CaCO3/L	1	7/27/2018 5:08:00 PM	SDR	EPA 200.7	
Magnesium	6.74	mg CaCO3/L	0.1	7/27/2018 5:08:00 PM	SDR	EPA 200.7	
Iron	0.0293	mg/L	0.01	8/8/2018 1:51:00 PM	SDR	EPA 200.7	
Magnesium	6.74	mg/L	0.1	7/27/2018 5:08:00 PM	SDR	EPA 200.7	
Manganese	0.0122	mg/L	0.001	7/23/2018 1:50:00 PM	HSW	EPA 200.8	
Mercury-ICPMS	ND	mg/L	0.0001	7/23/2018 1:50:00 PM	HSW	EPA 200.8	
Nickel	ND	mg/L	0.001	7/23/2018 1:50:00 PM	HSW	EPA 200.8	
NO3/N	ND	mg/L	0.1	7/14/2018 12:06:00 AM	MER	EPA 300.0	
NO2/N	ND	mg/L	0.1	7/14/2018 12:06:00 AM	MER	EPA 300.0	
pH	7.80	ph Units		7/20/2018 12:30:00 PM	RPU	SM 4500pH-B	
PO4/P	ND	mg/L	0.1	7/14/2018 12:06:00 AM	MER	EPA 300.0	
Potassium	5.05	mg/L	0.1	7/27/2018 5:08:00 PM	SDR	EPA 200.7	
Selenium	ND	mg/L	0.001	7/23/2018 1:50:00 PM	HSW	EPA 200.8	
Silica (as SiO2)	66.3	mg/L	0.1	7/27/2018 5:08:00 PM	SDR	EPA 200.7	
Silicon	31.0	mg/L	0.1	7/27/2018 5:08:00 PM	SDR	EPA 200.7	
Sodium	19.2	mg/L	0.1	7/27/2018 5:08:00 PM	SDR	EPA 200.7	
TDS	193	mg/L	50	7/19/2018 4:00:00 PM	RPU	SM 2540C	
Sulfate	6.57	mg/L	0.1	7/19/2018 11:00:00 PM	MER	EPA 300.0	
Thallium	ND	mg/L	0.001	7/23/2018 1:50:00 PM	HSW	EPA 200.8	
TKN	ND	mg/L	0.5	7/24/2018 10:30:00 AM	RPU	SM4500NORGC	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn:

Batch #: 180717035
Project Name: IOC

Analytical Results Report

Sample Number	180717035-001	**Sampling Date**	7/12/2018	**Date/Time Received**	7/13/2018	8:54 AM
Client Sample ID	5530	**Sampling Time**	3:30 PM			
Matrix	Drinking Water					
Comments						

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
TOC	0.158	mg/L	0.1	7/27/2018 2:48:00 PM	RPR	SM 5310B	
Zinc	0.00408	mg/L	0.001	7/23/2018 1:50:00 PM	HSW	EPA 200.8	

Authorized Signature

Todd Taruscio, Lab Manager

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Login Report

Customer Name: WALLA WALLA BASIN WATERSHED COUNCIL
810 S. MAIN RD
MILTON-FREEWATER OR 97862

Order ID: 180717035
Order Date: 7/17/2018

Contact Name:

Project Name: IOC

Comment:

Sample #: 180717035-001 **Customer Sample #:** 5530

Recv'd: ☑ **Matrix:** Drinking Water **Collector:**

Date Collected: 7/12/2018

Quantity: 2 **Date Received:** 7/13/2018 8:54:00 AM

Time Collected: 3:30 PM

Comment:

Test	Lab	Method	Due Date	Priority
ALKALINITY	M	SM2320B	7/25/2018	***Normal (~10 Days)***
BICARBONATE	M	SM2320B	7/25/2018	***Normal (~10 Days)***
CALCIUM ICP	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
CHLORIDE	M	EPA 300.0	7/25/2018	***Normal (~10 Days)***
Corrosivity	M	Calculation	7/25/2018	***Normal (~10 Days)***
HARDNESS by EPA 200.7	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
IRON ICP	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
MAGNESIUM ICP	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
MANGANESE ICP	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
pH	M	SM 4500pH-B	7/25/2018	***Normal (~10 Days)***
PHOSPHATE/P	M	EPA 300.0	7/25/2018	***Normal (~10 Days)***
POTASSIUM ICP	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
SILICON ICP	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
SOLIDS - TDS	M	SM 2540C	7/25/2018	***Normal (~10 Days)***
SULFATE	M	EPA 300.0	7/25/2018	***Normal (~10 Days)***
TKN	M	SM4500NORGC	7/25/2018	***Normal (~10 Days)***
ZINC	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
ANTIMONY	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
ARSENIC	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
BARIUM	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
BERYLLIUM	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
CADMIUM	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
CHROMIUM	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***

Customer Name: WALLA WALLA BASIN WATERSHED COUNCIL
810 S. MAIN RD
MILTON-FREEWATER OR 97862

Order ID: 180717035
Order Date: 7/17/2018

Contact Name:

Project Name: IOC

Comment:

CYANIDE IN DW MOSCOW EPA	M	EPA 335.4	7/25/2018	***Normal (~10 Days)***
FLUORIDE	M	EPA 300.0	7/25/2018	***Normal (~10 Days)***
MERCURY-ICPMS	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
NICKEL	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
NITRATE/N	M	EPA 300.0	7/25/2018	***Normal (~10 Days)***
NITRITE/N	M	EPA 300.0	7/25/2018	***Normal (~10 Days)***
OR IOC	M	N/A	7/25/2018	***Normal (~10 Days)***
SELENIUM	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***
SODIUM ICP	M	EPA 200.7	7/25/2018	***Normal (~10 Days)***
THALLIUM	M	EPA 200.8	7/25/2018	***Normal (~10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	10.5
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	N/A
Is there a trip blank to accompany VOC samples?	N/A
Labels and chain agree?	Yes
Total number of containers?	2

180717 035 WWBW Last Due 7/25/2018
1st SAMP 7/12/2018 1st RCVD 7/13/2018
IOC

Anatek Labs, Inc
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State of Oregon Drinking Water Chain of Custody Record

(fill in shaded areas below)

Water System: NA	Send Bill or Receipt To: ☐ Same as Water System Info Attn: Marie Cobb
System ID#:	Name: Walla Walla Basin Watershed Council
Address:	Address: 810 E. Main St.
City: State: Zip:	City: Milton-Freewater, OR State: Zip: 97862
Phone:	Purchase Order #: On-Farm ASR/ARR
Fax:	Email: jim@nlwinc.com

Return Results By
☐ Phone ☐ Mail ☐ Fax ☑ Email

Rush Samples - Results Needed By
Date:
Time:

Sample Identification

Sampled At: Hose bib on wellhead discharge Sampled By: Patten/Mathias
Date Collected: 7/12/18 Time Collected: 15:30
Entry Point or Source ID: NA
Source Name(s): 5530

Sample Composition

Location: ☐ Source ☐ Distribution
Type: ☑ Raw ☐ Treated

Note: Composited samples will not be accepted for analyses.

Check Desired Analyses

- ☐ **Phase II SOC (all 5 listed below)**
  - ☐ Semivolatiles (525.2)
  - ☐ Herbicides (515.4)
  - ☐ Carbamates (531.2)
  - ☐ Pesticides (505)
  - ☐ EDB (504.1)
- ☐ **Phase V SOC (all 3 listed below)**
  - ☐ Diquat (549.2)
  - ☐ Endothall (548.1)
  - ☐ Glyphosate (547)
- ☐ **Disinfection Biproducts (2 below)**
  - ☐ TTHM (524.3)
  - ☐ HAA5 (SM6251B)
- ☐ **VOC (524.3)**
- **IOC's**
  - ☑ Nitrate
  - ☐ Pb/Cu
  - ☑ Full IOC include Alkalinity, corrosivity
  - ☑ TOC
  - ☐ Asbestos
  - ☑ Gross Alpha
  - ☑ Gross Beta
  - ☐ Radium 226
  - ☐ Radium 228
  - ☐ Total Radium (226 + 228)
  - ☐ Uranium

will instruct on 7/16/18

Inspection Checklist (Anatek Use Only)

Preservative:				Sample Condition:		
Semivolatiles (525.2)	NaSulfite	○ Yes	○ No	Received Intact?	Yes	No
Herbicides (515.4)	NaThiosulfate	○ Yes	○ No	Labels & Chains Agree?	Yes	No
Carbamates (531.2)	$Na_2S_2O_3$ - $C_6H_7KO_7$	○ Yes	○ No	Containers Sealed?	Yes	No
Pesticides (505)	NaThiosulfate	○ Yes	○ No	VOC Headspace?	Yes	No
EDB (504.1)	NaThiosulfate	○ Yes	○ No	Temperature (°C)	10.5	
Diquat (549.2)	NaThiosulfate	○ Yes	○ No	Date & Time:		
Endothall (548.1)	NaThiosulfate	○ Yes	○ No			
Glyphosate (547)	NaThiosulfate	○ Yes	○ No			
THM's (524.3)	Maleic/Ascorbic Acid	○ Yes	○ No	Inspected By:		
HAA5 (SM6251B)	NH_4Cl	○ Yes	○ No			

OTHER:

☐ **DIOXIN**

Comments:
temp. 10.5 (ice present) IR1

Customer:	Date/Time	Received By:	Date/Time	Shipped By:	Date/Time	Received By:
Jamie Mathias	7/13/18 8:54	Julie Moore	7-13-18 08:54			

Samples submitted to Anatek Labs may be subcontacted to other accredited labs if necessary.
This message serves as notice of this possibility. Subcontracted analyses will be clearly noted on the analytical report.

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Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn:

Batch #: 180810018
Project Name: JIM MATHIEW/ NLW

Analytical Results Report

Sample Number	180810018-001	**Sampling Date**	8/9/2018	**Date/Time Received**	8/10/2018	11:45 AM	
Client Sample ID	WWRD-1A	**Sampling Time**	2:50 PM	**Extraction Date**	08/13/2018		
Matrix	Water						
Comments							

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
TOC	0.734	mg/L	0.1	8/13/2018 8:28:00 PM	RPR	SM 5310B	

Sample Number	180810018-002	**Sampling Date**	8/9/2018	**Date/Time Received**	8/10/2018	11:45 AM	
Client Sample ID	WWRD-1B	**Sampling Time**	2:52 PM	**Extraction Date**	08/13/2018		
Matrix	Water						
Comments							

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
TOC	0.738	mg/L	0.1	8/13/2018 8:48:00 PM	RPR	SM 5310B	

Authorized Signature

Todd Taruscio, Lab Manager

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Login Report

Customer Name: WALLA WALLA BASIN WATERSHED COUNCIL
810 S. MAIN RD
MILTON-FREEWATER OR 97862

Order ID: 180810018
Order Date: 8/10/2018

Contact Name:

Project Name: JIM MATHIEW/ NLW

Comment:

Sample #: 180810018-001 **Customer Sample #:** WWRD-1A

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 8/9/2018
Quantity: 1 **Date Received:** 8/10/2018 11:45:00 AM **Time Collected:** 2:50 PM
Comment:

Test	Lab	Method	Due Date	Priority
TOC - MOSC	M	SM 5310B	8/22/2018	***Normal (~10 Days)***

Sample #: 180810018-002 **Customer Sample #:** WWRD-1B

Recv'd: ☑ **Matrix:** Water **Collector:** **Date Collected:** 8/9/2018
Quantity: 1 **Date Received:** 8/10/2018 11:45:00 AM **Time Collected:** 2:52 PM
Comment:

Test	Lab	Method	Due Date	Priority
TOC - MOSC	M	SM 5310B	8/22/2018	***Normal (~10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	3.7
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	Yes
Is there a trip blank to accompany VOC samples?	No
Labels and chain agree?	Yes
Total number of containers?	2

180810 018 WWBW Last Due 8/22/2018
1st SAMP 8/9/2018 1st RCVD 8/10/2018
JIM MATHIEW/ NLW

Anatek Labs, Inc.

Chain of Custody Record

1282 Alturas Drive, Moscow ID 83843 (208) 883-2839 FAX 882-9246
504 E Sprague Ste D, Spokane WA 99202 (509) 838-3999 FAX 838-4433

Company Name: WWBWC	Project Manager: Marie Cobb / WWBWC
Address: 810 S. Main St	Project Name & #: Jim Mathieu / NLW
City: Mitlon-Freewater State: OR Zip: 97862	Email Address: jim@nlwinc.com
Phone:	Purchase Order #:
Fax:	Sampler Name & phone:

Turn Around Time & Reporting

Please refer to our normal turn around times at:
http://www.anateklabs.com/services/guidelines/reporting.asp

__Normal __Next Day* __2nd Day* __Other*_____
*All rush order requests must be prior approved.
__Phone __Mail __Fax __Email

Provide Sample Description / **List Analyses Requested** / **Note Special Instructions/Comments**

Lab ID	Sample Identification	Sampling Date/Time	Matrix	# of Containers	Sample Volume	Preservative: TOC
	WWRD-1A	8/9/18 14:50	H2O	1	40	✓
	" -1B	" 14:52	H2O	1	40	✓

Inspection Checklist

Received Intact?	(Y)	N
Labels & Chains Agree?	(Y)	N
Containers Sealed?	(Y)	N
VOC Head Space?	Y	(N)

UPS

	Printed Name	Signature	Company	Date	Time
Relinquished by	Jim Mathieu	Jim Mathieu	NLW	8/9/18	15:00
Received by	Brianne Peterson	B Peterson	Anatek	8/10/18	1145
Relinquished by					
Received by					
Relinquished by					
Received by					

Temperature (°C): 3.7 - 18.3
Preservative: HCL
Date & Time: 8/10/18 1145
Inspected By: BP

Anatek Labs, Inc.

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504 E Sprague Ste. D • Spokane WA 99202 • (509) 838-3999 • Fax (509) 838-4433 • email spokane@anateklabs.com

Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn: MARIE COBB

Batch #: 180813003
Project Name: IOC / TOC

Analytical Results Report

Sample Number 180813003-001
Client Sample ID 5239 / WELL HEAD
Matrix Drinking Water
Comments

Sampling Date 8/9/2018
Sampling Time 10:45 AM

Date/Time Received 8/10/2018 11:45 AM

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Antimony	ND	mg/L	0.001	8/22/2018 1:04:00 PM	HSW	EPA 200.8	
Arsenic	ND	mg/L	0.001	8/20/2018 5:24:00 PM	HSW	EPA 200.8	
Barium	0.0400	mg/L	0.001	8/20/2018 5:24:00 PM	HSW	EPA 200.8	
Beryllium	ND	mg/L	0.0003	8/22/2018 1:04:00 PM	HSW	EPA 200.8	
Bicarbonate	121	mg CaCO3/L	2	8/22/2018 10:30:00 AM	LAC	SM2320B	
Cadmium	ND	mg/L	0.001	8/20/2018 5:24:00 PM	HSW	EPA 200.8	
Calcium	31.0	mg/L	0.1	8/15/2018 12:01:00 PM	SDR	EPA 200.7	
Chloride	4.38	mg/L	1	8/16/2018 1:55:00 AM	MER	EPA 300.0	
Chromium	0.00117	mg/L	0.001	8/20/2018 5:24:00 PM	HSW	EPA 200.8	
Cyanide	ND	mg/L	0.01	8/15/2018 10:15:00 AM	RPU	EPA 335.4	
Fluoride	ND	mg/L	1	8/16/2018 1:55:00 AM	MER	EPA 300.0	
Iron	ND	mg/L	0.01	8/15/2018 12:01:00 PM	SDR	EPA 200.7	
Magnesium	11.8	mg/L	0.1	8/15/2018 12:01:00 PM	SDR	EPA 200.7	
Manganese	ND	mg/L	0.01	8/15/2018 12:01:00 PM	SDR	EPA 200.7	
Mercury-ICPMS	ND	mg/L	0.0001	8/20/2018 5:24:00 PM	HSW	EPA 200.8	
Nickel	ND	mg/L	0.001	8/20/2018 5:24:00 PM	HSW	EPA 200.8	
NO3/N	3.20	mg/L	1	8/16/2018 1:55:00 AM	MER	EPA 300.0	
NO2/N	ND	mg/L	1	8/16/2018 1:55:00 AM	MER	EPA 300.0	
Potassium	4.41	mg/L	0.1	8/15/2018 12:01:00 PM	SDR	EPA 200.7	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn: MARIE COBB

Batch #: 180813003
Project Name: IOC / TOC

Analytical Results Report

Sample Number 180813003-001
Client Sample ID 5239 / WELL HEAD
Matrix Drinking Water
Comments

Sampling Date 8/9/2018
Sampling Time 10:45 AM

Date/Time Received 8/10/2018 11:45 AM

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Selenium	ND	mg/L	0.001	8/20/2018 5:24:00 PM	HSW	EPA 200.8	
Silica (as SiO2)	38.5	mg/L	0.1	8/15/2018 12:01:00 PM	SDR	EPA 200.7	
Silicon	18.0	mg/L	0.1	8/15/2018 12:01:00 PM	SDR	EPA 200.7	
Sodium	10.9	mg/L	0.1	8/15/2018 12:01:00 PM	SDR	EPA 200.7	
TDS	214	mg/L	50	8/21/2018 6:00:00 PM	RPU	SM 2540C	
Sulfate	12.8	mg/L	1	8/16/2018 1:55:00 AM	MER	EPA 300.0	
Thallium	ND	mg/L	0.001	8/20/2018 5:24:00 PM	HSW	EPA 200.8	
TOC	0.455	mg/L	0.1	8/13/2018 11:58:00 PM	RPR	SM 5310B	
Turbidity	ND	NTU	0.1	8/21/2018 9:00:00 AM	RPU	EPA 180.1	

Authorized Signature

Todd Taruscio, Lab Manager

MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit

The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

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Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Login Report

Customer Name: WALLA WALLA BASIN WATERSHED COUNCIL
810 S. MAIN RD
MILTON-FREEWATER OR 97862

Order ID: 180813003
Order Date: 8/13/2018

Contact Name: MARIE COBB
Project Name: IOC / TOC

Comment:

Sample #: 180813003-001 **Customer Sample #:** 5239 / WELL HEAD

Recv'd: ☑ **Matrix:** Drinking Water **Collector:** LUKE / JIM **Date Collected:** 8/9/2018
Quantity: 3 **Date Received:** 8/10/2018 11:45:00 AM **Time Collected:** 10:45 AM
Comment:

Test	Lab	Method	Due Date	Priority
BICARBONATE	M	SM2320B	8/22/2018	***Normal (~10 Days)***
CALCIUM ICP	M	EPA 200.7	8/22/2018	***Normal (~10 Days)***
CHLORIDE	M	EPA 300.0	8/22/2018	***Normal (~10 Days)***
IRON ICP	M	EPA 200.7	8/22/2018	***Normal (~10 Days)***
MAGNESIUM ICP	M	EPA 200.7	8/22/2018	***Normal (~10 Days)***
MANGANESE ICP	M	EPA 200.7	8/22/2018	***Normal (~10 Days)***
POTASSIUM ICP	M	EPA 200.7	8/22/2018	***Normal (~10 Days)***
SILICON ICP	M	EPA 200.7	8/22/2018	***Normal (~10 Days)***
SOLIDS - TDS	M	SM 2540C	8/22/2018	***Normal (~10 Days)***
SULFATE	M	EPA 300.0	8/22/2018	***Normal (~10 Days)***
TOC - MOSC	M	SM 5310B	8/22/2018	***Normal (~10 Days)***
TURBIDITY	M	EPA 180.1	8/22/2018	***Normal (~10 Days)***
ANTIMONY	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***
ARSENIC	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***
BARIUM	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***
BERYLLIUM	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***
CADMIUM	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***
CHROMIUM	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***
CYANIDE IN DW MOSCOW EPA	M	EPA 335.4	8/22/2018	***Normal (~10 Days)***
FLUORIDE	M	EPA 300.0	8/22/2018	***Normal (~10 Days)***
MERCURY-ICPMS	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***
NICKEL	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***
NITRATE/N	M	EPA 300.0	8/22/2018	***Normal (~10 Days)***

Customer Name: WALLA WALLA BASIN WATERSHED COUNCIL
Order ID: 180813003

810 S. MAIN RD
Order Date: 8/13/2018

MILTON-FREEWATER OR 97862

Contact Name: MARIE COBB
Project Name: IOC / TOC

Comment:

NITRITE/N	M	EPA 300.0	8/11/2018	***Normal (~10 Days)***
OR IOC	M	N/A	8/22/2018	***Normal (~10 Days)***
SELENIUM	M	EPA 200.8	8/20/2018	***Normal (~10 Days)***
SODIUM ICP	M	EPA 200.7	8/20/2018	***Normal (~10 Days)***
THALLIUM	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	3.7
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	N/A
Is there a trip blank to accompany VOC samples?	N/A
Labels and chain agree?	Yes

180813 003 WWBW Last Due 8/22/2018
1st SAMP 8/9/2018 1st RCVD 8/10/2018
IOC / TOC

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State of Oregon Drinking Water Chain of Custody Record

(fill in shaded areas below)

Water System:	Send Bill or Receipt To: ☐ Same as Water System Info — Marie Cobb	**Return Results By**
System ID#: 5239	Name: Walla Walla Basin Watershed Council	☐ Phone ☐ Mail ☐ Fax ☐ Email
Address:	Address: 860 S Main St	
City: State: Zip:	City: Milton-Freewater State: OR Zip: 97862	**Rush Samples - Results Needed By**
Phone:	Purchase Order #:	Date:
Fax:	Email:	Time:

Sample Identification

Sampled At: Wellhead — Sampled By: ~~Kenneth~~ Luke Jim
Date Collected: 8/9/18 — Time Collected: 10:45
Entry Point or Source ID:
Source Name(s):

Sample Composition

Location: ☐ Source ☐ Distribution
Type: ☐ Raw ☐ Treated

Note: Composited samples will not be accepted for analyses.

Check Desired Analyses

- ☑ **Phase II SOC (all 5 listed below)**
  - ☐ Semivolatiles (525.2)
  - ☐ Herbicides (515.4)
  - ☐ Carbamates (531.2)
  - ☐ Pesticdes (505)
  - ☐ EDB (504.1)
- ☑ **Phase V SOC (all 3 listed below)**
  - ☐ Diquat (549.2)
  - ☐ Endothall (548.1)
  - ☐ Glyphosate (547)
- ☐ **Disinfection Byproducts (2 below)**
  - ☐ TTHM (524.3)
  - ☐ HAA5 (SM6251B)
- ☐ **VOC (524.3)**

IOC's

- ☐ Nitrate
- ☐ Pb/Cu
- ☑ Full IOC
- ☑ TOC x2
- ☐ Asbestos
- ☐ Gross Alpha
- ☐ Gross Beta
- ☐ Radium 226
- ☐ Radium 228
- ☐ Total Radium (226 + 228)
- ☐ Uranium

x2 trip - MM started

Inspection Checklist (Anatek Use Only)

	Preservative:		
Semivolatiles (525.2)	NaSulfite	☒ Yes	○ No
Herbicides (515.4)	NaThiosulfate	○ Yes	○ No
Carbamates (531.2)	$Na_2S_2O_3$ - $C_6H_7KO_7$	○ Yes	○ No
Pesticides (505)	NaThiosulfate	○ Yes	○ No
EDB (504.1)	NaThiosulfate	○ Yes	○ No
Diquat (549.2)	NaThiosulfate	☒ Yes	○ No
Endothall (548.1)	NaThiosulfate	○ Yes	○ No
Glyphosate (547)	NaThiosulfate	○ Yes	○ No
THM's (524.3)	Maleic/Ascorbic Acid	○ Yes	○ No
HAA5 (SM6251B)	NH_4Cl	☒ Yes	○ No

Sample Condition:		
Received Intact?	Yes	No
Labels & Chains Agree?	Yes	No
Containers Sealed?	Yes	No
VOC Headspace?	Yes	No
Temperature (°C)	3.7 IR-3	
Date & Time:	8/10/18 1145	
Inspected By:	Brianne Peterson	

VTS

OTHER:

☐ **DIOXIN**

Comments:

Customer:	Date/Time	Received By:	Date/Time	Shipped By:	Date/Time	Received By:

Samples submitted to Anatek Labs may be subcontacted to other accredited labs if necessary.
This message serves as notice of this possibility. Subcontracted analyses will be clearly noted on the analytical report.

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Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn: MARIE COBB

Batch #: 180813007
Project Name: SOC / VOC / IOC / TOC

Analytical Results Report

Sample Number 180813007-001 **Sampling Date** 8/9/2018 **Date/Time Received** 8/10/2018 11:35 AM
Client Sample ID 160 / WELL HEAD **Sampling Time** 9:45 AM **Extraction Date**
Matrix Drinking Water
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Alkalinity	39.7	mg CaCO3/L	2	8/22/2018 10:30:00 AM	LAC	SM2320B	
Aluminum	0.0292	mg/L	0.01	8/15/2018 12:06:00 PM	SDR	EPA 200.7	
NH3-N	ND	mg/L	0.05	8/15/2018 11:30:00 AM	RPU	SM4500NH3G	
Antimony	ND	mg/L	0.001	8/22/2018 1:16:00 PM	HSW	EPA 200.8	
Arsenic	ND	mg/L	0.001	8/20/2018 5:45:00 PM	HSW	EPA 200.8	
Barium	0.00825	mg/L	0.001	8/20/2018 5:45:00 PM	HSW	EPA 200.8	
Beryllium	ND	mg/L	0.0003	8/22/2018 1:16:00 PM	HSW	EPA 200.8	
Bicarbonate	39.7	mg CaCO3/L	2	8/22/2018 10:30:00 AM	LAC	SM2320B	
Cadmium	ND	mg/L	0.001	8/20/2018 5:45:00 PM	HSW	EPA 200.8	
Calcium	9.36	mg/L	0.1	8/15/2018 12:06:00 PM	SDR	EPA 200.7	
Chloride	1.18	mg/L	0.1	8/29/2018 10:03:00 PM	MER	EPA 300.0	
Chromium	ND	mg/L	0.001	8/20/2018 5:45:00 PM	HSW	EPA 200.8	
Copper	ND	mg/L	0.001	8/20/2018 5:45:00 PM	HSW	EPA 200.8	
Cyanide	ND	mg/L	0.01	8/15/2018 10:15:00 AM	RPU	EPA 335.4	
Diquat	ND	mg/L	0.0008	8/17/2018 1:24:00 PM	MER	EPA 549.2	
Endothall	ND	mg/L	0.01	8/16/2018 9:42:00 PM	GPB	EPA 548.1	
Fluoride	ND	mg/L	0.1	8/16/2018 4:26:00 AM	MER	EPA 300.0	
Glyphosate	ND	mg/L	0.01	8/14/2018 1:42:00 AM	MER	EPA 547	
Gross Alpha	<0.412 ± 0.339	pCi/L	0.412	9/10/2018 2:04:00 PM	HSW	EPA 900.0	U1
Gross Beta	2.30 ± 0.534	pCi/L	0.353	9/10/2018 2:04:00 PM	HSW	EPA 900.0	
Dibromoacetic acid	ND	mg/L	0.001	8/20/2018 1:56:00 PM	MAH	SM6251B	
Dichloroacetic acid	ND	mg/L	0.001	8/20/2018 1:56:00 PM	MAH	SM6251B	
Monobromoacetic acid	ND	mg/L	0.001	8/20/2018 1:56:00 PM	MAH	SM6251B	
Monochloroacetic acid	ND	mg/L	0.002	8/20/2018 1:56:00 PM	MAH	SM6251B	
Total HAA5	ND	mg/L	0.001	8/20/2018 1:56:00 PM	MAH	SM6251B	
Trichloroacetic acid	ND	mg/L	0.001	8/20/2018 1:56:00 PM	MAH	SM6251B	
Calcium	9.36	mg CaCO3/L	0.1	8/15/2018 12:06:00 PM	SDR	EPA 200.7	
Hardness	38.1	mg CaCO3/L	1	8/15/2018 12:06:00 PM	SDR	EPA 200.7	
Magnesium	3.57	mg CaCO3/L	0.1	8/15/2018 12:06:00 PM	SDR	EPA 200.7	
Iron	0.0281	mg/L	0.01	8/15/2018 12:06:00 PM	SDR	EPA 200.7	
Lead	ND	mg/L	0.001	8/20/2018 5:45:00 PM	HSW	EPA 200.8	
Magnesium	3.57	mg/L	0.1	8/15/2018 12:06:00 PM	SDR	EPA 200.7	
Manganese	ND	mg/L	0.01	8/15/2018 12:06:00 PM	SDR	EPA 200.7	
Mercury-ICPMS	ND	mg/L	0.0001	8/20/2018 5:45:00 PM	HSW	EPA 200.8	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
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Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn: MARIE COBB

Batch #: 180813007
Project Name: SOC / VOC / IOC / TOC

Analytical Results Report

Sample Number 180813007-001
Client Sample ID 160 / WELL HEAD
Matrix Drinking Water
Comments

Sampling Date 8/9/2018
Sampling Time 9:45 AM

Date/Time Received 8/10/2018 11:35 AM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Nickel	ND	mg/L	0.001	8/20/2018 5:45:00 PM	HSW	EPA 200.8	
NO3/N	1.64	mg/L	0.1	8/16/2018 4:26:00 AM	MER	EPA 300.0	
NO2/N	ND	mg/L	0.1	8/16/2018 4:26:00 AM	MER	EPA 300.0	
Chlordane	ND	mg/L	0.0004	8/22/2018 1:59:00 AM	GPB	EPA 505	
Endrin	ND	mg/L	2e-005	8/22/2018 1:59:00 AM	GPB	EPA 505	
gamma-BHC (Lindane)	ND	mg/L	4e-005	8/22/2018 1:59:00 AM	GPB	EPA 505	
Heptachlor	ND	mg/L	8e-005	8/22/2018 1:59:00 AM	GPB	EPA 505	
Heptachlor epoxide	ND	mg/L	4e-005	8/22/2018 1:59:00 AM	GPB	EPA 505	
Methoxychlor	ND	mg/L	0.0002	8/22/2018 1:59:00 AM	GPB	EPA 505	
PCBs	ND	mg/L	0.0005	8/22/2018 1:59:00 AM	GPB	EPA 505	
Toxaphene	ND	mg/L	0.002	8/22/2018 1:59:00 AM	GPB	EPA 505	
pH	6.51	ph Units		8/22/2018 10:30:00 AM	LAC	SM 4500pH-B	
PO4/P	ND	mg/L	0.1	8/16/2018 4:26:00 AM	MER	EPA 300.0	
Potassium	2.45	mg/L	0.1	8/15/2018 12:06:00 PM	SDR	EPA 200.7	
Barium Carrier	97.1	%		8/24/2018 12:43:00 PM	HSW	EPA 903.0	
Radium 226	<0.221 ± 0.205	pCi/L	0.221	8/24/2018 12:43:00 PM	HSW	EPA 903.0	U1, R12
Barium Carrier	101	%		8/29/2018 2:23:00 PM	HSW	EPA 904.0	
Radium 228	0.190 ± 0.177	pCi/L	0.179	8/29/2018 2:23:00 PM	HSW	EPA 904.0	
Total Radium	<0.411 ± 0.382	pCi/L		8/29/2018 2:23:00 PM	GPB	Calculation	
Selenium	ND	mg/L	0.001	8/20/2018 5:45:00 PM	HSW	EPA 200.8	
Acenaphthene	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Acenaphthylene	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Alachlor	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Anthracene	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Atrazine	ND	ug/L	0.1	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Benzo(ghi)perylene	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Benzo[a]anthracene	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Benzo[a]pyrene	ND	ug/L	0.02	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Benzo[b]fluoranthene	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Benzo[k]fluoranthene	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
bis(2-Ethylhexyl)phthalate	ND	ug/L	0.6	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
bis-2(ethylhexyl)adipate	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Bromacil	ND	ug/L	0.1	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Bromoxynil	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Butachlor	ND	ug/L	0.1	8/18/2018 1:19:00 AM	BMM	EPA 525.2	

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Address: 810 S. MAIN RD
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Attn: MARIE COBB

Batch #: 180813007
Project Name: SOC / VOC / IOC / TOC

Analytical Results Report

Sample Number 180813007-001
Client Sample ID 160 / WELL HEAD
Matrix Drinking Water
Comments

Sampling Date 8/9/2018
Sampling Time 9:45 AM

Date/Time Received 8/10/2018 11:35 AM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Butylbenzylphthalate	ND	ug/L	1	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Chlorpyrifos	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Chrysene	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Cyanizine	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Diazinon	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Dibenz[a,h]anthracene	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Diethylphthalate	ND	ug/L	1	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Dimethylphthalate	ND	ug/L	1	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Di-n-butylphthalate	ND	ug/L	1	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
EPTC	ND	ug/L	0.1	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Ethyl parathion	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Fluoranthene	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Fluorene	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Hexachlorobenzene	ND	ug/L	0.1	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Hexachlorocyclopentadiene	ND	ug/L	0.1	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Indeno[1,2,3-cd]pyrene	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Malathion	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Methoxychlor	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Metolachlor	ND	ug/L	0.1	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Metribuzin	ND	ug/L	0.1	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Molinate	ND	ug/L	0.1	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Naphthalene	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Parathion	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Pendimethalin	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Permethrin	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Phenanthrene	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Prometon	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Pronamide	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Propachlor	ND	ug/L	0.1	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Pyrene	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Simazine	ND	ug/L	0.07	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Terbacil	ND	ug/L	0.1	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Triademefon	ND	ug/L	0.2	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Trifluralin	ND	ug/L	0.1	8/18/2018 1:19:00 AM	BMM	EPA 525.2	
Silica (as SiO2)	35.1	mg/L	0.1	8/15/2018 12:06:00 PM	SDR	EPA 200.7	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn: MARIE COBB

Batch #: 180813007
Project Name: SOC / VOC / IOC / TOC

Analytical Results Report

Sample Number 180813007-001
Client Sample ID 160 / WELL HEAD
Matrix Drinking Water
Comments

Sampling Date 8/9/2018
Sampling Time 9:45 AM

Date/Time Received 8/10/2018 11:35 AM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Silicon	16.4	mg/L	0.1	8/15/2018 12:06:00 PM	SDR	EPA 200.7	
Silver	ND	mg/L	0.001	8/20/2018 5:45:00 PM	HSW	EPA 200.8	
Sodium	3.10	mg/L	0.1	8/15/2018 12:06:00 PM	SDR	EPA 200.7	
TDS	310	mg/L	50	8/21/2018 6:00:00 PM	RPU	SM 2540C	
Sulfate	2.71	mg/L	0.1	8/24/2018 8:52:00 PM	MER	EPA 300.0	
MBAS	ND	mg/L 342.4MW LAS	0.05	8/22/2018 10:00:00 AM	ETL	SM5540C	H1
Thallium	ND	mg/L	0.001	8/20/2018 5:45:00 PM	HSW	EPA 200.8	
Bromodichloromethane	ND	mg/L	0.0005	8/14/2018 9:59:00 PM	SAT	EPA 524.3	
Bromoform	ND	mg/L	0.0005	8/14/2018 9:59:00 PM	SAT	EPA 524.3	
Chloroform	ND	mg/L	0.0005	8/14/2018 9:59:00 PM	SAT	EPA 524.3	
Dibromochloromethane	ND	mg/L	0.0005	8/14/2018 9:59:00 PM	SAT	EPA 524.3	
Total Trihalomethane	ND	mg/L	0.0005	8/14/2018 9:59:00 PM	SAT	EPA 524.3	
TKN	ND	mg/L	0.5	8/27/2018 2:00:00 PM	RPU	SM4500NORGC	
TOC	0.549	mg/L	0.1	8/14/2018 12:16:00 AM	RPR	SM 5310B	
Total P	0.0458	mg/L	0.01	8/22/2018 1:15:00 PM	RPU	SM4500PF	
Turbidity	0.29	NTU	0.1	8/21/2018 9:00:00 AM	RPU	EPA 180.1	
Uranium	ND	mg/L	0.001	8/20/2018 5:45:00 PM	HSW	EPA 200.8	
Uranium Activity	ND	pCi/L	0.67	8/20/2018 5:45:00 PM	HSW	EPA 200.8	
1,1,1-Trichloroethane	ND	mg/L	0.0005	8/14/2018 3:38:00 AM	SAT	EPA 524.3	
1,1,2-Trichloroethane	ND	mg/L	0.0005	8/14/2018 3:38:00 AM	SAT	EPA 524.3	
1,1-Dichloroethene	ND	mg/L	0.0005	8/14/2018 3:38:00 AM	SAT	EPA 524.3	
1,2,4-Trichlorobenzene	ND	mg/L	0.0005	8/14/2018 3:38:00 AM	SAT	EPA 524.3	
1,2-Dichlorobenzene	ND	mg/L	0.0005	8/14/2018 3:38:00 AM	SAT	EPA 524.3	
1,2-Dichloroethane	ND	mg/L	0.0005	8/14/2018 3:38:00 AM	SAT	EPA 524.3	
1,2-Dichloropropane	ND	mg/L	0.0005	8/14/2018 3:38:00 AM	SAT	EPA 524.3	
1,4-Dichlorobenzene	ND	mg/L	0.0005	8/14/2018 3:38:00 AM	SAT	EPA 524.3	
Benzene	ND	mg/L	0.0005	8/14/2018 3:38:00 AM	SAT	EPA 524.3	
Carbon Tetrachloride	ND	mg/L	0.0005	8/14/2018 3:38:00 AM	SAT	EPA 524.3	
Chlorobenzene	ND	mg/L	0.0005	8/14/2018 3:38:00 AM	SAT	EPA 524.3	
cis-1,2-dichloroethene	ND	mg/L	0.0005	8/14/2018 3:38:00 AM	SAT	EPA 524.3	
Ethylbenzene	ND	mg/L	0.0005	8/14/2018 3:38:00 AM	SAT	EPA 524.3	
Methylene chloride	ND	mg/L	0.0005	8/14/2018 3:38:00 AM	SAT	EPA 524.3	
Styrene	ND	mg/L	0.0005	8/14/2018 3:38:00 AM	SAT	EPA 524.3	
Tetrachloroethene	ND	mg/L	0.0005	8/14/2018 3:38:00 AM	SAT	EPA 524.3	
Toluene	ND	mg/L	0.0005	8/14/2018 3:38:00 AM	SAT	EPA 524.3	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn: MARIE COBB

Batch #: 180813007
Project Name: SOC / VOC / IOC / TOC

Analytical Results Report

Sample Number 180813007-001 **Sampling Date** 8/9/2018 **Date/Time Received** 8/10/2018 11:35 AM
Client Sample ID 160 / WELL HEAD **Sampling Time** 9:45 AM **Extraction Date**
Matrix Drinking Water
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Total Xylene	ND	mg/L	0.0005	8/14/2018 3:38:00 AM	SAT	EPA 524.3	
trans-1,2-Dichloroethene	ND	mg/L	0.0005	8/14/2018 3:38:00 AM	SAT	EPA 524.3	
Trichloroethene	ND	mg/L	0.0005	8/14/2018 3:38:00 AM	SAT	EPA 524.3	
Vinyl Chloride	ND	mg/L	0.0005	8/14/2018 3:38:00 AM	SAT	EPA 524.3	
Zinc	0.00521	mg/L	0.001	8/20/2018 5:45:00 PM	HSW	EPA 200.8	

Sample Number 180813007-001A **Sampling Date** 8/9/2018 **Date/Time Received** 8/10/2018 11:35 AM
Client Sample ID 160 / WELL HEADA **Sampling Time** 9:45 AM **Extraction Date** 8/15/2018
Matrix Drinking Water
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
2,4,5-T	ND	ug/L	0.1	8/17/2018 6:49:00 AM	MAH	EPA 515.4	
2,4,5-TP (Silvex)	ND	ug/L	0.2	8/17/2018 6:49:00 AM	MAH	EPA 515.4	
2,4-D	ND	ug/L	0.1	8/17/2018 6:49:00 AM	MAH	EPA 515.4	
2,4-DB	ND	ug/L	1	8/17/2018 6:49:00 AM	MAH	EPA 515.4	
3,5-Dichlorobenzoic Acid	ND	ug/L	0.5	8/17/2018 6:49:00 AM	MAH	EPA 515.4	
Acifluorofen	ND	ug/L	2	8/17/2018 6:49:00 AM	MAH	EPA 515.4	
Bentazon	ND	ug/L	0.5	8/17/2018 6:49:00 AM	MAH	EPA 515.4	
Chloramben	ND	ug/L	0.2	8/17/2018 6:49:00 AM	MAH	EPA 515.4	
Dacthal	ND	ug/L	0.02	8/17/2018 6:49:00 AM	MAH	EPA 515.4	
Dalapon	ND	ug/L	1	8/17/2018 6:49:00 AM	MAH	EPA 515.4	
Dicamba	ND	ug/L	0.2	8/17/2018 6:49:00 AM	MAH	EPA 515.4	
Dichloroprop	ND	ug/L	0.1	8/17/2018 6:49:00 AM	MAH	EPA 515.4	
Dinoseb	ND	ug/L	0.2	8/17/2018 6:49:00 AM	MAH	EPA 515.4	
Pentachlorophenol	ND	ug/L	0.04	8/17/2018 6:49:00 AM	MAH	EPA 515.4	
Picloram	ND	ug/L	0.1	8/17/2018 6:49:00 AM	MAH	EPA 515.4	
Total Dacthal	ND	ug/L	0.02	8/17/2018 6:49:00 AM	MAH	EPA 515.4	

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Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn: MARIE COBB

Batch #: 180813007
Project Name: SOC / VOC / IOC / TOC

Analytical Results Report

Sample Number 180813007-002
Client Sample ID TRIP BLANK
Matrix Drinking Water
Comments

Sampling Date 8/9/2018
Sampling Time 9:45 AM

Date/Time Received 8/10/2018 11:35 AM
Extraction Date

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
1,1,1-Trichloroethane	ND	mg/L	0.0005	8/14/2018 4:12:00 AM	SAT	EPA 524.3	
1,1,2-Trichloroethane	ND	mg/L	0.0005	8/14/2018 4:12:00 AM	SAT	EPA 524.3	
1,1-Dichloroethene	ND	mg/L	0.0005	8/14/2018 4:12:00 AM	SAT	EPA 524.3	
1,2,4-Trichlorobenzene	ND	mg/L	0.0005	8/14/2018 4:12:00 AM	SAT	EPA 524.3	
1,2-Dichlorobenzene	ND	mg/L	0.0005	8/14/2018 4:12:00 AM	SAT	EPA 524.3	
1,2-Dichloroethane	ND	mg/L	0.0005	8/14/2018 4:12:00 AM	SAT	EPA 524.3	
1,2-Dichloropropane	ND	mg/L	0.0005	8/14/2018 4:12:00 AM	SAT	EPA 524.3	
1,4-Dichlorobenzene	ND	mg/L	0.0005	8/14/2018 4:12:00 AM	SAT	EPA 524.3	
Benzene	ND	mg/L	0.0005	8/14/2018 4:12:00 AM	SAT	EPA 524.3	
Carbon Tetrachloride	ND	mg/L	0.0005	8/14/2018 4:12:00 AM	SAT	EPA 524.3	
Chlorobenzene	ND	mg/L	0.0005	8/14/2018 4:12:00 AM	SAT	EPA 524.3	
cis-1,2-dichloroethene	ND	mg/L	0.0005	8/14/2018 4:12:00 AM	SAT	EPA 524.3	
Ethylbenzene	ND	mg/L	0.0005	8/14/2018 4:12:00 AM	SAT	EPA 524.3	
Methylene chloride	ND	mg/L	0.0005	8/14/2018 4:12:00 AM	SAT	EPA 524.3	
Styrene	ND	mg/L	0.0005	8/14/2018 4:12:00 AM	SAT	EPA 524.3	
Tetrachloroethene	ND	mg/L	0.0005	8/14/2018 4:12:00 AM	SAT	EPA 524.3	
Toluene	ND	mg/L	0.0005	8/14/2018 4:12:00 AM	SAT	EPA 524.3	
Total Xylene	ND	mg/L	0.0005	8/14/2018 4:12:00 AM	SAT	EPA 524.3	
trans-1,2-Dichloroethene	ND	mg/L	0.0005	8/14/2018 4:12:00 AM	SAT	EPA 524.3	
Trichloroethene	ND	mg/L	0.0005	8/14/2018 4:12:00 AM	SAT	EPA 524.3	
Vinyl Chloride	ND	mg/L	0.0005	8/14/2018 4:12:00 AM	SAT	EPA 524.3	

Authorized Signature

Todd Taruscio, Lab Manager

H1 Sample analysis performed past holding time.
MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit
R12 Matrix spike duplicate recovery was below method acceptance limits; the associated blank spike recovery and matrix spike recovery was acceptable.
U1 The analyte was not detected at the calculated detection limit

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Login Report

Customer Name: WALLA WALLA BASIN WATERSHED COUNCIL
810 S. MAIN RD
MILTON-FREEWATER OR 97862

Order ID: 180813007
Order Date: 8/13/2018

Contact Name: MARIE COBB

Project Name: SOC / VOC / IOC / TOC

Comment:

Sample #: 180813007-001 **Customer Sample #:** 160 / WELL HEAD

Recv'd: ☑ **Matrix:** Drinking Water **Collector:** LUKE / JIM **Date Collected:** 8/9/2018
Quantity: 13 **Date Received:** 8/10/2018 11:35:00 AM **Time Collected:** 9:45 AM
Comment:

Test	Lab	Method	Due Date	Priority
ALKALINITY	M	SM2320B	8/22/2018	***Normal (~10 Days)***
ALUMINUM ICP	M	EPA 200.7	8/22/2018	***Normal (~10 Days)***
AMMONIA-NITROGEN	M	SM4500NH3G	8/22/2018	***Normal (~10 Days)***
BICARBONATE	M	SM2320B	8/22/2018	***Normal (~10 Days)***
CALCIUM ICP	M	EPA 200.7	8/22/2018	***Normal (~10 Days)***
CHLORIDE	M	EPA 300.0	8/22/2018	***Normal (~10 Days)***
COPPER	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***
GROSS ALPHA MOSC	M	EPA 900.0	8/22/2018	***Normal (~10 Days)***
GROSS BETA MOSC	M	EPA 900.0	8/22/2018	***Normal (~10 Days)***
HAA5 SM6251B OR	M	SM6251B	8/22/2018	***Normal (~10 Days)***
HARDNESS by EPA 200.7	M	EPA 200.7	8/22/2018	***Normal (~10 Days)***
IRON ICP	M	EPA 200.7	8/22/2018	***Normal (~10 Days)***
LEAD	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***
MAGNESIUM ICP	M	EPA 200.7	8/22/2018	***Normal (~10 Days)***
MANGANESE ICP	M	EPA 200.7	8/22/2018	***Normal (~10 Days)***
pH	M	SM 4500pH-B	8/22/2018	***Normal (~10 Days)***
PHOSPHATE/P	M	EPA 300.0	8/22/2018	***Normal (~10 Days)***
POTASSIUM ICP	M	EPA 200.7	8/22/2018	***Normal (~10 Days)***
RADIUM 226 MOSC	M	EPA 903.0	8/22/2018	***Normal (~10 Days)***
RADIUM 228 MOSC	M	EPA 904.0	8/22/2018	***Normal (~10 Days)***
RADIUM TOTAL	M	Calculation	8/22/2018	***Normal (~10 Days)***
SILICON ICP	M	EPA 200.7	8/22/2018	***Normal (~10 Days)***
SILVER	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***

Customer Name: WALLA WALLA BASIN WATERSHED COUNCIL **Order ID:** 180813007

810 S. MAIN RD **Order Date:** 8/13/2018

MILTON-FREEWATER OR 97862

Contact Name: MARIE COBB **Project Name:** SOC / VOC / IOC / TOC

Comment:

SULFATE	M	EPA 300.0	8/22/2018	***Normal (~10 Days)***
SURFACTANTS	M	SM5540C	8/22/2018	***Normal (~10 Days)***
THM - TOTAL 524.3 OR	M	EPA 524.3	8/22/2018	***Normal (~10 Days)***
TKN	M	SM4500NORGC	8/22/2018	***Normal (~10 Days)***
TOC - MOSC	M	SM 5310B	8/22/2018	***Normal (~10 Days)***
TOTAL P FIA	M	SM4500PF	8/22/2018	***Normal (~10 Days)***
TURBIDITY	M	EPA 180.1	8/22/2018	***Normal (~10 Days)***
URANIUM	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***
VOLATILES 524.3 OR	M	EPA 524.3	8/22/2018	***Normal (~10 Days)***
ZINC	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***
ANTIMONY	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***
ARSENIC	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***
BARIUM	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***
BERYLLIUM	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***
CADMIUM	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***
CHROMIUM	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***
CYANIDE IN DW MOSCOW EPA	M	EPA 335.4	8/22/2018	***Normal (~10 Days)***
FLUORIDE	M	EPA 300.0	8/22/2018	***Normal (~10 Days)***
MERCURY-ICPMS	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***
NICKEL	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***
NITRATE/N	M	EPA 300.0	8/22/2018	***Normal (~10 Days)***
NITRITE/N	M	EPA 300.0	8/22/2018	***Normal (~10 Days)***
OR IOC	M	N/A	8/22/2018	***Normal (~10 Days)***
SELENIUM	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***
SODIUM ICP	M	EPA 200.7	8/22/2018	***Normal (~10 Days)***
THALLIUM	M	EPA 200.8	8/22/2018	***Normal (~10 Days)***
HERBICIDES 515.4 OR	M	EPA 515.4	8/22/2018	***Normal (~10 Days)***
OR Phase II SOC	M	N/A	8/22/2018	***Normal (~10 Days)***
PESTICIDES 505 OR	M	EPA 505	8/22/2018	***Normal (~10 Days)***
SEMIVOLATILES 525.2 OR	M	EPA 525.2	8/22/2018	***Normal (~10 Days)***
DIQUAT 549.2 OR	M	EPA 549.2	8/22/2018	***Normal (~10 Days)***
ENDOTHALL 548.1 OR	M	EPA 548.1	8/22/2018	***Normal (~10 Days)***
GLYPHOSATE 547 OR	M	EPA 547	8/22/2018	***Normal (~10 Days)***
OR Phase V SOC	M	N/A	8/22/2018	***Normal (~10 Days)***

Customer Name: WALLA WALLA BASIN WATERSHED COUNCIL
810 S. MAIN RD
MILTON-FREEWATER OR 97862

Order ID: 180813007
Order Date: 8/13/2018

Contact Name: MARIE COBB
Project Name: SOC / VOC / IOC / TOC

Comment:

Sample #: 180813007-002 **Customer Sample #:** TRIP BLANK

Recv'd: ☑ **Matrix:** Drinking Water **Collector:** LUKE / JIM **Date Collected:** 8/9/2018
Quantity: 2 **Date Received:** 8/10/2018 11:35:00 AM **Time Collected:** 9:45 AM
Comment:

Test	Lab	Method	Due Date	Priority
VOLATILES 524.3 OR	M	EPA 524.3	8/22/2018	***Normal (~10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	4.3
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	Yes
Is there a trip blank to accompany VOC samples?	Yes
Labels and chain agree?	Yes

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T: (208) 883-2839 F: (208) 882-9246
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State of Oregon Drinking Water Chain of Custody Record

(fill in shaded areas below)

180813 007 WWBW Last Due 8/22/2018
1st SAMP 8/9/2018 1st RCVD 8/10/2018
SOC / VOC / IOC / TOC

Water System:		Send Bill or Receipt To: ☐ Same as Water System Info: Marie Cobb	**Return Results By**
System ID#: 160		Name: Walla Walla Basin Watershed Council	☐ Phone ☐ Mail ☐ Fax ☐ Email
Address:		Address: 810 S Main St	
City:	State:	Zip:	City: Milton-Freewater State: OR Zip: 97862	**Rush Samples - Results Needed By**
Phone:		Purchase Order #:	**Date:**
Fax:		Email: marie.cobb@wwbwc.org	**Time:**

Sample Identification

Sampled At: Wellhead Sampled By: Luke, Jim
Date Collected: 8/9/18 Time Collected: 09:45
Entry Point or Source ID:
Source Name(s):

Sample Composition

Location: ☐ Source ☐ Distribution
Type: ☐ Raw ☐ Treated

Note: Composited samples will not be accepted for analyses.

Check Desired Analyses

- ☑ **Phase II SOC (all 5 listed below)**
  - ☐ Semivolatiles (525.2) x2
  - ☐ Herbicides (515.4) x1
  - ☐ Carbamates (531.2)
  - ☐ Pesticdes (505) x2
  - ☐ EDB (504.1)
- ☑ **Phase V SOC (all 3 listed below)**
  - ☐ Diquat (549.2) x1
  - ☐ Endothall (548.1)
  - ☐ Glyphosate (547) x1
- ☐ **Disinfection Byproducts (2 below)**
  - ☐ TTHM (524.3) x2
  - ☐ HAA5 (SM6251B) x2
- ☑ **VOC (524.3)** x2

IOC's

- ☐ Nitrate
- ☐ Pb/Cu
- ☑ Full IOC x2
- ☑ TOC x2
- ☐ Asbestos
- ☑ Gross Alpha x1
- ☑ Gross Beta x1
- ☑ Radium 226 x1
- ☑ Radium 228 x1
- ☑ Total Radium (226 + 228)
- ☑ Uranium

x2 trip blanks

Inspection Checklist (Anatek Use Only)

Preservative:			Sample Condition:	
Semivolatiles (525.2)	NaSulfite	⊘ Yes ○ No	Received Intact?	(Yes) No
Herbicides (515.4)	NaThiosulfate	○ Yes ○ No	Labels & Chains Agree?	(Yes) No
Carbamates (531.2)	$Na_2S_2O_3$ - $C_6H_7KO_7$	○ Yes ○ No	Containers Sealed?	(Yes) No
Pesticides (505)	NaThiosulfate	○ Yes ○ No	VOC Headspace?	Yes (No) VPS
EDB (504.1)	NaThiosulfate	○ Yes ○ No	Temperature (°C)	4.3 -1R-3
Diquat (549.2)	NaThiosulfate	⊘ Yes ○ No	Date & Time:	8/10/18 1135
Endothall (548.1)	NaThiosulfate	○ Yes ○ No	Inspected By:	Brianne Peterson
Glyphosate (547)	NaThiosulfate	○ Yes ○ No		
THM's (524.3)	Maleic/Ascorbic Acid	○ Yes ○ No		
HAA5 (SM6251B)	NH_4Cl	⊘ Yes ○ No		

OTHER:

☐ **DIOXIN** x1

Comments:

Customer:	Date/Time	Received By:	Date/Time	Shipped By:	Date/Time	Received By:

Samples submitted to Anatek Labs may be subcontacted to other accredited labs if necessary.
This message serves as notice of this possibility. Subcontracted analyses will be clearly noted on the analytical report.

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Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn: MARIE COBB

Batch #: 180830054
Project Name: GW-09

Analytical Results Report

Sample Number 180830054-001 **Sampling Date** 8/29/2018 **Date/Time Received** 8/30/2018 10:55 AM
Client Sample ID GW-09 / 4-IN DISCHARGE PIPE **Sampling Time**
Matrix Drinking Water
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Alkalinity	198	mg CaCO3/L	2	9/5/2018 2:00:00 PM	LAC	SM2320B	
Aluminum	0.0316	mg/L	0.01	9/4/2018 5:18:00 PM	SDR	EPA 200.7	
NH3-N	ND	mg/L	0.05	9/4/2018 11:00:00 AM	RPU	SM4500NH3G	
Antimony	ND	mg/L	0.001	9/4/2018 6:28:00 PM	HSW	EPA 200.8	
Arsenic	ND	mg/L	0.001	9/4/2018 6:28:00 PM	HSW	EPA 200.8	
Barium	0.00962	mg/L	0.001	9/4/2018 6:28:00 PM	HSW	EPA 200.8	
Beryllium	ND	mg/L	0.0003	9/7/2018 2:33:00 PM	HSW	EPA 200.8	
Bicarbonate	198	mg CaCO3/L	2	9/5/2018 2:00:00 PM	LAC	SM2320B	
Cadmium	ND	mg/L	0.001	9/4/2018 6:28:00 PM	HSW	EPA 200.8	
Calcium	7.34	mg/L	0.1	9/4/2018 5:18:00 PM	SDR	EPA 200.7	
Chloride	0.575	mg/L	0.1	8/31/2018 6:42:00 AM	MER	EPA 300.0	
Chromium	ND	mg/L	0.001	9/7/2018 2:33:00 PM	HSW	EPA 200.8	
Copper	ND	mg/L	0.001	9/4/2018 6:28:00 PM	HSW	EPA 200.8	
Cyanide	ND	mg/L	0.01	9/4/2018 12:15:00 PM	BKP	EPA 335.4	
Diquat	ND	mg/L	0.0008	8/31/2018 11:48:00 AM	MER	EPA 549.2	
1,2-Dibromo-3-chloropropane(DBC	ND	mg/L	4e-005	9/4/2018 7:56:00 PM	GPB	EPA 504.1	
1,2-Dibromoethane (EDB)	ND	mg/L	2e-005	9/4/2018 7:56:00 PM	GPB	EPA 504.1	
Endothall	ND	mg/L	0.01	9/1/2018 12:49:00 AM	GPB	EPA 548.1	
Fluoride	ND	mg/L	0.1	8/31/2018 6:42:00 AM	MER	EPA 300.0	
Glyphosate	ND	mg/L	0.01	9/4/2018 4:29:00 AM	MER	EPA 547	
Gross Alpha	1.85 ± 0.672	pCi/L	0.356	9/24/2018 1:18:00 PM	GPB	EPA 900.0	
Gross Beta	3.32 ± 0.583	pCi/L	1	9/24/2018 1:18:00 PM	GPB	EPA 900.0	
Calcium	7.34	mg CaCO3/L	0.1	9/4/2018 5:18:00 PM	SDR	EPA 200.7	
Hardness	29.4	mg CaCO3/L	1	9/4/2018 5:18:00 PM	SDR	EPA 200.7	
Magnesium	2.68	mg CaCO3/L	0.1	9/4/2018 5:18:00 PM	SDR	EPA 200.7	
2,4,5-T	ND	ug/L	0.1	9/21/2018 2:10:00 AM	MAH	EPA 515.4	
2,4,5-TP (Silvex)	ND	ug/L	0.2	9/21/2018 2:10:00 AM	MAH	EPA 515.4	
2,4-D	ND	ug/L	0.1	9/21/2018 2:10:00 AM	MAH	EPA 515.4	
2,4-DB	ND	ug/L	1	9/21/2018 2:10:00 AM	MAH	EPA 515.4	
3,5-Dichlorobenzoic Acid	ND	ug/L	0.5	9/21/2018 2:10:00 AM	MAH	EPA 515.4	
Acifluorofen	ND	ug/L	2	9/21/2018 2:10:00 AM	MAH	EPA 515.4	
Bentazon	ND	ug/L	0.5	9/21/2018 2:10:00 AM	MAH	EPA 515.4	
Chloramben	ND	ug/L	0.2	9/21/2018 2:10:00 AM	MAH	EPA 515.4	
Dacthal	ND	ug/L	0.02	9/21/2018 2:10:00 AM	MAH	EPA 515.4	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn: MARIE COBB

Batch #: 180830054
Project Name: GW-09

Analytical Results Report

Sample Number 180830054-001 **Sampling Date** 8/29/2018 **Date/Time Received** 8/30/2018 10:55 AM
Client Sample ID GW-09 / 4-IN DISCHARGE PIPE **Sampling Time**
Matrix Drinking Water
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Dalapon	ND	ug/L	1	9/21/2018 2:10:00 AM	MAH	EPA 515.4	
Dicamba	ND	ug/L	0.2	9/21/2018 2:10:00 AM	MAH	EPA 515.4	
Dichloroprop	ND	ug/L	0.1	9/21/2018 2:10:00 AM	MAH	EPA 515.4	
Dinoseb	ND	ug/L	0.2	9/21/2018 2:10:00 AM	MAH	EPA 515.4	
Pentachlorophenol	ND	ug/L	0.04	9/21/2018 2:10:00 AM	MAH	EPA 515.4	
Picloram	ND	ug/L	0.1	9/21/2018 2:10:00 AM	MAH	EPA 515.4	
Total Dacthal	ND	ug/L	0.02	9/21/2018 2:10:00 AM	MAH	EPA 515.4	
Iron	0.0541	mg/L	0.01	9/4/2018 5:18:00 PM	SDR	EPA 200.7	
Lead	ND	mg/L	0.001	9/4/2018 6:28:00 PM	HSW	EPA 200.8	
Magnesium	2.68	mg/L	0.1	9/4/2018 5:18:00 PM	SDR	EPA 200.7	
Manganese	ND	mg/L	0.01	9/4/2018 5:18:00 PM	SDR	EPA 200.7	
Mercury-ICPMS	ND	mg/L	0.0001	9/4/2018 6:28:00 PM	HSW	EPA 200.8	
Nickel	ND	mg/L	0.001	9/4/2018 6:28:00 PM	HSW	EPA 200.8	
NO3/N	ND	mg/L	0.1	8/31/2018 6:42:00 AM	MER	EPA 300.0	
NO2/N	ND	mg/L	0.1	8/31/2018 6:42:00 AM	MER	EPA 300.0	
Odor	ND	Ton	1	8/31/2018 8:45:00 AM	RPU	SM2150B	
4,4-DDD	ND	ug/L	0.1	9/11/2018 2:30:00 PM	GPB	EPA 505	
4,4-DDE	ND	ug/L	0.1	9/11/2018 2:30:00 PM	GPB	EPA 505	
4,4-DDT	ND	ug/L	0.1	9/11/2018 2:30:00 PM	GPB	EPA 505	
Aldrin	ND	ug/L	0.1	9/11/2018 2:30:00 PM	GPB	EPA 505	
alpha-BHC	ND	ug/L	0.1	9/11/2018 2:30:00 PM	GPB	EPA 505	
Aroclor 1016 (PCB-1016)	ND	ug/L	0.08	9/11/2018 2:30:00 PM	GPB	EPA 505	
Aroclor 1221 (PCB-1221)	ND	ug/L	1	9/11/2018 2:30:00 PM	GPB	EPA 505	
Aroclor 1232 (PCB-1232)	ND	ug/L	0.5	9/11/2018 2:30:00 PM	GPB	EPA 505	
Aroclor 1242 (PCB-1242)	ND	ug/L	0.3	9/11/2018 2:30:00 PM	GPB	EPA 505	
Aroclor 1248 (PCB-1248)	ND	ug/L	0.1	9/11/2018 2:30:00 PM	GPB	EPA 505	
Aroclor 1254 (PCB-1254)	ND	ug/L	0.1	9/11/2018 2:30:00 PM	GPB	EPA 505	
Aroclor 1260 (PCB-1260)	ND	ug/L	0.2	9/11/2018 2:30:00 PM	GPB	EPA 505	
beta-BHC	ND	ug/L	0.1	9/11/2018 2:30:00 PM	GPB	EPA 505	
Chlordane	ND	ug/L	0.2	9/11/2018 2:30:00 PM	GPB	EPA 505	
delta-BHC	ND	ug/L	0.1	9/11/2018 2:30:00 PM	GPB	EPA 505	
Dieldrin	ND	ug/L	0.1	9/11/2018 2:30:00 PM	GPB	EPA 505	
Endosulfan I	ND	ug/L	0.1	9/11/2018 2:30:00 PM	GPB	EPA 505	
Endosulfan II	ND	ug/L	0.1	9/11/2018 2:30:00 PM	GPB	EPA 505	
Endosulfan sulfate	ND	ug/L	0.1	9/11/2018 2:30:00 PM	GPB	EPA 505	

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Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn: MARIE COBB

Batch #: 180830054
Project Name: GW-09

Analytical Results Report

Sample Number 180830054-001 **Sampling Date** 8/29/2018 **Date/Time Received** 8/30/2018 10:55 AM
Client Sample ID GW-09 / 4-IN DISCHARGE PIPE **Sampling Time**
Matrix Drinking Water
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Endrin	ND	ug/L	0.01	9/11/2018 2:30:00 PM	GPB	EPA 505	
Endrin aldehyde	ND	ug/L	0.1	9/11/2018 2:30:00 PM	GPB	EPA 505	
Endrin ketone	ND	ug/L	0.1	9/11/2018 2:30:00 PM	GPB	EPA 505	
gamma-BHC (Lindane)	ND	ug/L	0.02	9/11/2018 2:30:00 PM	GPB	EPA 505	
Heptachlor	ND	ug/L	0.04	9/11/2018 2:30:00 PM	GPB	EPA 505	
Heptachlor epoxide	ND	ug/L	0.02	9/11/2018 2:30:00 PM	GPB	EPA 505	
Methoxychlor	ND	ug/L	0.1	9/11/2018 2:30:00 PM	GPB	EPA 505	
PCBs	ND	ug/L	0.5	9/11/2018 2:30:00 PM	GPB	EPA 505	
Toxaphene	ND	ug/L	1	9/11/2018 2:30:00 PM	GPB	EPA 505	
pH	7.19	ph Units		9/5/2018 4:15:00 PM	RPU	SM 4500pH-B	
PO4/P	ND	mg/L	0.1	8/31/2018 6:42:00 AM	MER	EPA 300.0	M2
Potassium	2.04	mg/L	0.1	9/4/2018 5:18:00 PM	SDR	EPA 200.7	
Barium Carrier	88.5	%		9/10/2018 5:09:00 PM	HSW	EPA 903.0	
Radium 226	<0.425 ± 0.375	pCi/L	0.425	9/10/2018 5:09:00 PM	HSW	EPA 903.0	U1, R13
Barium Carrier	94.4	%		9/21/2018 4:40:00 PM	HSW	EPA 904.0	
Radium 228	<0.186 ± 0.180	pCi/L	0.186	9/21/2018 4:40:00 PM	HSW	EPA 904.0	U1
Total Radium	<0.611 ± 0.555	pCi/L		9/25/2018 5:09:00 PM	HSW	Calculation	U1
Selenium	ND	mg/L	0.001	9/4/2018 6:28:00 PM	HSW	EPA 200.8	
Acenaphthene	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Acenaphthylene	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
a-Chlordane	ND	ug/L	0.1	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Alachlor	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Anthracene	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Atrazine	ND	ug/L	0.1	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Benzo(ghi)perylene	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Benzo[a]anthracene	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Benzo[a]pyrene	ND	ug/L	0.02	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Benzo[b]fluoranthene	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Benzo[k]fluoranthene	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
bis(2-Ethylhexyl)phthalate	ND	ug/L	0.6	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
bis-2(ethylhexyl)adipate	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Bromacil	ND	ug/L	0.1	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Bromoxynil	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Butachlor	ND	ug/L	0.1	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Butylbenzylphthalate	ND	ug/L	1	9/11/2018 9:39:00 PM	BMM	EPA 525.2	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn: MARIE COBB

Batch #: 180830054
Project Name: GW-09

Analytical Results Report

Sample Number 180830054-001 **Sampling Date** 8/29/2018 **Date/Time Received** 8/30/2018 10:55 AM
Client Sample ID GW-09 / 4-IN DISCHARGE PIPE **Sampling Time**
Matrix Drinking Water
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Chlorpyrifos	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Chrysene	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Cyanizine	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Diazinon	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Dibenz[a,h]anthracene	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Diethylphthalate	ND	ug/L	1	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Dimethylphthalate	ND	ug/L	1	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Di-n-butylphthalate	ND	ug/L	1	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
EPTC	ND	ug/L	0.1	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Ethyl parathion	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Fluoranthene	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Fluorene	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
g-Chlordane	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Hexachlorobenzene	ND	ug/L	0.1	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Hexachlorocyclopentadiene	ND	ug/L	0.1	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Indeno[1,2,3-cd]pyrene	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Malathion	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
MCPA	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Methoxychlor	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Metolachlor	ND	ug/L	0.1	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Metribuzin	ND	ug/L	0.1	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Molinate	ND	ug/L	0.1	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Naphthalene	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Parathion	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Pendimethalin	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Permethrin	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Phenanthrene	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Prometon	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Pronamide	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Propachlor	ND	ug/L	0.1	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Pyrene	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Simazine	ND	ug/L	0.07	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Terbacil	ND	ug/L	0.1	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
trans-Nonachlor	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Triademefon	ND	ug/L	0.2	9/11/2018 9:39:00 PM	BMM	EPA 525.2	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Attn: MARIE COBB

Batch #: 180830054
Project Name: GW-09

Analytical Results Report

Sample Number 180830054-001 **Sampling Date** 8/29/2018 **Date/Time Received** 8/30/2018 10:55 AM
Client Sample ID GW-09 / 4-IN DISCHARGE PIPE **Sampling Time**
Matrix Drinking Water
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Trifluralin	ND	ug/L	0.1	9/11/2018 9:39:00 PM	BMM	EPA 525.2	
Silica (as SiO2)	34.7	mg/L	0.1	9/4/2018 5:18:00 PM	SDR	EPA 200.7	
Silicon	16.2	mg/L	0.1	9/4/2018 5:18:00 PM	SDR	EPA 200.7	
Silver	ND	mg/L	0.001	9/4/2018 6:28:00 PM	HSW	EPA 200.8	
Sodium	3.00	mg/L	0.1	9/4/2018 5:18:00 PM	SDR	EPA 200.7	
TDS	ND	mg/L	50	9/6/2018 3:30:00 PM	RPU	SM 2540C	
Sulfate	0.747	mg/L	0.1	8/31/2018 6:42:00 AM	MER	EPA 300.0	
MBAS	ND	mg/L 342.4MW LAS	0.05	9/12/2018 11:00:00 AM	ETL	SM5540C	H1
Thallium	ND	mg/L	0.001	9/4/2018 6:28:00 PM	HSW	EPA 200.8	
TKN	ND	mg/L	1	9/18/2018 3:00:00 PM	BKP	SM4500NORGC	
TOC	0.538	mg/L	0.1	8/31/2018 9:03:00 PM	RPR	SM 5310B	
Total P	0.0241	mg/L	0.01	9/5/2018 1:45:00 PM	RPU	SM4500PF	
Turbidity	0.67	NTU	0.1	8/3/2018 8:45:00 AM	RPU	EPA 180.1	
Uranium	ND	mg/L	0.001	9/4/2018 6:28:00 PM	HSW	EPA 200.8	
Uranium Activity	ND	pCi/L	0.67	9/4/2018 6:28:00 PM	HSW	EPA 200.8	
1,1,1-Trichloroethane	ND	mg/L	0.0005	9/1/2018 12:10:00 AM	SAT	EPA 524.3	
1,1,2-Trichloroethane	ND	mg/L	0.0005	9/1/2018 12:10:00 AM	SAT	EPA 524.3	
1,1-Dichloroethene	ND	mg/L	0.0005	9/1/2018 12:10:00 AM	SAT	EPA 524.3	
1,2,4-Trichlorobenzene	ND	mg/L	0.0005	9/1/2018 12:10:00 AM	SAT	EPA 524.3	
1,2-Dichlorobenzene	ND	mg/L	0.0005	9/1/2018 12:10:00 AM	SAT	EPA 524.3	
1,2-Dichloroethane	ND	mg/L	0.0005	9/1/2018 12:10:00 AM	SAT	EPA 524.3	
1,2-Dichloropropane	ND	mg/L	0.0005	9/1/2018 12:10:00 AM	SAT	EPA 524.3	
1,4-Dichlorobenzene	ND	mg/L	0.0005	9/1/2018 12:10:00 AM	SAT	EPA 524.3	
Benzene	ND	mg/L	0.0005	9/1/2018 12:10:00 AM	SAT	EPA 524.3	
Carbon Tetrachloride	ND	mg/L	0.0005	9/1/2018 12:10:00 AM	SAT	EPA 524.3	
Chlorobenzene	ND	mg/L	0.0005	9/1/2018 12:10:00 AM	SAT	EPA 524.3	
cis-1,2-dichloroethene	ND	mg/L	0.0005	9/1/2018 12:10:00 AM	SAT	EPA 524.3	
Ethylbenzene	ND	mg/L	0.0005	9/1/2018 12:10:00 AM	SAT	EPA 524.3	
Methylene chloride	ND	mg/L	0.0005	9/1/2018 12:10:00 AM	SAT	EPA 524.3	
Styrene	ND	mg/L	0.0005	9/1/2018 12:10:00 AM	SAT	EPA 524.3	
Tetrachloroethene	ND	mg/L	0.0005	9/1/2018 12:10:00 AM	SAT	EPA 524.3	
Toluene	ND	mg/L	0.0005	9/1/2018 12:10:00 AM	SAT	EPA 524.3	
Total Xylene	ND	mg/L	0.0005	9/1/2018 12:10:00 AM	SAT	EPA 524.3	
trans-1,2-Dichloroethene	ND	mg/L	0.0005	9/1/2018 12:10:00 AM	SAT	EPA 524.3	
Trichloroethene	ND	mg/L	0.0005	9/1/2018 12:10:00 AM	SAT	EPA 524.3	

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn: MARIE COBB

Batch #: 180830054
Project Name: GW-09

Analytical Results Report

Sample Number 180830054-001 **Sampling Date** 8/29/2018 **Date/Time Received** 8/30/2018 10:55 AM
Client Sample ID GW-09 / 4-IN DISCHARGE PIPE **Sampling Time**
Matrix Drinking Water
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
Vinyl Chloride	ND	mg/L	0.0005	9/1/2018 12:10:00 AM	SAT	EPA 524.3	
Zinc	ND	mg/L	0.001	9/4/2018 6:28:00 PM	HSW	EPA 200.8	

Sample Number 180830054-001A **Sampling Date** 8/29/2018 **Date/Time Received** 8/30/2018 10:55 AM
Client Sample ID GW-09 / 4-IN DISCHARGE PIPEA **Sampling Time**
Matrix Drinking Water
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
3-Hydroxycarbofuran	ND	ug/L	2	9/2/2018 2:51:00 AM	MER	EPA 531.2	
Aldicarb	ND	ug/L	0.5	9/2/2018 2:51:00 AM	MER	EPA 531.2	
Aldicarb Sulfone	ND	ug/L	1	9/2/2018 2:51:00 AM	MER	EPA 531.2	
Aldicarb Sulfoxide	ND	ug/L	1	9/2/2018 2:51:00 AM	MER	EPA 531.2	
Baygon	ND	ug/L	1	9/2/2018 2:51:00 AM	MER	EPA 531.2	
Carbaryl	ND	ug/L	2	9/2/2018 2:51:00 AM	MER	EPA 531.2	
Carbofuran	ND	ug/L	0.9	9/2/2018 2:51:00 AM	MER	EPA 531.2	
Methiocarb	ND	ug/L	1	9/2/2018 2:51:00 AM	MER	EPA 531.2	
Methomyl	ND	ug/L	1	9/2/2018 2:51:00 AM	MER	EPA 531.2	
Oxamyl	ND	ug/L	2	9/2/2018 2:51:00 AM	MER	EPA 531.2	
Propoxur	ND	ug/L	1	9/2/2018 2:51:00 AM	MER	EPA 531.2	
Azinphos-methyl	ND	ug/L	0.1	9/18/2018 7:20:00 PM	BMM	EPA 8270CMOD	
DEET	ND	ug/L	0.1	9/18/2018 7:20:00 PM	BMM	EPA 8270CMOD	
Dimethoate	ND	ug/L	0.1	9/18/2018 7:20:00 PM	BMM	EPA 8270CMOD	
Fluridone	ND	ug/L	0.1	9/18/2018 7:20:00 PM	BMM	EPA 8270CMOD	
Hexazinone	ND	ug/L	0.1	9/18/2018 7:20:00 PM	BMM	EPA 8270CMOD	
Norflorazon	ND	ug/L	0.1	9/18/2018 7:20:00 PM	BMM	EPA 8270CMOD	
Acetamiprid	ND	ug/L	0.5	9/28/2018 11:43:00 AM	TGT	EPA 8321A	
Diuron	ND	ug/L	0.5	9/28/2018 11:43:00 AM	TGT	EPA 8321A	
Imidacloprid	ND	ug/L	0.5	9/28/2018 11:43:00 AM	TGT	EPA 8321A	
Propiconazole	ND	ug/L	0.5	9/28/2018 11:43:00 AM	TGT	EPA 8321A	
Pyraclostrobin	ND	ug/L	0.5	9/28/2018 11:43:00 AM	TGT	EPA 8321A	

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Client: WALLA WALLA BASIN WATERSHED COUNCIL
Address: 810 S. MAIN RD
MILTON-FREEWATER, OR 97862
Attn: MARIE COBB

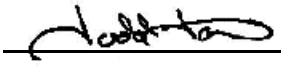
Batch #: 180830054
Project Name: GW-09

Analytical Results Report

Sample Number 180830054-002 **Sampling Date** 8/29/2018 **Date/Time Received** 8/30/2018 10:55 AM
Client Sample ID TRIP BLANK **Sampling Time**
Matrix Drinking Water
Comments

Parameter	Result	Units	PQL	Analysis Date	Analyst	Method	Qualifier
1,1,1-Trichloroethane	ND	mg/L	0.0005	9/1/2018 12:44:00 AM	SAT	EPA 524.3	
1,1,2-Trichloroethane	ND	mg/L	0.0005	9/1/2018 12:44:00 AM	SAT	EPA 524.3	
1,1-Dichloroethene	ND	mg/L	0.0005	9/1/2018 12:44:00 AM	SAT	EPA 524.3	
1,2,4-Trichlorobenzene	ND	mg/L	0.0005	9/1/2018 12:44:00 AM	SAT	EPA 524.3	
1,2-Dichlorobenzene	ND	mg/L	0.0005	9/1/2018 12:44:00 AM	SAT	EPA 524.3	
1,2-Dichloroethane	ND	mg/L	0.0005	9/1/2018 12:44:00 AM	SAT	EPA 524.3	
1,2-Dichloropropane	ND	mg/L	0.0005	9/1/2018 12:44:00 AM	SAT	EPA 524.3	
1,4-Dichlorobenzene	ND	mg/L	0.0005	9/1/2018 12:44:00 AM	SAT	EPA 524.3	
Benzene	ND	mg/L	0.0005	9/1/2018 12:44:00 AM	SAT	EPA 524.3	
Carbon Tetrachloride	ND	mg/L	0.0005	9/1/2018 12:44:00 AM	SAT	EPA 524.3	
Chlorobenzene	ND	mg/L	0.0005	9/1/2018 12:44:00 AM	SAT	EPA 524.3	
cis-1,2-dichloroethene	ND	mg/L	0.0005	9/1/2018 12:44:00 AM	SAT	EPA 524.3	
Ethylbenzene	ND	mg/L	0.0005	9/1/2018 12:44:00 AM	SAT	EPA 524.3	
Methylene chloride	ND	mg/L	0.0005	9/1/2018 12:44:00 AM	SAT	EPA 524.3	
Styrene	ND	mg/L	0.0005	9/1/2018 12:44:00 AM	SAT	EPA 524.3	
Tetrachloroethene	ND	mg/L	0.0005	9/1/2018 12:44:00 AM	SAT	EPA 524.3	
Toluene	ND	mg/L	0.0005	9/1/2018 12:44:00 AM	SAT	EPA 524.3	
Total Xylene	ND	mg/L	0.0005	9/1/2018 12:44:00 AM	SAT	EPA 524.3	
trans-1,2-Dichloroethene	ND	mg/L	0.0005	9/1/2018 12:44:00 AM	SAT	EPA 524.3	
Trichloroethene	ND	mg/L	0.0005	9/1/2018 12:44:00 AM	SAT	EPA 524.3	
Vinyl Chloride	ND	mg/L	0.0005	9/1/2018 12:44:00 AM	SAT	EPA 524.3	

Authorized Signature



Todd Taruscio, Lab Manager

H1 Sample analysis performed past holding time.
M2 Matrix spike recovery was low; the associated blank spike recovery was acceptable. Potential matrix effect.
MCL EPA's Maximum Contaminant Level
ND Not Detected
PQL Practical Quantitation Limit
R13 Matrix spike recovery was above method acceptance limits; the associated blank spike recovery and matrix spike duplicate recovery were acceptable.
U1 The analyte was not detected at the calculated detection limit

The results reported relate only to the samples indicated.
Soil/solid results are reported on a dry-weight basis unless otherwise noted.

Certifications held by Anatek Labs ID: EPA:ID00013; AZ:0701; FL(NELAP):E87893; ID:ID00013; MT:CERT0028; NM: ID00013;NV:ID00013; OR:ID200001-002; WA:C595
Certifications held by Anatek Labs WA: EPA:WA00169; ID:WA00169; WA:C585; MT:Cert0095; FL(NELAP): E871099

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Login Report

Customer Name: WALLA WALLA BASIN WATERSHED COUNCIL
810 S. MAIN RD
MILTON-FREEWATER OR 97862

Order ID: 180830054
Order Date: 8/30/2018

Contact Name: MARIE COBB
Project Name: GW-09
Comment:

Sample #: 180830054-001 **Customer Sample #:** GW-09 / 4-IN DISCHARGE PIPE

Recv'd: ☑ **Matrix:** Drinking Water **Collector:** LUKE ADAMS **Date Collected:** 8/29/2018
Quantity: 31 **Date Received:** 8/30/2018 10:55:00 AM **Time Collected:**
Comment:

Test	Lab	Method	Due Date	Priority
ALKALINITY	M	SM2320B	9/12/2018	***Normal (~10 Days)***
ALUMINUM ICP	M	EPA 200.7	9/12/2018	***Normal (~10 Days)***
AMMONIA-NITROGEN	M	SM4500NH3G	9/12/2018	***Normal (~10 Days)***
BICARBONATE	M	SM2320B	9/12/2018	***Normal (~10 Days)***
CALCIUM ICP	M	EPA 200.7	9/12/2018	***Normal (~10 Days)***
CARBAMATE 531.2 OR	M	EPA 531.2	9/12/2018	***Normal (~10 Days)***
CHLORIDE	M	EPA 300.0	9/12/2018	***Normal (~10 Days)***
COPPER	M	EPA 200.8	9/12/2018	***Normal (~10 Days)***
EDB 504.1 OR	M	EPA 504.1	9/12/2018	***Normal (~10 Days)***
GROSS ALPHA MOSC	M	EPA 900.0	9/12/2018	***Normal (~10 Days)***
GROSS BETA MOSC	M	EPA 900.0	9/12/2018	***Normal (~10 Days)***
HARDNESS by EPA 200.7	M	EPA 200.7	9/12/2018	***Normal (~10 Days)***
IRON ICP	M	EPA 200.7	9/12/2018	***Normal (~10 Days)***
LEAD	M	EPA 200.8	9/12/2018	***Normal (~10 Days)***
MAGNESIUM ICP	M	EPA 200.7	9/12/2018	***Normal (~10 Days)***
MANGANESE ICP	M	EPA 200.7	9/12/2018	***Normal (~10 Days)***
ODOR	M	SM2150B	9/12/2018	***Normal (~10 Days)***
pH	M	SM 4500pH-B	9/12/2018	***Normal (~10 Days)***
PHOSPHATE/P	M	EPA 300.0	9/12/2018	***Normal (~10 Days)***
POTASSIUM ICP	M	EPA 200.7	9/12/2018	***Normal (~10 Days)***
RADIUM 226 MOSC	M	EPA 903.0	9/12/2018	***Normal (~10 Days)***
RADIUM 228 MOSC	M	EPA 904.0	9/12/2018	***Normal (~10 Days)***
RADIUM TOTAL	M	Calculation	9/12/2018	***Normal (~10 Days)***

Customer Name: WALLA WALLA BASIN WATERSHED COUNCIL **Order ID:** 180830054

810 S. MAIN RD **Order Date:** 8/30/2018

MILTON-FREEWATER OR 97862

Contact Name: MARIE COBB **Project Name:** GW-09

Comment:

SILICON ICP	M	EPA 200.7	9/12/2018	***Normal (~10 Days)***
SILVER	M	EPA 200.8	9/12/2018	***Normal (~10 Days)***
SOLIDS - TDS	M	SM 2540C	9/12/2018	***Normal (~10 Days)***
SULFATE	M	EPA 300.0	9/12/2018	***Normal (~10 Days)***
SURFACTANTS	M	SM5540C	9/12/2018	***Normal (~10 Days)***
TKN	M	SM4500NORGC	9/12/2018	***Normal (~10 Days)***
TOC - MOSC	M	SM 5310B	9/12/2018	***Normal (~10 Days)***
TOTAL P FIA	M	SM4500PF	9/12/2018	***Normal (~10 Days)***
TURBIDITY	M	EPA 180.1	9/12/2018	***Normal (~10 Days)***
URANIUM	M	EPA 200.8	9/12/2018	***Normal (~10 Days)***
VOLATILES 524.3 OR	M	EPA 524.3	9/12/2018	***Normal (~10 Days)***
ZINC	M	EPA 200.8	9/12/2018	***Normal (~10 Days)***
ANTIMONY	M	EPA 200.8	9/12/2018	***Normal (~10 Days)***
ARSENIC	M	EPA 200.8	9/12/2018	***Normal (~10 Days)***
BARIUM	M	EPA 200.8	9/12/2018	***Normal (~10 Days)***
BERYLLIUM	M	EPA 200.8	9/12/2018	***Normal (~10 Days)***
CADMIUM	M	EPA 200.8	9/12/2018	***Normal (~10 Days)***
CHROMIUM	M	EPA 200.8	9/12/2018	***Normal (~10 Days)***
CYANIDE IN DW MOSCOW EPA	M	EPA 335.4	9/12/2018	***Normal (~10 Days)***
FLUORIDE	M	EPA 300.0	9/12/2018	***Normal (~10 Days)***
MERCURY-ICPMS	M	EPA 200.8	9/12/2018	***Normal (~10 Days)***
NICKEL	M	EPA 200.8	9/12/2018	***Normal (~10 Days)***
NITRATE/N	M	EPA 300.0	9/12/2018	***Normal (~10 Days)***
NITRITE/N	M	EPA 300.0	9/12/2018	***Normal (~10 Days)***
OR IOC	M	N/A	9/12/2018	***Normal (~10 Days)***
SELENIUM	M	EPA 200.8	9/12/2018	***Normal (~10 Days)***
SODIUM ICP	M	EPA 200.7	9/12/2018	***Normal (~10 Days)***
THALLIUM	M	EPA 200.8	9/12/2018	***Normal (~10 Days)***
HERBICIDES 515.4 OR	M	EPA 515.4	9/12/2018	***Normal (~10 Days)***
OR Phase II SOC	M	N/A	9/12/2018	***Normal (~10 Days)***
PESTICIDES 505 OR	M	EPA 505	9/12/2018	***Normal (~10 Days)***
SEMIVOLATILES 525.2 OR	M	EPA 525.2	9/12/2018	***Normal (~10 Days)***
DIQUAT 549.2 OR	M	EPA 549.2	9/12/2018	***Normal (~10 Days)***
ENDOTHALL 548.1 OR	M	EPA 548.1	9/12/2018	***Normal (~10 Days)***
GLYPHOSATE 547 OR	M	EPA 547	9/12/2018	***Normal (~10 Days)***
OR Phase V SOC	M	N/A	9/12/2018	***Normal (~10 Days)***

Customer Name: WALLA WALLA BASIN WATERSHED COUNCIL
810 S. MAIN RD
MILTON-FREEWATER OR 97862

Order ID: 180830054
Order Date: 8/30/2018

Contact Name: MARIE COBB
Project Name: GW-09

Comment:

Sample #: 180830054-002 **Customer Sample #:** TRIP BLANK

Recv'd: ☑ **Matrix:** Drinking Water **Collector:**
Date Collected: 8/29/2018

Quantity: 1 **Date Received:** 8/30/2018 10:55:00 AM
Time Collected:

Comment:

Test	Lab	Method	Due Date	Priority
VOLATILES 524.3 OR	M	EPA 524.3	9/12/2018	***Normal (~10 Days)***

SAMPLE CONDITION RECORD

Samples received in a cooler?	Yes
Samples received intact?	Yes
What is the temperature of the sample(s)? (°C)	5.8
Samples received with a COC?	Yes
Samples received within holding time?	Yes
Are all sample bottles properly preserved?	Yes
Are VOC samples free of headspace?	Yes
Is there a trip blank to accompany VOC samples?	Yes
Labels and chain agree?	Yes
Total number of containers?	33

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State of Oregon
Drinking Water
Chain of Custody Record
(fill in shaded areas below)

180830 054 WWBW Last Due 9/12/2018
1st SAMP 8/29/2018 1st RCVD 8/30/2018
GW-09

formatted PDF
.xlsx

Water System:	Send Bill or Receipt To: ☐ Same as Water System Info Attn: MARIE COBB	**Return Results By**
System ID#: GW_09	Name: WALLA WALLA BASIN WATERSHED COUNCIL	☐ Phone ☐ Mail
Address:	Address: 810 S Main St	☐ Fax ☑ Email
City: State: Zip:	City: Milton-Freewater State: OR Zip: 97862	**Rush Samples - Results Needed By**
Phone:	Purchase Order #:	Date:
Fax:	Email: [redacted] results to: jim@nwinc.com	Time:

Sample Identification

Sampled At: 4-in discharge pipe ~50 east of Nursery Bridge Sampled By: Luke Adams
Date Collected: 8/29/18 Time Collected:
Entry Point or Source ID: NA
Source Name(s): GW_09

Sample Composition

Irr. Well
Location: ☐ Source ☐ Distribution
Type: ☑ Raw ☐ Treated
Note: Composited samples will not be accepted for analyses.

Check Desired Analyses *

- ☑ **Phase II SOC (all 5 listed below)**
  - ☐ Semivolatiles (525.2) x2
  - ☐ Herbicides (515.4) x1
  - ☐ Carbamates (531.2) x1
  - ☐ Pesticides (505) x2
  - ☐ EDB (504.1) x2
- ☑ **Phase V SOC (all 3 listed below)**
  - ☐ Diquat (549.2) x1
  - ☐ Endothall (548.1)
  - ☐ Glyphosate (547) x1
- ☐ **Disinfection Biproducts (2 below)**
  - ☐ TTHM (524.3)
  - ☐ HAA5 (SM6251B)
- ☑ **VOC (524.3)** x3 +1TB

IOC's

- ☐ Nitrate
- ☐ Pb/Cu
- ☑ Full IOC x2
- ☑ TOC x2
- ☐ Asbestos
- ☑ Gross Alpha x1
- ☑ Gross Beta ~~x1~~ NM
- ☑ Radium 226 x1
- ☑ Radium 228 x1
- ☑ Total Radium (226 + 228) 1x
- ☑ Uranium

* PLUS ANALYTES Emailed from Jim Mathieu to Anatek 8/29/18

Inspection Checklist (Anatek Use Only)

Preservative:			Sample Condition:		
Semivolatiles (525.2)	NaSulfite	○ Yes ○ No	Received Intact?	Yes	No
Herbicides (515.4)	NaThiosulfate	○ Yes ○ No	Labels & Chains Agree?	Yes	No
Carbamates (531.2)	$Na_2S_2O_3$ - $C_6H_7KO_7$	○ Yes ○ No	Containers Sealed?	Yes	No
Pesticides (505)	NaThiosulfate	○ Yes ○ No	VOC Headspace?	Yes	No
EDB (504.1)	NaThiosulfate	○ Yes ○ No	Temperature (°C)	5.8 IR3	
Diquat (549.2)	NaThiosulfate	○ Yes ○ No	Date & Time:	8/30/18 10:55	
Endothall (548.1)	NaThiosulfate	○ Yes ○ No			
Glyphosate (547)	NaThiosulfate	○ Yes ○ No			
THM's (524.3)	Maleic/Ascorbic Acid	○ Yes ○ No	Inspected By:	MM	
HAA5 (SM6251B)	NH_4Cl	○ Yes ○ No			

OTHER: surfactants, TDS, metals, hardness, ortho P, sulfate, alkalinity, NH_3, TKN, turbidity, pH long, total P
☐ **DIOXIN**

Comments:
HCl, NaOH, H_2SO_4
rads preserved w/ HNO3 (CR20208) when received

Customer:	Date/Time	Received By:	Date/Time	Shipped By:	Date/Time	Received By:
Luke Adams	08-29-18 10:50			UPS	8/30/18 10:55	Melanie Clark

Samples submitted to Anatek Labs may be subcontacted to other accredited labs if necessary.
This message serves as notice of this possibility. Subcontracted analyses will be clearly noted on the analytical report.

Billing address

Name: Attn: MARIE, WWBWC

Address: 810 S. Main St.

City, State, Zip: Milton-Freewater OR 97862

Phone: _____ Fax: _____

Table Rock
Analytical Laboratory, LLC
419 SW 5th St
Pendleton, OR 97801
Ph-541-276-3085
Fax-541-276-2041
trocklab@gmail.com

Report Address

Name: JIM MATHIEU (jim@nlwinc.com)

Address: _____

City, State, Zip: _____

QUANTITATIVE COLIFORM ANALYSIS

Bottle Lot #: _____

Lab Sample ID#: 180713C1

Sample Collection Date/Time: 7 / 12 / 2018 _____ : _____ AM / PM
Month / Day / Year / Hour / Min

Collected By: Patten / Mathieu

Sample Point: Hose bib on wellhead discharge

Address: —

ID	Date	Time
5227	7/12/18	13:00
30939	"	14:20
5530	"	15:30

Sample Type: ☐ Waste Water ☑ Irrigation Water

Total Coliform in cfu/
E. Coli "

LAB USE ONLY

Sample Received Date/Time: 07/13/2018 (Month / Day / Year) 13 : 05 (Hour / Min) AM / PM Initials: JN Temp: 6.9 °C

Analysis Start Date/Time: 07/13/2018 (Month / Day / Year) 14 : 05 (Hour / Min) AM / PM Initials: JN

Method(s): Check all that apply. ☑ SM 9223 ☑ Colilert Quantitray Other _____ (specify)

Analysis Complete Date/Time 07/14/2018 (Month / Day / Year) 15 : 57 (Hour / Min) AM / PM RN (Analyst) BLR (Reviewer) BLRead (Signature)

RAW RESULTS	Total Coliform	E.Coli
# Large Wells Positive	0	0
# Small Wells Positive	0	0
MPN /100 mls	0	0

FINAL RESULTS

Total Coliform 0 MPN /100 mls

E. Coli 0 MPN /100 mls

Fax Results Fax# _____ Completed _____

Email Results Address _____ Completed _____

Call Results Phone# _____ Completed _____

Test results relate only to the parameters tested and to the samples as received by the laboratory.

Transferred from Jenna McKee to Wes Bangs 11:51 7/13/18

Billing address

Name: Attn: MARIE, WWBWC

Address: 810 S. Main St.

City, State, Zip: Milton-Freewater OR 97862

Phone: ______ Fax: ______

Table Rock
Analytical Laboratory, LLC
419 SW 5th St
Pendleton, OR 97801
Ph-541-276-3085
Fax-541-276-2041
trocklab@gmail.com

Report Address

Name: JIM MATHIEU (jim@nlwinc.com)

Address:

City, State, Zip:

QUANTITATIVE COLIFORM ANALYSIS

Bottle Lot #: ______

Lab Sample ID#: 180713C2

Sample Collection Date/Time: 7 / 12 / 2018 (Month / Day / Year) ____ : ____ (Hour / Min) AM / PM

Collected By: Patton / Mathieu

Sample Point: Hose bib on wellhead discharge

Address: —

ID	Date	Time
5227	7/12/18	13:00
50939 (circled)	"	14:20
5530	"	15:30

Sample Type: ☐ Waste Water ☑ Irrigation Water

Total Coliform in cfu/
E. Coli "

LAB USE ONLY

Sample Received Date/Time: 07/13/2018 (Month / Day / Year) 13:05 (Hour / Min) AM / PM ✗ Initials: TN Temp: 6.6 °C

Analysis Start Date/Time: 07/13/2018 (Month / Day / Year) 14:05 (Hour / Min) AM / PM ✓ Initials: TN

Method(s): (Check all that apply) ✗ SM 9223 ✓ Colilert Quantitray Other______ (specify)

Analysis Complete Date/Time 07/14/2018 (Month / Day / Year) 15:57 (Hour Min) AM / PM ✗ RN (Analyst) BLR (Reviewer) BLReed (Signature)

RAW RESULTS	Total Coliform	E.Coli
# Large Wells Positive	4	Ø
# Small Wells Positive	Ø	Ø
MPN /100 mls	4.1	Ø

FINAL RESULTS		
Total Coliform	4	MPN /100 mls
E. Coli	Ø	MPN /100 mls

Fax Results	Fax#		Completed
Email Results	Address		Completed
Call Results	Phone#		Completed

Test results relate only to the parameters tested and to the samples as received by the laboratory.

Transferred from [signature] to [signature] 11:51 7/13/18

Billing address

Name: Attn: MARIE, WWBWC

Address: 810 S. Main St.

City, State, Zip: Milton-Freewater OR 97862

Phone: ______ Fax: ______

Table Rock Analytical Laboratory, LLC
419 SW 5th St
Pendleton, OR 97801
Ph-541-276-3085
Fax-541-276-2041
trocklab@gmail.com

Report Address

Name: JIM MATHIEU (jim@nlwinc.com)

Address: ______

City, State, Zip: ______

QUANTITATIVE COLIFORM ANALYSIS

Bottle Lot #: ______

Lab Sample ID#: 180713C3

Sample Collection Date/Time: 7 / 12 / 2018 (Month Day Year) ___ : ___ (Hour Min) AM / PM →

ID	Date	Time
5227	7/12/18	13:00
50939	"	14:20
(5530)	"	15:30

Collected By: Patton / Mathieu

Sample Point: Hose bib on wellhead discharge

Address: —

Total Coliform in cfu/l
E. Coli "

Sample Type: ☐ Waste Water
☑ Irrigation Water

LAB USE ONLY

Sample Received Date/Time: 07/13/2018 (Month / Day / Year) 13 : 05 (Hour Min) AM / PM Initials: TN Temp: 6.6 °C

Analysis Start Date/Time: 07/13/2018 (Month / Day / Year) 14 : 05 (Hour Min) AM / PM Initials: TN

Method(s): (Check all that apply.) ✓ SM 9223 ✓ Colilert Quantitray Other______ (specify)

Analysis Complete Date/Time 07/14/2018 (Month / Day / Year) 1557 (Hour Min) ☐AM ☒PM RN (Analyst) BLR (Reviewer) BLRead (Signature)

RAW RESULTS	Total Coliform	E.Coli
# Large Wells Positive	Ø	Ø
# Small Wells Positive	Ø	Ø
MPN /100 mls	Ø	Ø

FINAL RESULTS		
Total Coliform	Ø	MPN /100 mls
E. Coli	Ø	MPN /100 mls

Fax Results	Fax#		Completed
Email Results	Address		Completed
Call Results	Phone#		Completed

Test results relate only to the parameters tested and to the samples as received by the laboratory.

Transferred from [signature] to [signature] 11:51 7/13/18

Billing address

Name: WWBWC

Address: 810 S. Main St.

City, State, Zip: Milton-Freewater, OR 97862

Phone: _____ Fax: _____

Table Rock
Analytical Laboratory, LLC
419 SW 5th St
Pendleton, OR 97801
Ph-541-276-3085
Fax-541-276-2041
trocklab@gmail.com

Report Address

Name: Jim Mathieu (jim@nlwinc.com)

Address: _____

City, State, Zip: _____

QUANTITATIVE COLIFORM ANALYSIS

Bottle Lot #: _____

Lab Sample ID#: 180809G1

Sample Collection Date/Time: 8 / 9 / 2018 (Month / Day / Year) 10 : 30 (Hour : Min) ☑ AM ☐ PM ID: 5239

Collected By: Adams / Mathieu

Sample Point: _____

Address: _____

Sample Type: ☐ Waste Water ☑ Irrigation Water

Total coliform
E. Coli

LAB USE ONLY

Sample Received Date/Time: 8 / 9 / 18 (Month / Day / Year) 16 : 37 (Hour : Min) ☐ AM ☒ PM Initials: BLR Temp: 14.0 °C

Analysis Start Date/Time: 8 / 9 / 18 (Month / Day / Year) 16 : 52 (Hour : Min) ☐ AM ☒ PM Initials: BLR

Method(s): Check all that apply. ☒ SM 9223 ☒ Colilert Quantitray ☐ Other _____ (specify)

Analysis Complete Date/Time: 8 10 18 (Month / Day / Year) 17 22 (Hour Min) ☐ AM ☒ PM BLR (Analyst) BLR (Reviewer) BLRead (Signature)

RAW RESULTS	Total Coliform	E.Coli
# Large Wells Positive	39	0
# Small Wells Positive	6	0
MPN /100 mls	83.6	0

FINAL RESULTS

Total Coliform: 84 MPN /100 mls

E. Coli: 0 MPN /100 mls

☐ Fax Results Fax# _____ Completed _____

☐ Email Results Address _____ Completed _____

☐ Call Results Phone# _____ Completed _____

Test results relate only to the parameters tested and to the samples as received by the laboratory.

Jim Mathieu 16:45 8/9/18

Billing address

Name: WWBWC

Address: 810 S. Main St.

City, State, Zip: Milton-Freewater, OR 97862

Phone: _____ Fax: _____

Table Rock
Analytical Laboratory, LLC
419 SW 5th St
Pendleton, OR 97801
Ph-541-276-3085
Fax-541-276-2041
trocklab@gmail.com

Report Address

Name: Jim Mathieu (jim@nlwinc.com)

Address: _____

City, State, Zip: _____

QUANTITATIVE COLIFORM ANALYSIS

Bottle Lot #: _____

Lab Sample ID#: 180809G2

Sample Collection Date/Time: 8 / 9 / 2018 (Month / Day / Year) 09 : 45 (Hour : Min) ☑ AM ☐ PM

ID: 160

Time: 09:45

Date: 8/9/18

Collected By: Adams / Mathieu

Sample Point: _____

Address: _____

Sample Type: ☐ Waste Water ☑ Monitoring well

☐ Irrigation Water

Total Coliform
E. Coli

LAB USE ONLY

Sample Received Date/Time: 8 / 9 / 18 (Month / Day / Year) 16 : 37 (Hour : Min) ☐ AM ☑ PM Initials: BLR Temp: 13.5 °C

Analysis Start Date/Time: 8 / 9 / 18 (Month / Day / Year) 16 : 52 (Hour : Min) ☐ AM ☑ PM Initials: BLR

Method(s): Check all that apply. ☒ SM 9223 ☒ Colilert Quantitray ☐ Other _____ (specify)

Analysis Complete Date/Time 8/10/18 (Month / Day / Year) 17:22 (Hour Min) ☐ AM ☒ PM BLR (Analyst) BLR (Reviewer) BLRead (Signature)

RAW RESULTS	Total Coliform	E.Coli
# Large Wells Positive	26	0
# Small Wells Positive	1	0
MPN /100 mls	36.9	0

FINAL RESULTS

Total Coliform 37 MPN /100 mls

E. Coli 0 MPN /100 mls

☐ Fax Results Fax# _____ Completed _____

☐ Email Results Address _____ Completed _____

☐ Call Results Phone# _____ Completed _____

Test results relate only to the parameters tested and to the samples as received by the laboratory.

Jam Mathieu 16:45 8/9/18

Billing address

Name: WWBWC

Address: 810 S Main St

City, State, Zip: Milton-Freewater OR 97862

Phone: (541)-938-2170 Fax: _____

Report Address

Name: Jim Mathieu (jim@nlwinc.com)

Address: _____

City, State, Zip: _____

Table Rock
Analytical Laboratory, LLC
419 SW 5th St
Pendleton, OR 97801
Ph-541-276-3085
Fax-541-276-2041
trocklab@gmail.com

QUANTITATIVE COLIFORM ANALYSIS

Bottle Lot #: _____

Lab Sample ID#: ~~18080961~~ 180829F1

Sample Collection Date/Time: 08 / 29 / 2018 09 : 30 ☒ AM ☐ PM ID: GW_09
Month Day Year Hour Min

Collected By: Adams

Sample Point: _____

Address: _____

Sample Type: ☐ Waste Water — Total Coliform

☒ Irrigation Water — E. Coli

LAB USE ONLY

Sample Received Date/Time: 08 / 29 / 2018 13 : 10 ☐ AM ☒ PM Initials: JR Temp: 8.5 °C
Month / Day / Year Hour Min

Analysis Start Date/Time: 08 / 29 / 2018 13 : 30 ☐ AM ☒ PM Initials: TN
Month / Day / Year Hour Min

Method(s): Check all that apply. ☒ SM 9223 ☒ Colilert Quantitray ☐ Other _____ (specify)

Analysis Complete Date/Time 08/30/2018 13:37 ☐ AM ☒ PM TN BLR BLRead
Month / Day / Year Hour Min Analyst Reviewer Signature

RAW RESULTS	Total Coliform	E.Coli
# Large Wells Positive	11	0
# Small Wells Positive	1	0
MPN /100 mls	13.4	0

FINAL RESULTS

Total Coliform 13 MPN /100 mls

E. Coli 0 MPN /100 mls

☐ Fax Results Fax# _____ Completed _____

☐ Email Results Address _____ Completed _____

☐ Call Results Phone# _____ Completed _____

Test results relate only to the parameters tested and to the samples as received by the laboratory.

Benton-Franklin Health District

7102 W. Okanogan Pl. • Kennewick, WA 99336 • 509-460-4206

COLIFORM BACTERIA ANALYSIS FORM

Date Sample Collected	Time Sample Collected	County
08/29/2018 (Month Day Year)	09 : 30 ☒ AM ☐ PM	Umatilla

Type of Water System (check only one box)

☐ Group A ☐ Group B ☒ Other Irrigation well

Group A and Group B Systems – Provide from Water Facilities Inventory (WFI):

ID# GW-09

System Name:

Contact Person: Jim Mathieu

Day Phone: ( ) | Cell Phone: (206) 769-2700

Email: jim@nlwinc.com | Eve. Phone: ( )

Send results to: (Print full name, address and zip code or e-mail)

Jim Mathieu

jim@nlwinc.com

next to 83753 Eastside Rd, Milton-Freewater, OR

SAMPLE INFORMATION

Sample collected by (name): Luke Adams

Specific location where sample collected: well head

Special instructions or comments: HPC

Type of Sample (select only **one** type of sample from types 1 through 5 below)

1. ☐ **Routine Distribution Sample (A/P)**
   Chlorinated: Yes_____ No ✓
   Chlorine Residual: Total____ Free____

2. ☐ **Repeat Sample (A/P)**
   (from distribution system after unsat. routine)
   Unsatisfactory routine lab number:
   ____ ____ ____ - ____ ____ ____ ____ ____
   Unsatisfactory routine collect date:
   ____/____/____
   Chlorinated: Yes_____ No_____
   Chlorine Residual: Total_____ Free_____

3. **Ground Water Rule Source Sample**
   S | | |
   ☐ Triggered (A/P)
   ☐ Assessment (A/P)

4. **Surface or GWI Raw Source Water Sample** (Enumeration)
   S | | |
   ☐ *E. coli* ☐ Fecal Filtered Yes____ No_____

5. ☒ Sample Collected for **Information Only:** Investigative

LAB USE ONLY	**DRINKING WATER RESULTS**	LAB USE ONLY
☐ **Unsatisfactory** Total Coliform Present **and** ☐ *E.coli* present ☐ *E.coli* absent		☐ **Satisfactory**

Bacterial Density Results: Total Coliform_____/100ml. *E.coli*_____/100ml.
Fecal Coliform 9.0 /100ml. HPC 9.0 /1 ml.

Replacement Sample Required: ☐ TNTC ☐ Sample too old
☐ Sample Volume ☐ Damaged Container ☐ _____

Date/Time Received: 8/29/18 4:40 PM
Receipt Temp C°:

Method Code: ☐ 9921B ☒ 9215B ☐ 9223B Other_____

Date Reported to DOH: 8/31/18

Lab Use Only:

DOH Lab-Sample#
062-05501

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COLIFORM BACTERIA ANALYSIS FORM

Date Sample Collected	Time Sample Collected	County
8 / 9 / 18 (Month / Day / Year)	09:45 ☐ AM ☐ PM	Umatilla

Type of Water System (check only one box)

☐ Group A ☐ Group B ☑ Other Monitoring Well

Group A and Group B Systems – Provide from Water Facilities Inventory (WFI):

ID# 160

System Name:

Contact Person: Jim Mathieu

Day Phone: ( ) | Cell Phone: (206) 769-2708

Email: jim@nLwinc.com | Eve. Phone: ( )

Send results to: (Print full name, address and zip code or e-mail)

Jim Mathieu
jim@nLwinc.com

SAMPLE INFORMATION

Sample collected by (name): Luke Adams

Specific location where sample collected: Well head

Special instructions or comments: APC

Type of Sample (select only **one** type of sample from types 1 through 5 below)

1. ☐ **Routine Distribution Sample (A/P)**
   Chlorinated: Yes_____ No✓
   Chlorine Residual: Total____ Free____

2. ☐ **Repeat Sample (A/P)**
   (from distribution system after unsat. routine)
   Unsatisfactory routine lab number:
   ____ ____ ____ - ____ ____ ____ ____ ____
   Unsatisfactory routine collect date:
   ____/____/____
   Chlorinated: Yes_____ No_____
   Chlorine Residual: Total_____ Free_____

3. **Ground Water Rule Source Sample**
   S | | |
   ☐ Triggered (A/P)
   ☐ Assessment (A/P)

4. **Surface or GWI Raw Source Water Sample** (Enumeration)
   S | | |
   ☐ *E. coli* ☐ Fecal Filtered Yes____ No____

5. ☑ Sample Collected for **Information Only:** Investigative

LAB USE ONLY	**DRINKING WATER RESULTS**	LAB USE ONLY
☐ **Unsatisfactory** Total Coliform Present **and** ☐ *E.coli* present ☐ *E.coli* absent		☐ **Satisfactory**

Bacterial Density Results: Total Coliform_____/100ml. *E.coli*_____/100ml.
Fecal Coliform_____/100ml. HPC 71 /1 ml.

Replacement Sample Required: ☐ TNTC ☐ Sample too old
☐ Sample Volume ☐ Damaged Container ☐ _____

Date/Time Received: 8-10-18 9:40	Method Code: ☐ 9921B ☒ 9215B ☐ 9223B Other_____
Receipt Temp C°: 16 °C	
Date Reported to DOH 8/12/18	Lab Use Only:
DOH Lab-Sample# 062-05080	

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COLIFORM BACTERIA ANALYSIS FORM

Date Sample Collected	Time Sample Collected	County
8 / 9 / 18 (Month / Day / Year)	10 : 30 ☑ AM ☐ PM	Umatilla

Type of Water System (check only one box)

☐ Group A ☐ Group B ☑ Other Irr. Well

Group A and Group B Systems – Provide from Water Facilities Inventory (WFI):

ID# 5239

System Name:

Contact Person: Jim Mathieu

Day Phone: ( ) | Cell Phone: (206) 769-2700

Email: | Eve. Phone: ( )

Send results to: (Print full name, address and zip code or e-mail)

Jim Mathieu
jim@nlwinc.com
NLW
6556 37th Ave NE
Seattle, WA 98115

SAMPLE INFORMATION

Sample collected by (name): Luke Adams

Specific location where sample collected: Wellhead

Special instructions or comments: HPC

Type of Sample (select only **one** type of sample from types 1 through 5 below)

1. ☐ **Routine Distribution Sample (A/P)**
   Chlorinated: Yes_____ No ✓
   Chlorine Residual: Total____ Free____

2. ☐ **Repeat Sample (A/P)**
   (from distribution system after unsat. routine)
   Unsatisfactory routine lab number:
   ____ ____ ____ - ____ ____ ____ ____ ____
   Unsatisfactory routine collect date:
   ____/____/____
   Chlorinated: Yes_____ No_____
   Chlorine Residual: Total____ Free____

3. **Ground Water Rule Source Sample**
   S | | |
   ☐ Triggered (A/P)
   ☐ Assessment (A/P)

4. **Surface or GWI Raw Source Water Sample** (Enumeration)
   S | | |
   ☐ *E. coli* ☐ Fecal Filtered Yes____ No_____

5. ☐ Sample Collected for **Information Only:** Investigative

LAB USE ONLY **DRINKING WATER RESULTS** LAB USE ONLY

☐ **Unsatisfactory** Total Coliform Present **and**
☐ *E.coli* present ☐ *E.coli* absent
☐ **Satisfactory**

Bacterial Density Results: Total Coliform_____/100ml. *E.coli*_____/100ml.
Fecal Coliform_____/100ml. HPC 7415 /1 ml.

Replacement Sample Required: ☐ TNTC ☐ Sample too old
☐ Sample Volume ☐ Damaged Container ☐ _____

Date/Time Received:	Method Code:
8-10-18 9:40	☐ 9921B ☐ 9215B ☐ 9223B Other_____
Receipt Temp C°: 13°C	
Date Reported to DOH: 8/12/18	Lab Use Only:
DOH Lab-Sample#: 062-05081	

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COLIFORM BACTERIA ANALYSIS FORM

Date Sample Collected	Time Sample Collected	County
7 / 12 / 18 (Month / Day / Year)	13:00 ☐ AM ☑ PM	~~Umatilla~~ OR

Type of Water System (check only one box)

☐ Group A ☐ Group B ☑ Other For Well

Group A and Group B Systems – Provide from Water Facilities Inventory (WFI):

well ID# 5227

System Name:

Contact Person: Jim Mathieu

Day Phone: (206) 525-0049 Cell Phone: (206) 769-2700

Email: jim@nlwinc.com Eve. Phone: ( )

Send results to: (Print full name, address and zip code or e-mail)

Northwest Land & Water
6556 37th Ave NE
Seattle, WA 98115

SAMPLE INFORMATION

Sample collected by (name): Patton / Mathieu

Specific location where sample collected: 5227 Hose bib on wellhead discharg

Special instructions or comments: Groundwater

Type of Sample (select only **one** type of sample from types 1 through 5 below)

1. ☐ **Routine Distribution Sample (A/P)**
   Chlorinated: Yes____ No ✓
   Chlorine Residual: Total____ Free____

2. ☐ **Repeat Sample (A/P)**
   (from distribution system after unsat. routine)
   Unsatisfactory routine lab number: N/A
   Unsatisfactory routine collect date: ____/____/____
   Chlorinated: Yes____ No____
   Chlorine Residual: Total____ Free____

3. **Ground Water Rule Source Sample**
   S | | |
   NA
   ☐ Triggered (A/P)
   ☐ Assessment (A/P)

4. **Surface or GWI Raw Source Water Sample** (Enumeration)
   ☐ *E. coli* ☐ Fecal Filtered Yes____ No ✓
   S | | |

5. ☑ Sample Collected for **Information Only:** HPC

LAB USE ONLY **DRINKING WATER RESULTS** LAB USE ONLY

☐ **Unsatisfactory** Total Coliform Present **and**
☐ *E.coli* present ☐ *E.coli* absent

☐ **Satisfactory**

Bacterial Density Results: Total Coliform____/100ml. *E.coli*____/100ml.
Fecal Coliform____/100ml. HPC <10 /1 ml.

Replacement Sample Required: ☐ TNTC ☐ Sample too old
☐ Sample Volume ☐ Damaged Container ☐ ____

Date/Time Received: 7/13/18 3:10 AM
Receipt Temp C°:

Method Code: ☐ 9921B ☒ 9215B ☐ 9223B Other____

Date Reported to DOH: 7/19/18

DOH Lab-Sample#: 062-04404

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COLIFORM BACTERIA ANALYSIS FORM

Date Sample Collected (Month / Day / Year)	Time Sample Collected	County
7 / 12 / 18	14 : 20 ☐ AM ☑ PM	Umatilla, OR

Type of Water System (check only one box)

☐ Group A ☐ Group B ☑ Other Irr Well

Group A and Group B Systems – Provide from Water Facilities Inventory (WFI):

Well ID# 50939 NA

System Name:

Contact Person: Jim Mathieu

Day Phone: (206) 525-0049 Cell Phone: (206) 769-2700

Email: jim@nlwma.com Eve. Phone: ( )

Send results to: (Print full name, address and zip code or e-mail)

Northwest Land & Water
6556 37th Ave NE
Seattle WA 98115

SAMPLE INFORMATION

Sample collected by (name): Patton / Mathieu

Specific location where sample collected: 50939 Hosebib on Wellhead discharge

Special instructions or comments: Groundwater

Type of Sample (select only **one** type of sample from types 1 through 5 below)

1. ☐ **Routine Distribution Sample (A/P)**
   Chlorinated: Yes_____ No ✓
   Chlorine Residual: Total____ Free____

2. ☐ **Repeat Sample (A/P)**
   (from distribution system after unsat. routine)
   Unsatisfactory routine lab number:
   NA - _____
   Unsatisfactory routine collect date:
   ____/____/____
   Chlorinated: Yes_____ No_____
   Chlorine Residual: Total_____ Free_____

3. **Ground Water Rule Source Sample**
   S | | |
   ☐ Triggered (A/P)
   ☐ Assessment (A/P)
   NA

4. **Surface or GWI Raw Source Water Sample** (Enumeration)
   ☐ *E. coli* ☐ Fecal Filtered Yes____ No ✓
   S | | |

5. ☑ Sample Collected for **Information Only:** HPC

LAB USE ONLY **DRINKING WATER RESULTS** LAB USE ONLY

☐ **Unsatisfactory** Total Coliform Present **and**
☐ *E.coli* present ☐ *E.coli* absent

☐ **Satisfactory**

Bacterial Density Results: Total Coliform_____/100ml. *E.coli*_____/100ml.
Fecal Coliform_____/100ml. HPC 410 /1 ml.

Replacement Sample Required: ☐ TNTC ☐ Sample too old
☐ Sample Volume ☐ Damaged Container ☐ _____

Date/Time Received: 7/13/18 3:10 AS

Receipt Temp C°:

Method Code: ☐ 9921B ☑ 9215B ☐ 9223B Other_____

Date Reported to DOH: 7/16/18

DOH Lab-Sample#: 062-044 05

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COLIFORM BACTERIA ANALYSIS FORM

Date Sample Collected	Time Sample Collected	County
7 / 12 / 16 (Month / Day / Year)	15 : 30 ☐ AM ☐ PM	Umatilla county

Type of Water System (check only one box)

☐ Group A ☐ Group B ☑ Other Irr Well

Group A and Group B Systems – Provide from Water Facilities Inventory (WFI):

Well ID# 5530

System Name: NA

Contact Person: Jim Mathieu

Day Phone: (206) 525-0049 | Cell Phone: (206) 769-2700

Email: | Eve. Phone: ( )

Send results to: (Print full name, address and zip code or e-mail)

Northwest Land & Water
6556 37th Ave. NE
Seattle WA 98115

SAMPLE INFORMATION

Sample collected by (name): Patton / Mathieu

Specific location where sample collected: 5530 Hose bib on well head discharge

Special instructions or comments: Groundwater

Type of Sample (select only **one** type of sample from types 1 through 5 below)

1. ☐ **Routine Distribution Sample (A/P)**
   Chlorinated: Yes_____ No ✓
   Chlorine Residual: Total____ Free____

2. ☐ **Repeat Sample (A/P)**
   (from distribution system after unsat. routine)
   Unsatisfactory routine lab number:
   NA
   Unsatisfactory routine collect date:
   ____/____/____
   Chlorinated: Yes_____ No_____
   Chlorine Residual: Total_____ Free_____

3. **Ground Water Rule Source Sample**
   S
   NA
   ☐ Triggered (A/P)
   ☐ Assessment (A/P)

4. **Surface or GWI Raw Source Water Sample** (Enumeration)
   ☐ *E. coli* ☐ Fecal Filtered Yes____ No ✓
   S

5. ☑ Sample Collected for **Information Only:** HPC

LAB USE ONLY **DRINKING WATER RESULTS** LAB USE ONLY

☐ **Unsatisfactory** Total Coliform Present **and**
☐ *E.coli* present ☐ *E.coli* absent

☐ **Satisfactory**

Bacterial Density Results: Total Coliform_____/100ml. *E.coli*_____/100ml.
Fecal Coliform_____/100ml. HPC <10 /1 ml.

Replacement Sample Required: ☐ TNTC ☐ Sample too old
☐ Sample Volume ☐ Damaged Container ☐ _____

Date/Time Received: 7/15/16 3:10 AS
Receipt Temp C°:

Method Code:
☐ 9921B ☒ 9215B
☐ 9223B Other_____

Date Reported to DOH: 7/15/16

DOH Lab-Sample#: 062-04466

Lab Use Only:

DOH Form #331-319 (effective 06/17) - If you need this publication in an alternative format, call 800.525.0127 (TDD/TTY call 711).
This and other publications are available at www.doh.wa.gov/drinkingwater.

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