

CITY of CASCADE LOCKS

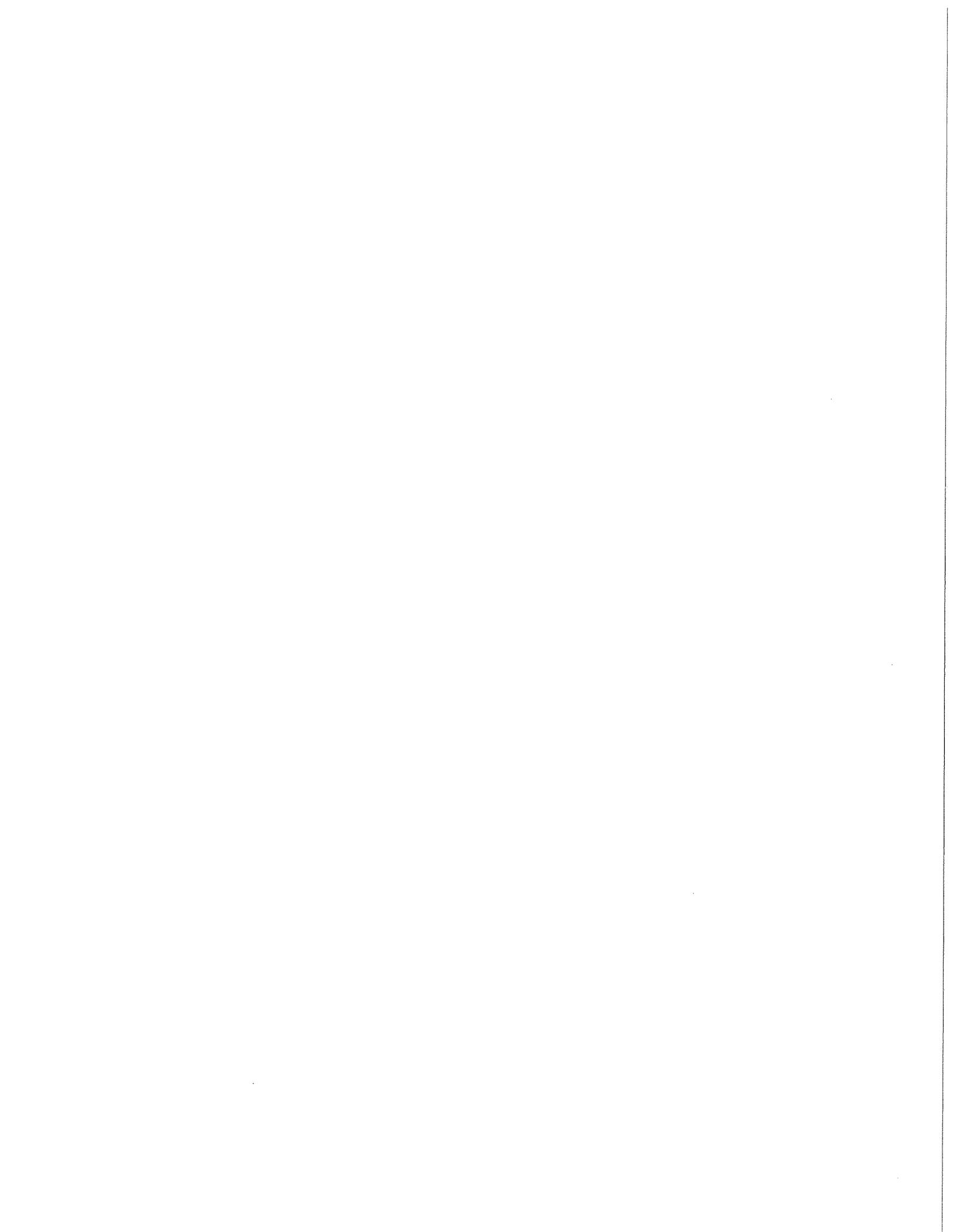
AGENDA

CITY COUNCIL MEETING, Monday, July 13, 2015, 7:00 PM, CITY HALL

Purpose: The City Council meets on the 2nd and 4th Mondays of each month to conduct city business.

1. **Call to Order/Pledge of Allegiance/Roll Call.**
2. **Additions or amendments to the Agenda.** (The Mayor may add items to the agenda after it is printed and distributed only when required by business necessity and only after an explanation has been given. The addition of agenda items after the agenda has been printed is otherwise discouraged.)
3. **Adoption of Consent Agenda.** (Consent Agenda may be approved in its entirety in a single motion. Items are considered to be routine. Any Councilor may make a motion to remove any item from the Consent Agenda for individual discussion.)
 - a. **Approval of June 22, 2015 Minutes.**
 - b. **Approval of June 25, 2015 Town Hall Minutes.**
 - c. **Approval of CH2M Contract to Operate the Wastewater Treatment Plant.**
 - d. **Approval of Mid-Columbia Home Repair Program IGA.**
 - e. **Ratification of the Bills in the Amount of \$ 137,426.50.**
4. **Public Hearings.**
5. **Action Items:**
 - a. **Appointment to Committees.**
 - b. **Appointment to City Council for Vacant Position.**
 - c. **Approve Ordinance No. 439 Regulating the Operation of Marijuana Facilities.**
 - d. **Approve Aquifer Study.**
 - e. **Approve Fire Captain Leave of Absence.**
6. **Appearance of Interested Citizens to Share a Variety of Perspectives on Issues Facing Our Community.** (Comments on matters not on the agenda or previously discussed.)
7. **Reports and Presentations.**
 - a. **City Committees.**
 - b. **City Administrator Zimmerman Report.**
8. **Mayor and City Council Comments.**
9. **Other matters.**
10. **Executive Session per ORS 192.660 (2) (i) Performance Evaluations of Public Officers and Employees.**
11. **Adjournment.**

The meeting location is accessible to persons with disabilities. A request for an interpreter for the hearing impaired, or for other accommodations for person with disabilities, should be made at least 48 hours in advance of the meeting by contacting the City of Cascade Locks office at 541-374-8484.



1. **Call to Order/Pledge of Allegiance/Roll Call.** Mayor Cramblett called the meeting to order at 7:00 PM. CM's Groves, Fitzpatrick, Randall, Busdieker, Helfrich and Mayor Cramblett were present. CM Walker was excused. Also present were City Administrator Gordon Zimmerman, City Recorder Kathy Woosley, Finance Officer Marianne Bump, Station Captain Jesse Metheny, Kathy Tittle, Dave Palais, Aurora delVal, Katelin Stuart, Caroline Park, Jackson Vanderpool, and Camera Operator Betty Rush.
2. **Additions or amendments to the Agenda.** Mayor Cramblett said he would move to **Other Matters**. CM Helfrich said he is no longer a resident of Cascade Locks and resigned from Council. He said it has been an honor and pleasure serving the citizens of this community. He said whether opinions differed the decisions were made for the benefit of the community. He said there are economic opportunities before the Council, whether they are small companies or large, push forward and be positive. Jeff said he respects each and every Councilor for what they believe in and what they do. He said the ways to get to the decisions may have been different but in the end the decisions were made. Jeff said the staff does an incredible job for the City.

Mayor Cramblett presented Jeff with a certificate of appreciation. He said he appreciated Jeff and his volunteer effort that he has given to the City.
3. **Adoption of Consent Agenda.**
 - a. **Approval of May 21, 2015 Joint City/Port Minutes.**
 - b. **Approval of June 8, 2015 Minutes.**
 - c. **Ratification of the Bills in the Amount of \$69,213.66.**
 - d. **Approval of Emergency Reporting Contract.**Mayor Cramblett read the list of items on the Consent Agenda. **Motion:** CM Randall moved, seconded by CM Groves, to approve the Consent Agenda. The motion passed unanimously by CM's Groves, Fitzpatrick, Randall, Busdieker, and Mayor Cramblett.
4. **Public Hearings.** None.
5. **Action Items:**
 - a. **Appointment to Committees.** Mayor Cramblett appointed Joel Koch to the Tourism Committee and the Architectural Committee. There was consensus of Council.
 - b. **Approve Res. No. 1333 Year End Adjustments.** CA Zimmerman explained that the budget is a forecast and was a little off. This resolution makes the necessary adjustments. CM Busdieker asked for the three accounts in the Emergency Service Funds and the accounts in the Sewer Fund Personnel Services. FO Bump said EMS Funds were equipment and vehicle maintenance, intern scholarship, and building maintenance. She said the Sewer Fund was Field Supervisor and Utility Worker 1. **Motion:** CM Busdieker moved, seconded by CM Fitzpatrick, to approve Resolution No. 1333. The motion passed unanimously by CM's Groves, Randall, Fitzpatrick, Busdieker, and Mayor Cramblett.
 - c. **Approval of Hood River County Library District Lease Agreement.** CA Zimmerman explained that the Library still plans to move to the school building but they are waiting on funding. He said this just continues the agreement they have with the City until they vacate the space. **Motion:** CM Randall moved, seconded by CM Busdieker, to approve the Hood River

County Library District Lease Agreement. The motion passed unanimously by CM's Groves, Randall, Fitzpatrick, Busdieker, and Mayor Cramblett.

d. Approve Municipal Judge Agreement. Motion: CM Fitzpatrick moved, seconded by CM Randall, to approve the Municipal Judge Agreement. The motion passed unanimously by CM's Groves, Randall, Fitzpatrick, Busdieker, and Mayor Cramblett.

e. Approve First Amendment to City of Springfield Intergovernmental Agreement. SC Metheny said the fee for billing has gone from \$38.00 to \$40.00 per bill. Kathy Tittle, from the audience, asked if this was per time billed. SC Metheny and CA Zimmerman explained it was a fee to bill per incident. **Motion:** CM Fitzpatrick moved, seconded by CM Randall, to renew the contract with the City of Springfield.

CM Busdieker asked why there is an option listed to search elsewhere. SC Metheny said for due diligence. CA Zimmerman said the City of Springfield bills for most cities in Oregon. The motion passed unanimously by CM's Groves, Randall, Fitzpatrick, Busdieker, and Mayor Cramblett.

f. Command Vehicle Options. CA Zimmerman said staff is looking for Council direction and specific guidelines. He said if Council would give an allowable amount then staff could seek a vehicle and negotiate. Mayor Cramblett asked if the \$20,000 mentioned in the staff report is a good number. SC Metheny said he would look at service vehicles with quite a bit of service life left and already equipped. He said \$20,000 looks like they could get a vehicle with some life left in it for that much money. CA Zimmerman said staff would be looking for a financing package to get the monthly payments down. CM Fitzpatrick asked how much mileage reimbursement is being paid to him per month. SC Metheny said \$300 - \$400 per month. He said there is also a liability risk to the City with him driving his personal vehicle.

CM Busdieker asked how many miles would the City likely get out of one of the vehicles shown in the staff report. SC Metheny said the mileage rates here in the City are fairly low. He explained that most cities will surplus their vehicles at 150,000 miles. CM Busdieker asked if the service life would run out before it was paid off if we were to purchase the 2010 Tahoe. SC Metheny said the City would probably have eight to ten years of useful life out of that vehicle.

CM Busdieker asked if a vehicle was purchased from Alabama how would he determine that the engine would be good. SC Metheny said the City would hire an independent evaluator. CM Busdieker said there would also be a charge to get the vehicle here. CM Groves said there has to be some vehicles locally. SC Metheny said he included these examples as these are large companies. He said that he would look locally and negotiate below sticker price on the vehicle.

CM Groves asked if everything would be set up for the vehicle. SC Metheny said the vehicles wouldn't include everything. He said most agencies pull their radio equipment and lighting. CM Groves asked if we already have the lighting. SC Metheny said we have some lighting and there are standards that have to be met for lighting. CM Groves said her experience has been that paint, logos, etc. has to be added so then the price goes beyond what was approved. She said she considers the \$20,000 to include everything. CM Groves said she didn't think the City needed a command vehicle.

SC Metheny said he has spent months searching for low cost options from other agencies and there wasn't anything available. CM Groves asked if the command vehicle would be housed at the fire station or would it be his personal vehicle. SC Metheny said it would not be his personal

vehicle. He said they have run a program where the vehicle would be with the duty officer. He said they may try a different program where the vehicle would stay at the fire station and be equipped with rescue equipment. He said the command vehicle goes out with most ambulance calls and has the lowest cost impact.

CM Groves asked if the City has two fire engines and two ambulances. SC Metheny said one structure fire engine and two ambulances. CM Groves asked how often those vehicles are used. SC Metheny said in the last two weeks the ambulances have been out about five times with the second ambulance only one time. He said there are many factors considered when sending out vehicles. CM Groves said we are a small community and we have asked citizens to help fund this department and now we want to buy a vehicle. CM Groves asked how many volunteers there were. SC Metheny said there are ten volunteers with six or seven being very active.

Katelin Stuart, from the audience, said this has been argued several times over the last few years. She said it was decided that we wanted the fire department so we should fund them the way they need to be funded. She said, as a citizen, she is tired of them purchasing second grade items and later having to throw more money at it. She said we are nickel and diming them to death. She said to fund them the way they need to be funded.

Mayor Cramblett said the City came in to this knowing that they would have to operate on a bare bones budget. Katelin said there are other ways to fund this. She said if we're going to do this we need to do it right.

CM Randall said there are a lot of good thoughts about how all this should play out. He said he agrees with some of the comments. He said he is also tired of throwing good money after bad. He said he thought the general consensus of Council was to get a command vehicle. He said the vehicle should be a good value for the money.

Motion: CM Fitzpatrick moved, seconded by CM Randall, to empower SC Metheny and CA Zimmerman to make a deal on a command vehicle that will fit the needs of the City to include parameters listed in the staff report (Option 1) not to exceed \$25,000. The motion passed unanimously by CM's Groves, Randall, Fitzpatrick, Busdieker, and Mayor Cramblett.

CA Zimmerman said SC Metheny just passed his practical skills test and SC Metheny said he would be testing more tomorrow.

g. First Reading of Ordinance No. 439 (marijuana sales). Aurora delVal said she was disturbed by the discussion at the last Council meeting and wondered how Nestlé could be promoted for economic development and this not be considered for economic development. She said she was here to ask Council to make an informed decision and not a moralistic or arbitrary one. She asked why Council would turn away an opportunity for increased tax revenue. Aurora said she thought the market would be customers off of the Pacific Crest Trail. She said we have a liquor store right in the middle of town that also sells cigarettes. She said anyone suffering chronic pain would be a customer. She asked Council to consider who would be using this.

Aurora said she was confused about the acceptable locations. She said placing on the outskirts of town to limit minor access seemed strange. She said she went to a dispensary in Hood River and it was pretty low key. She said marijuana is going to be legal pretty soon and the City could make some money on this. She said she is concerned with safety and how this would affect customers

on the outskirts of town. She said it would make more sense to have this type of business in town in order to keep an eye on it.

Aurora submitted an article from The New York Times comparing alcohol to marijuana (Exhibit A).

Jackson Vanderpool said he was the one to bring up the question on dispensaries. He wanted to know the possibility of future business. He said he is concerned with such a quick decision from Council as to the direction they wanted to go. He said he brought this up a month ago and almost instantaneously there is an Ordinance drawn up that is going to eliminate the downtown corridor and completely eliminate the industrial property also. He said the industrial park has the bike trail and disc golf course. He said the Council is taking a viable tax based business and not even going to consider it. Jackson said the Measure passed in this County by a majority of the voters.

Jackson said safety might be more of an issue when located outside of the downtown area. He said he would feel like a second class citizen by being forced to go out of town. He said the State of Oregon isn't even going to start accepting applications until January and think this is an injustice for the Council to go above and beyond what the State is doing.

CA Zimmerman gave the first reading of Ordinance No. 439.

CM Busdieker said Jackson said everything she planned to say. CM Fitzpatrick said he wished the voters would have given this another five years to see what was going to happen with labs across the river. He said people can get marijuana wherever they want and it doesn't mean people aren't going to smoke it.

Mayor Cramblett said most cities are taking the same approach and following some of the guidelines of the State of Oregon. He explained that any resolution or ordinance can be changed. He said the Council is treading lightly. He said property on Herman Creek Lane would fit the criteria. Mayor Cramblett said you can grow your own for medical purposes.

Aurora said she is a hospice volunteer and works with someone who is in a lot of pain. She said this patient would not be in any shape to get this on her own. She said this is a business opportunity and doesn't understand shutting the door on this type of business.

Katelin said she didn't understand the immediate need to put an ordinance in place. Mayor Cramblett explained that the State of Oregon requires cities to have something in place. Jackson said the State of Oregon will not accept applications until January 1, 2016. He asked why the Council wouldn't wait to see what the State of Oregon's regulations are going to be. He said Council could regulate more than the State but why not wait to see what those regulations are.

CM Busdieker asked how the Council could possibly think that banning from almost everywhere in town is treading lightly. She said the Measure passed 55% to 45% and this is what the people said they want. Mayor Cramblett said Council's job is the how, when and where to locate dispensaries.

Motion: CM Fitzpatrick moved, seconded by CM Groves, to approve Ordinance No. 439 regulating the operation of marijuana facilities. The second reading and vote will take place at the next meeting.

h. Approve Tourism Committee Support Contract. CM Busdieker said she would be recusing herself from this item. CA Zimmerman said the Tourism Committee has selected Sofia Urrutia-Lopez for the contract support for the Tourism Committee. **Motion:** CM Groves moved, seconded by CM Fitzpatrick, to approve the contracted vendor program to support the Tourism Committee operations.

Caroline Park said the Tourism Committee voted for Sofia for the position. She said Deanna has done a lot of work for the Committee and thanked her. The motion passed with CM's Groves, Randall, Fitzpatrick, and Mayor Cramblett voting in favor.

i. Determine Process for City Administrator Evaluation. CA Zimmerman said the evaluation form in the packet is what has been used in the past. He said Council could choose another one or develop another one. He said if this is the process chosen then they would need to complete the forms, turn them in to CR Woosley or FO Bump. He said the evaluations would be forwarded to the City Attorney. CM Busdieker asked for a copy of the job description.

6. Appearance of Interested Citizens to Share a Variety of Perspectives on Issues Facing Our Community. Kathy Tittle said Hood River County will be holding a drought declaration meeting this Wednesday and asked if any Councilors would be attending that meeting. She said if and when Hood River County is declared a drought emergency would the City ask to not be included. Kathy asked if there would be scientific water mapping to prove the City is not low on water and done by an independent researcher.

Dave Palais distributed a copy of a Technical Memorandum with information that Councilor Busdieker had requested (Exhibit B). He said this document and additional data tables will be posted to the Nestlé Project website.

Katelin said she attended a meeting in the very beginning where citizens were assured that Cascade Locks would protect itself, due diligence, independent data, no trucks down Forest Lane. She said she isn't seeing any of that. She suggested due diligence is not having Nestlé suggest the facilitator and not paying for hydrogeology studies that we need. She said we are supposed to be independent, the pioneer spirit, and protecting our citizens. She said the people elected to Council are doing what they want. Katelin said she doesn't see any protection. She asked if anyone is paying attention that this is a drought year. She said the tests should be run now and not when there is plenty of water. Katelin reported that a rain gage is not in Cascade Locks but at Bonneville. She said Cascade Locks data is not being tracked. Katelin said she is disappointed as she thought she was trusting people that were independent, who could think for themselves, and look through the data. She said she is just hearing, "This is going to happen." She said this is not what I call representing the people and protecting ourselves. She said shoving a town hall on the end of another thing doesn't count. Katelin said we need to talk to people and among ourselves and decide what is best for us as a community. She reminded Council that they were elected to represent the citizens.

CM Busdieker said the original facilitator was suggested by the attorneys contracted to represent the Nestlé issues.

Caroline Park said she was trying to understand where everyone is coming from and hears contradictions regarding the marijuana issues. She said the Council is preemptively making decisions to protecting the community from this industry and its products.

Caroline said she attended a Port Commission meeting recently and asked the Commission how we were going to protect ourselves from not getting taken advantage of. She asked the Council how we were going to protect ourselves. She said Nestlé does not have a good reputation. She said she has a business here and wants to be on the main street. She said she doesn't want to be on the main street if there are tons of trucks coming through on a daily basis. Caroline hoped the Council would consider and address how the community will not get taken advantage of.

7. Reports and Presentations.

a. City Committees.

b. City Administrator Zimmerman Report. CA Zimmerman gave his report (Exhibit C). He asked Council if the City would grant approval for a temporary liquor license for Cascade Locks Ale House. There was consensus of Council. CA Zimmerman said there was a request for a waiver of the noise ordinance to allow music to 11:00 PM at the Scot Sullenger residence. CM Busdieker said she thought the neighbors should be notified. Mayor Cramblett said there will be a lot of noise all around on the 4th of July. CM Randall said he thought the ordinance stated that the neighbors would have to be notified. CA Zimmerman said there is nothing in the ordinance to that effect. Council directed CA Zimmerman to notify Sullengers to have them inform neighbors.

8. Mayor and City Council Comments. CM Busdieker thanked Katelin for reminding everyone of the drought meeting on Wednesday. CM Busdieker said she wanted to inform the citizens as to how the facilitator was changed for the upcoming Town Hall. She said the original person chosen to facilitate was a public relations guy and that means that this would be used to rewrite the fact sheet in Nestlé's favor. She said the facilitator was not a mediator to create a real conversation. She said he is known for his method of marginalizing critics and he worked for those who are primarily funded by Nestlé. CM Busdieker said there is no way that he could be considered independent.

CM Busdieker thanked all the citizens that jumped on this and got City Hall to drop him within 24 hours. She said when she received her council packet she noticed that he was in attendance at the Nestlé negotiating team meeting. She said this was another concrete indication that there was no way that he could have been independent on this issue. She said the City had no business recommending him in the first place.

CM Busdieker reported crime was down 10% in Colorado.

CM Fitzpatrick thanked Jeff Helfrich for his time and dedication while on the Council. He said they started in different places but admired the position that he took and then came together for the benefit of the citizens. He said he would miss working with him. CM Fitzpatrick congratulated staff on the work being done on the shop.

CM Randall congratulated SC Metheny for finishing the paramedic training. He said this takes a lot of dedication to see it through especially with a family. He said he hopes SC Metheny stays with the City for many years.

CM Groves thanked Jeff Helfrich for his dedication to the City. She said Jeff gave her all the encouragement when she decided to join Council and knew that she and Jeff would be able to work together. She said she appreciated him.

Mayor Cramblett said when volunteering you are putting in a lot of time. He said there have been meetings that last until midnight. He said Jeff has been through this. He said he has a brand new family and appreciates him and his family for giving of his time.

Mayor Cramblett thanked SC Metheny for doing such a good job and thanked Council for providing for these programs.

Mayor Cramblett said it should be easy for the City to track how the aquifer is holding up. He said tests were done on recovery time when well water was pulled down and run for 24 hours straight. He said droughts come and go and a lot of water in Cascade Locks comes from rain fall. He said he remembers when water was restricted to low levels in the reservoir.

Mayor Cramblett reminded everyone of Sternwheeler Days this weekend.

CA Zimmerman asked Council how the Council wanted to proceed with the vacancy. Council decided to advertise asking for applications.

9. Other matters.

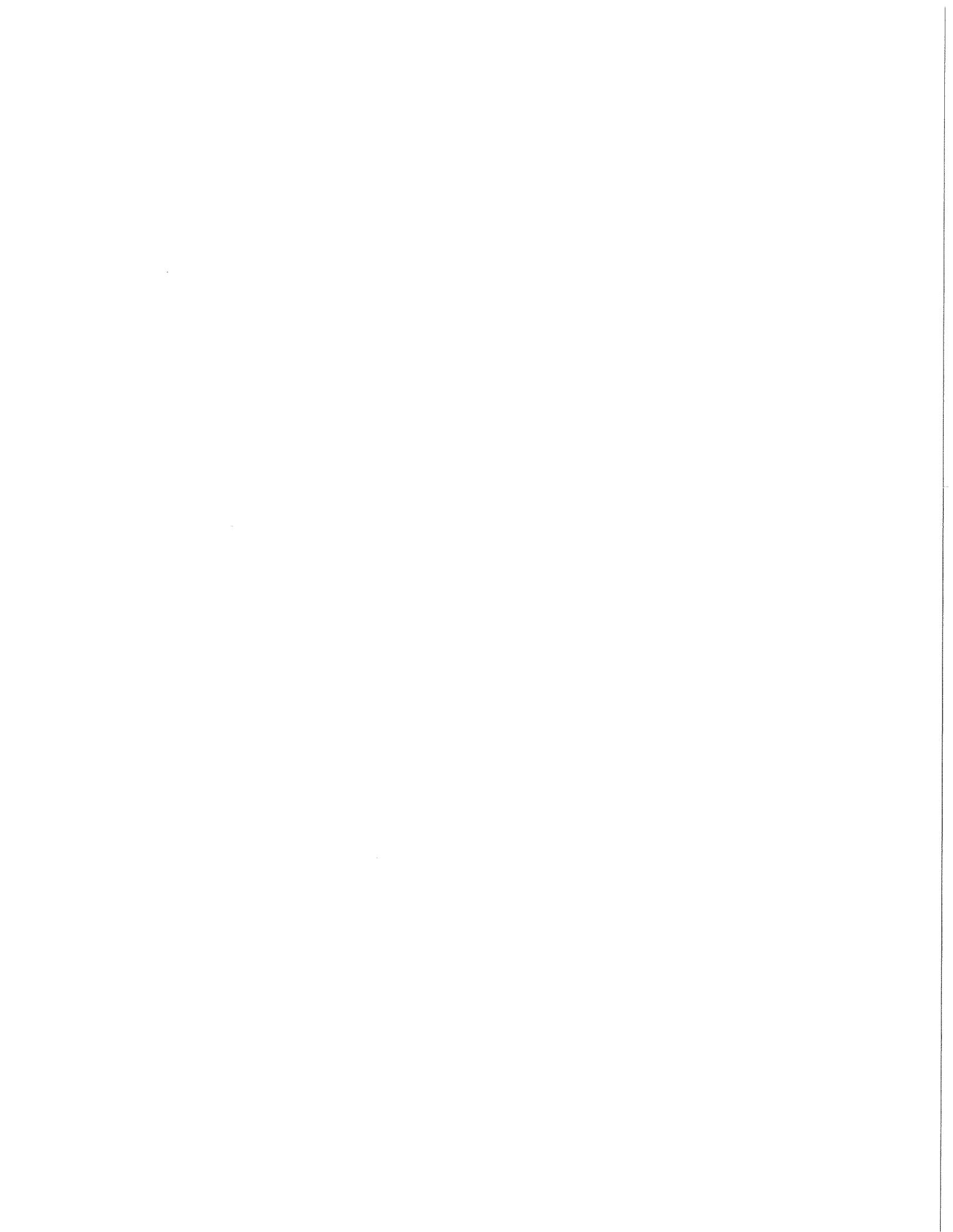
10. Executive Session as may be required. None.

11. Adjournment. Motion: CM Busdieker moved, seconded by CM Randall, to adjourn. The motion passed unanimously by CM's Groves, Randall, Fitzpatrick, Busdieker, and Mayor Cramblett. The meeting was adjourned at 8:45 PM.

Prepared by
Kathy Woosley, City Recorder

APPROVED:

Tom Cramblett, Mayor





The New York Times

<http://nyti.ms/1DmccgC>

Edited by David Leonhardt

The Upshot

THE NEW HEALTH CARE

Alcohol or Marijuana? A Pediatrician Faces the Question

MARCH 16, 2015

Aaron E. Carroll

As my children, and my friends' children, are getting older, a question that comes up again and again from friends is this: Which would I rather my children use — alcohol or marijuana?

The immediate answer, of course, is “neither.” But no parent accepts that. It's assumed, and not incorrectly, that the vast majority of adolescents will try one or the other, especially when they go to college. So they press me further.

The easy answer is to demonize marijuana. It's illegal, after all. Moreover, its potential downsides are well known. Scans show that marijuana use is associated with potential changes in the brain. It's associated with increases in the risk of psychosis. It may be associated with changes in lung function or long-term cancer risk, even though a growing body of evidence says that seems unlikely. It can harm memory, it's associated with lower academic achievement, and its use is linked to less success later in life.

But these are all associations, not known causal pathways. It may be, for instance, that people predisposed to

EXHIBIT A
TO MINUTES OF MEETING
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psychosis are more likely to use pot. We don't know. Moreover, all of these potential dangers seem scary only when viewed in isolation. Put them next to alcohol, and everything looks different.

Because marijuana is illegal, the first thing I think about before answering is crime. In many states, being caught with marijuana is much worse than being caught with alcohol while underage. But ignoring the relationship between alcohol and crime is a big mistake. The National Council on Alcoholism and Drug Dependence reports that alcohol use is a factor in 40 percent of all violent crimes in the United States, including 37 percent of rapes and 27 percent of aggravated assaults.

No such association has been found among marijuana users. Although there are studies that can link marijuana to crime, it's almost all centered on its illegal distribution. People who are high are not committing violence.

People will argue that casual use isn't the issue; it's abuse that's worrisome for crime. They're right — but for alcohol. A recent study in Pediatrics investigated the factors associated with death in delinquent youth. Researchers found that about 19 percent of delinquent males and 11 percent of delinquent females had an alcohol use disorder. Further, they found that even five years after detention, those with an alcohol use disorder had a 4.7 times greater risk of death from external causes, like homicide, than those without an alcohol disorder.

When I'm debating my answer, I think about health as well. Once again, there's no comparison. Binge drinking accounted for about half of the more than 80,000 alcohol-related deaths in the United States in 2010, according to a 2012 report by the Centers for Disease Control and Prevention. The economic costs associated with excessive alcohol consumption in the United States were estimated to be about \$225 billion. Binge drinking, defined as four or more drinks for women and five or more drinks for men on a single occasion, isn't rare either. More than 17 percent of all people in the United States are binge drinkers, and more than 28 percent of people age 18 to 24.

Binge drinking is more common among people with a household income of at least \$75,000. This is a solid middle-class problem.

Marijuana, on the other hand, kills almost no one. The number of deaths attributed to marijuana use is pretty much zero. A study that tracked more than 45,000 Swedes for 15 years found no increase in mortality in those who used marijuana, after controlling for other factors. Another study published in the American Journal of Public Health

followed more than 65,000 people in the United States and found that marijuana use had no effect at all on mortality in healthy men and women.

I think about which is more dangerous when driving. A 2013 case-control study found that marijuana use increased the odds of being in a fatal crash by 83 percent. But adding alcohol to drug use increased the odds of a fatal crash by more than 2,200 percent. A more recent study found that, after controlling for various factors, a detectable amount of THC, the active ingredient in pot, in the blood did not increase the risk of accidents at all. Having a blood alcohol level of at least 0.05 percent, though, increased the odds of being in a crash by 575 percent.

I think about which substance might put young people at risk for being hurt by others. That's where things become even more stark. In 1995 alone, college students reported more than 460,000 alcohol-related incidents of violence in the United States. A 2011 prospective study found that mental and physical dating abuse were more common on drinking days among college students. On the other hand, a 2014 study looking at marijuana use and intimate partner violence in the first nine years of marriage found that those who used marijuana had lower rates of such violence. Indeed, the men who used marijuana the most were the least likely to commit violence against a partner.

Most people come out of college not dependent on the substances they experimented with there. But some do. So I also consider which of the two might lead to abuse. Even there, alcohol fares poorly compared with marijuana. While 9 percent of pot users eventually become dependent, more than 20 percent of alcohol users do.

An often-quoted, although hotly debated, study in the Lancet ranked many drugs according to their harm score, both to users and to others. Alcohol was clearly in the lead. One could make a case, though, that heroin, crack cocaine and methamphetamine would be worse if they were legal and more commonly used. But it's hard to see how pot could overtake alcohol even if it were universally legal. Use of marijuana is not rare, even now when it's widely illegal to buy and use. It's estimated that almost half of Americans age 18 to 20 have tried it at some point in their lives; more than a third of them have used it in the last year.

I also can't ignore what I've seen as a pediatrician. I've seen young people brought to the emergency room because they've consumed too much alcohol and become poisoned. That happens thousands of times a year. Some

even die.

And when my oldest child heads off to college in the not-too-distant future, this is what I will think of: Every year more than 1,800 college students die from alcohol-related accidents. About 600,000 are injured while under alcohol's influence, almost 700,000 are assaulted, and almost 100,000 are sexually assaulted. About 400,000 have unprotected sex, and 100,000 are too drunk to know if they consented. The numbers for pot aren't even in the same league.

I'm a pediatrician, as well as a parent. I can, I suppose, demand that my children, and those I care for in a clinic, never engage in risky behavior. But that doesn't work. Many will still engage in sexual activity, for instance, no matter how much I preach about the risk of a sexually transmitted infection or pregnancy. Because of that, I have conversations about how to minimize risk by making informed choices. While no sex is preferable to unprotected sex, so is sex with a condom. Talking about the harm reduction from condom use doesn't mean I'm telling them to have sex.

Similarly, none of these arguments I've presented are "pro pot" in the sense that I'm saying that adolescents should go use marijuana without worrying about consequences. There's little question that marijuana carries with it risks to people who use it, as well as to the nation. The number of people who will be hurt from it, will hurt others because of it, begin to abuse it, and suffer negative consequences from it are certainly greater than zero. But looking only at those dangers, and refusing to grapple with them in the context of our society's implicit consent for alcohol use in young adults, is irrational.

When someone asks me whether I'd rather my children use pot or alcohol, after sifting through all the studies and all the data, I still say "neither." Usually, I say it more than once. But if I'm forced to make a choice, the answer is "marijuana."

Aaron E. Carroll is a professor of pediatrics at Indiana University School of Medicine. He blogs on health research and policy at The Incidental Economist, and you can follow him on Twitter at @aaroncarroll.

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PACIFIC groundwater GROUP

Technical Memorandum

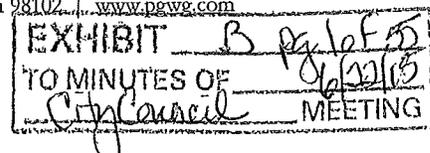
To: Dave Palais, Nestlé Waters North America
From: Dan Matlock, Pacific Groundwater Group
Re: Hydrogeologic Data and Information Used to Develop the *Hydrogeology and Water Resources of Cascade Locks, Oxbow Springs, and the Lower Herman Creek Basin* November 2010 Town Hall Presentation
Date: June 19, 2015

As requested, this memorandum presents data and technical information used to prepare the *Hydrogeology and Water Resources of Cascade Locks, Oxbow Springs, and the Lower Herman Creek Basin* slide presentation given by Nestlé Waters North America (NWNA) in an open house meeting in November 2010. In addition, related data collected subsequent to the presentation are included in this memo. We understand the presentation material was also referenced in recent discussions between Deanna Busdieker, Cascade Locks City Council member, and yourself, and that discussion topics of particular interest included:

- The groundwater system and aquifer interactions (Sections 1 and 2)
- Aquifer storage and recharge, including the unsaturated, or vadose zone (Section 2)
- City of Cascade Locks wellfield groundwater level data, including data collected during the 1977 drought if available (Section 2.2.1)
- Input sources for the Oxbow Springs water balance (Section 2.2.2)
- Oxbow Springs flow data, including data collected during the 1977 drought if available (Section 3)
- Data used to construct trilinear diagram shown in the November 2010 slide presentation (Section 4)

Throughout this memo are references to the related November 2010 slide numbers and the discussion topics listed above. Time-series plots of groundwater level, Columbia River level, water temperature, air temperature, and spring/stream flow data are included in this memo. These plots present data collected at high frequencies (e.g. 1 measurement/15 minutes) or over long periods (e.g. 50 years), which preclude reasonable presentation in tables included with this memorandum. Citations are provided on time-series plots for data that are not tabulated in this memo.

This work was performed, and this memorandum prepared, in accordance with hydrogeologic practices generally accepted at this time and in this area for the exclusive use of Nestlé Waters



North America, for specific application to the project site. No other warranty, express or implied, is made.

1.0 HYDROGEOLOGIC FRAMEWORK

Information in this section provides context for Slide 4/16. This hydrogeologic discussion is based on the following references, supplemented by field reconnaissance by Pacific Groundwater Group (PGG) between 2008 and 2015:

- A Reconnaissance of the Ground-water Resources of the Hood River Valley and the Cascade Locks Area, Hood River County, Oregon (Sceva, 1966)
- Geologic Hazards of Parts of Northern Hood River, Wasco and Sherman Counties, Oregon (Beaulieu, 1977)
- Oxbow Fish Hatchery Preliminary Hydrogeologic Assessment (Squier / Kleinfelder, 2005)
- Report of Dam Sites on Lower Columbia River (Hodge, 1932)

The cross section in Slide 4/16 was based on published surficial geology maps (Beaulieu, 1977 and Sceva, 1966), well logs publically available from Oregon Water Resources Department (OWRD), and a technical report prepared for the Oxbow Fish Hatchery (Squier / Kleinfelder, 2005).

After the November 2010 Town Hall presentation, additional cross sections in the vicinity of Oxbow Springs and the City of Cascade Locks' (City) wellfield were prepared for NWN's investigations, which are presented in this memo. Again, these cross sections are based on published surficial maps (Beaulieu, 1977 and Sceva, 1966), well logs available from OWRD, and site reconnaissance.

1.1 GEOLOGIC AND HYDROGEOLOGIC UNITS

The City of Cascade Locks was developed on a terrace adjacent to the Columbia River. To the south of this terrace, deep bedrock slides have created irregular topography and complex stratigraphy referred to as the Old Slide Block in Sceva (1966), and the Cascade Locks landslide in Beaulieu (1977).

Surficial geology in the Cascade Locks area is presented in Figure 1, which has been modified from Beaulieu in the following ways:

- Intrusive rock outcrops mapped by Sceva (1966) and observed during field reconnaissance near the Columbia River were added.
- Surficial deposits between Oxbow Springs and Dry Creek Falls were generally mapped by Beaulieu as Eagle Creek Formation; however, field reconnaissance indicated materials in this area are more consistent with talus deposits, which is how they are presented in Figure 1.

For these investigations, major geologic units exposed in the vicinity include the Quaternary Alluvium, Quaternary Thick Talus, Cascades Formation (High Cascades Volcanics and Wind River Flows), Intrusive Igneous Rocks, Rhododendron Formation, Columbia River Basalt Group, and the Eagle Creek Formation. These are described below, in order of youngest to oldest.

In terms of their hydrogeologic properties, or capacity to transmit water, an important distinction is whether the units are unconsolidated—like sand or gravel where the particles are loosely arranged and not cemented together—or consolidated—like sandstone where the particles are bound to one another, or basalt where the rock mass is fused together.

1.1.1 Quaternary Alluvium (Qal), unconsolidated

The City of Cascade Locks is underlain by unconsolidated gravel, sand, silt, and clay, classified as Quaternary Alluvium.

Most of the Quaternary Alluvium within the Cascade Locks vicinity was laid down during the late Pleistocene (18,000 to 15,000 years ago) from a series of catastrophic flood events known as the “Missoula floods.” The floods swept across eastern Washington and down the Columbia River Gorge at the end of the last ice age as a result of periodic ruptures of an ice dam on the Clark Fork River that created Glacial Lake Missoula. Given the high energy of deposition, these deposits are typically very coarse grained and highly permeable.

The same catastrophic flood events from Glacial Lake Missoula that deposited material in the Cascade Locks vicinity also deposited the Spokane Valley Rathdrum Prairie aquifer in northeastern Washington (Hsieh et al., 2007). The Spokane Valley Rathdrum Prairie aquifer has been extensively studied and modeled by the U.S. Geological Survey (USGS). In the central part of this aquifer, available data indicate that horizontal hydraulic conductivity, or permeability, values are very high and range from about 1,000 feet per day (ft/d) to several tens of thousands of feet per day (Hsieh et al., 2007). Further downstream from Cascade Locks in the Vancouver Washington area, horizontal hydraulic conductivity values of 2,000 to 29,500 ft/d were assigned to an aquifer within Missoula flood deposits in a peer-reviewed numeric groundwater flow model (Parametrix et al., 2008). The hydraulic conductivity values used in the Vancouver model were based on extensive field testing of local wells.

1.1.2 Quaternary Thick Talus (Qtc), unconsolidated

Quaternary Thick Talus (Qtc) consists of the unconsolidated rock and soil debris that is accumulating at the base of cliffs south of Cascade Locks due to rock fall and rock slides. Soil permeability is highly variable, based on characteristics of the parent material. The Quaternary Thick Talus locally has a thickness greater than 50 feet.

1.1.3 Cascades Formation (Qtv/Qvw1), consolidated

The Cascades Formation consists of basaltic and andesitic flow rock, agglomerate, tuff breccia, and debris flows of High Cascades volcanic peaks (Qtv). The formation locally occupies ridge top positions overlying the Columbia River Basalts and the Rhododendron Formation. The Wind

River (Qvw1) Basalt is made up of relatively young vent and intra-canyon flows, which occur locally just east of lower Herman Creek.

1.1.4 Intrusive Igneous Rock (QTi), consolidated

A wide variety of basaltic and dioritic rocks of the Quaternary and Pliocene are mapped by Beaulieu (1977) as intrusive igneous rock, including numerous outcrops of andesite and diorite exposed in the Cascade Locks area. Near Government Cove, these exposures are hard, fresh, and coarsely jointed and are used for quarry rock.

1.1.5 Rhododendron Formation (Tpr), consolidated

The Rhododendron Formation is composed of Pliocene-aged tuff breccia, agglomerate, and ash forming benches between the massive Columbia River Basalts and the High Cascades volcanics in the cliffs of the Columbia River Gorge.

1.1.6 Columbia River Basalt Group (Tcr), consolidated

The Columbia River Basalt Group (CRBG) is made up of multiple Miocene-aged flood-basalt formations. These formations consist of extensive flows of dense, dark-gray basaltic lava, which commonly display columnar fracturing in the cliffs and bluffs of the Columbia River Gorge. Groundwater aquifers are found in the broken contact zones between individual flows, and also within the pillow lava deposit facies of the CRBG.

1.1.7 Eagle Creek Formation (Tme), consolidated and semi-consolidated

The Eagle Creek Formation is both consolidated and semi-consolidated. The consolidated portions are described as hard, stream-deposited sandstone and conglomerate, and semi-consolidated portions are debris flows and tuff breccias (Beaulieu, 1977). Sceva (1966) included relatively impermeable andesitic lava flow layers in this formation.

2.0 GROUNDWATER FLOW SYSTEM

Information in this section is provided in response to inquiries regarding the groundwater system, aquifer interactions, and aquifer recharge. Section 2.2.1 includes groundwater level information related to the statement on Slide 10/16 of the November 2010 presentation, and related to inquiries regarding the 1977 drought. The discussion in Section 2.2.2 includes inputs to the water budget presented on Slide 5/6, and Section 2.3 presents information related to the productivity of the aquifer that supports the City's wellfield.

2.1 PRINCIPAL AQUIFERS

Where sufficient well logs and other subsurface information are available, regional hydrogeologic studies published by the USGS and other agencies may include maps depicting the lateral extent of aquifers. To date, a published map of aquifers in the vicinity of Cascade Locks has not

been identified. However, the surficial geology map (Figure 1) presents the geologic units that the principal aquifers occur within.

The principal aquifers in the study area for Nwana Investigations are the Landslide and Talus Slope (LSTS) aquifer and the Pleistocene Alluvial Aquifer (PAA). A conceptual model of groundwater movement through the aquifers is discussed in Section 2.2.

The LSTS aquifer occurs within the Quaternary Thick Talus (Qtc) deposits that overlie the older Cascade Volcanics Deposits and Eagle Creek Formation. The Qtc materials have accumulated at the base of the cliffs that form the south wall of the Columbia River Gorge. The permeability of the landslide/talus slope (LSTS) aquifer is expected to vary depending on how the landslide and talus materials were deposited through mass wasting (movement of soil and rock material downslope under the influence of gravity) as well as how intervening erosional processes may have created channels for preferential water movement.

The PAA occurs in the coarse-grained alluvial sand and gravel deposits (Qal) that underlie the City (Figure 1)¹. The City of Cascade Locks' municipal wellfield produces water from the PAA and pumping tests indicate the aquifer is very permeable (Section 2.3). This is consistent with the well-characterized, very permeable Spokane Valley Rathdrum Prairie aquifer that also occurs in Missoula flood deposits (Section 1.1.1).

2.2 GROUNDWATER MOVEMENT THROUGH OXBOW SPRINGS AND THE CITY WELLFIELD

Discussions in the following sections describe how groundwater flows through the hydrogeologic system that supports Oxbow Springs and the City wellfield. The discussion begins with a conceptual hydrogeologic model of the system. This is followed by descriptions of key elements used to develop the conceptual model, including a water budget for the Oxbow Springs topographic recharge basin, and seepage studies of Herman Creek and Little Herman Creek.

2.2.1 Conceptual Hydrogeologic Model

A conceptual hydrogeologic model was developed from previous studies cited in Section 1 and field observations made by PGG during site visits. The conceptual model is presented to describe the hydrogeologic systems that support Oxbow Springs and the City of Cascade Locks wellfield. The following discussion is graphically supported by a surficial geologic map (Figure 1) and hydrogeologic profiles (Figures 2 and 3) developed for the area along traces A-A' and B-B' (Figure 1). Driller's well logs used to produce the cross sections are presented in Appendix A.

A number of springs emanate from cliffs south of the City of Cascade Locks at generally comparable elevations, which form a line of springs or "spring line" that includes Oxbow Springs, Williams Springs, Crystal Springs, and Moody Springs (Figure 1). These springs represent discharge from the LSTS aquifer. The watershed upgradient (south) of the spring line is undeveloped and is

¹ Regionally the aquifer in the Quaternary alluvial deposits, and specifically the Missoula flood deposits, is referred to as the PAA.

within the Mt Hood National forest. A portion of precipitation that falls in the watershed infiltrates the Qtc deposits and is one source of recharge for the LSTS aquifer. Other sources of recharge to the LSTS aquifer are infiltration of surface water from the overlying bluffs, and inflow of groundwater that originates in the Cascades Formation, Rhododendron Formation, and Columbia River Basalt Group but flows below ground surface into the LSTS aquifer (Figure 1).

LSTS Aquifer:

LSTS aquifer recharge from surface water infiltration is supported by observations made by PGG during field reconnaissance of Dry Creek on numerous visits in both wet and dry seasons between fall 2008 and spring 2015. Dry Creek flows to the northwest over Dry Creek Falls. During field reconnaissance in seasonally dry months, there was no observed stream flow between approximately 1,500 feet downstream of Dry Creek Falls and Dry Creek Springs, even though an estimated 2 cubic feet per second (cfs) of water was flowing over the falls (based on visual estimates). During these site visits, the coarse sand, gravel, cobbles, and boulders in this reach of the streambed were observed to be dry. In contrast, during field reconnaissance in seasonally wet months, there was significant stream flow (visually several cfs or more) in the reach between about 1,500 feet downstream of Dry Creek Falls and Dry Creek Springs.

These field observations suggests that during the dry seasons, the water that flows over Dry Creek Falls infiltrates the LSTS aquifer and provides recharge that supports the springs. In addition, during the wet seasons there is sufficient water flowing over Dry Creek Falls that some surface flow stays within the stream bed that is in excess of water that infiltrates the LSTS aquifer.

Currently there are insufficient wells completed in the LSTS aquifer to measure groundwater flow directions. Conceptually, groundwater within the LSTS aquifer would generally be expected to flow topographically downhill and to the north. In addition to discharging at the springs, the LSTS aquifer also contributes subsurface discharges (subflows) to the PAA north of the spring line.

PAA

The PAA is another productive aquifer in the vicinity of Cascade Locks found in the alluvial sand and gravel deposits (Qal) that underlie the City (Figure 1). Municipal water for the City of Cascade Locks is supplied by two wells located on the northeast end of the City near the mouth of Herman Creek (Figure 4). Both wells are completed in the PAA at depths of about 75 to 103 feet below ground (Appendix A).

Recharge sources to the PAA include subflow from the LSTS aquifer, infiltration of precipitation where the Qal deposits are exposed at ground surface, and infiltration of stream flow from Herman Creek and Little Herman Creek to the underlying aquifer (Section 2.2.3).

Groundwater flow directions within the PAA are generally toward the north or northwest with discharge to the Columbia River. In the vicinity of Cascade Locks, water levels in the Columbia River are regulated by the Bonneville Dam, located approximately 5 miles south-west of Oxbow Springs. Figure 5a presents a comparison of groundwater elevations measured at the City well-

field and Columbia River elevations measured at the USGS monitoring station located in Stevenson, Washington (14128600). The USGS gage is directly across the river from the City's wellfield. The data cover the period from about September 2011 to January 2012. Figure 5b provides a more detailed comparison for October 2011.

The water level plots indicate that water levels in the PAA are highly correlated with Columbia River trends. Groundwater levels rise and fall with fluctuating river conditions (Figures 5a and 5b). However, as described below, the river is not a source of recharge to the City's wellfield. Water level changes at the wellfield tend to be lagged behind river changes by about three to four hours (Figure 5b). The short lag times also indicate that the aquifer is very permeable. The long-term data indicate that aquifer water levels are very stable and almost completely controlled by river stage. Annual variations in river and aquifer water levels are on the order of 1 to 2 feet with the highest levels occurring in late spring and the lowest levels in mid-winter.

The City's supply wells intercept a portion of groundwater that is naturally flowing through the PAA and discharging to the Columbia River. During non-pumping conditions at the wellfield, all groundwater from upgradient recharge sources (e.g. seepage from Herman Creek) flows northward through the wellfield area and discharges to the Columbia River (Figure 6a). The direction of the gradient, or slope of the water table, is maintained towards the river at all times, although the value of the slope changes as river levels change. This is analogous to a floating boat dock on a tidally influenced river with access from shore via an inclined ramp (Figure 6b). As the tides cause the river level to rise, the dock also rises and correspondingly the bottom of the ramp rises and the angle of the ramp becomes less steep. As the tides cause the river level to drop, the dock also drops and correspondingly the bottom of the ramp drops and the angle of the ramp becomes steeper. Regardless of the level of the river and the boat dock, the ramp always slopes toward the river and a ball at the top of the ramp would always roll towards the boat dock.

The same is true of the relationship between groundwater and the Columbia River at the City's wellfield during non-pumping conditions, although the magnitudes of the changes are relatively small. As the river level rises, the water levels in the City wells go up (bottom of the ramp in the analogy above) and the absolute value of the slope of the water table (steepness of ramp in the analogy above) decreases. As the Columbia River level drops, groundwater levels in the City wells also drop and the slope of the water table steepens. As with the boat ramp analogy, the water table always slopes in the direction toward the Columbia River because of considerable seepage from Herman Creek. Because the direction of the water table slope is always toward the river, groundwater always flows toward the river, much as a ball on the top of the ramp would always roll toward the boat dock. In reality, at Cascade Locks the river level is held quite stable by Bonneville Dam. Therefore, the changes in groundwater levels are small and the changes in the absolute value (steepness) of the slope of the water table are small. In addition, changes to the absolute value of the slope of the water table are small because the PAA is very permeable.

During pumping conditions, a portion of groundwater from upgradient sources (e.g. seepage from Herman Creek) is captured by the wellfield, while the majority of groundwater continues to discharge to the Columbia River. When the wells are pumped, the water table in the immediate vicinity is drawn down (Figure 6c). This creates a groundwater divide between the wellfield and the river, which is represented by a high point in the water table (Figure 6c). A groundwater di-

vide is a hydraulic pressure boundary between two discharge points from which groundwater flows in different directions. Despite the relationship between water levels in the Columbia River and groundwater levels in the PAA described above, the river is not a source of recharge to the wellfield because of the groundwater divide. The groundwater divide is always maintained between the City wellfield and the Columbia River because the quantity of recharge to the PAA from Herman Creek seepage is at least double the quantity of groundwater the City is authorized to pump from the wellfield at full utilization of their water right (Section 2.2.3). Therefore, even when the wellfield is pumping, some groundwater continues to flow around the City wells and discharge to the Columbia River. This concept is supported by results of stream flow and water quality monitoring on behalf of NRNA (Sections 2.2.3 and 4.1).

Groundwater levels for the City's wellfield during the 1977 drought were not included in data obtained from the City. However, water levels in the Columbia River provide some insights because the river and groundwater levels at the wellfield are highly correlated. Long-term water level elevations in the Bonneville Pool measured at the Bonneville Dam were obtained from the U.S. Army Corps of Engineers and are presented in Figure 7. The data indicate that between 1965 and 2015 water levels in the Bonneville Pool have been very stable; the average pool elevation from 1965 and mid 1975 was approximately 72.5 to 73 feet (U.S. Corps of Engineers Bonneville Datum), and has been approximately 74 feet since. Regulating the Columbia River maintains relatively stable groundwater levels in the PAA, and therefore a relatively stable saturated aquifer thickness.

2.2.2 Oxbow Springs Water Budget

This section presents underlying assumptions and inputs for the water budget calculation presented in Slide 5/6 of the November 2010 presentation. The water budget was a key component in developing the conceptual model of the recharge area that supports Oxbow Springs.

A water budget, or water balance, is a tool used to account for the amount of recharge (inputs) and discharge or withdrawal (outputs) through a watershed. They are often used by regulators or planning agencies to evaluate if there is sufficient water in a basin to develop a new source of supply. For the Cascade Locks project, a water budget was developed to assess the concept that the LSTS aquifer supports Oxbow Springs and receives recharge from Dry Creek stream flow infiltration.

The recharge water basin upstream of Oxbow Springs is estimated to be 0.25 square miles based on topographic divides (Figure 8a). The water budget terms for this basin are precipitation (input), evapotranspiration (output), and runoff (output). Not all precipitation will become spring flow, as some will be lost back to the atmosphere via evapotranspiration, some will runoff via surface water drain courses, and other water may discharge directly to the down-gradient alluvial aquifer via subflow. Site reconnaissance indicates that there is no surficial runoff in the Oxbow Springs topographic catchment. Subflow quantities are not well defined but would represent additional unaccounted flow in the catchment.

Estimates of precipitation and evapotranspiration in the water budget were obtained from values published by Oregon State University and by the USGS.

The PRISM Climate Group with Oregon State University gathers climate observations from a wide range of monitoring stations, applies sophisticated quality control measures, and develops spatial climate data sets of short- and long-term patterns. The United States Department of Agriculture has a long-time partnership with the PRISM Climate Group. At the end of each decade, average values for temperature and precipitation are computed over the preceding 30 years by the PRISM Climate Group. Average annual precipitation contours generated by the PRISM Climate Group for 1971 - 2000 are presented in Figure 8a (Taylor, 1993).

The evapotranspiration estimate used in the Oxbow Springs water budget is consistent with preliminary USGS estimates of hydrologic components for Bull Run Lake and the Bull Run Lake Drainage Basin in Multnomah and Clackamas Counties (Snyder and Brownell, 1996). The Bull Run Lake watershed has been the subject of considerable study as the majority of Portland's potable water supply flows from the watershed. The Bull Run Lake evapotranspiration estimate was considered reasonable for the Oxbow Springs topographic recharge basin based on the comparable physiography, climate, and vegetation.

In the water budget, discharge estimates from Oxbow Springs are based on flow monitoring performed for NWA investigations at the Little Herman Creek gage (Figure 9). The Little Herman Creek gage is located on the north side of I-84 about 500 feet northeast of the Oxbow Springs Hatchery rearing ponds (Figure 10). Oxbow Springs is the primary source of water to Little Herman Creek; therefore, the gage provides a continuous record of total spring discharge. Over the 2008-March 2015 monitoring period, the amount of water discharged by Oxbow Springs ranged from 1.8 to 10 cfs (Figure 9).

The water budget presented in Slide 5/6 of the November 2010 presentation is reproduced in Table 1a, and annotated with data source information. Subsequent to the 2010 presentation, the water budget was updated (Table 1b) when the average annual precipitation contours for the 1981-2010 period became available from PRISM (Figure 8b).

In both water budgets, the total discharge estimates from Oxbow Springs are significantly more than can be accounted for by recharge to the Oxbow Springs topographic basin. Therefore, a substantial amount of spring flow is unaccounted for by recharge in the Oxbow Spring basin and a larger watershed is likely contributing flow to the spring.

The Oxbow Springs topographic recharge basin is bounded by the Herman Creek and Dry Creek topographic recharge basins (Figures 8a and 8b). The boundary with the Herman Creek recharge basin to the east is well defined by topography. The lower portions of the Herman Creek channel south of the City Limits are at lower elevations than the Oxbow Springs recharge basin. Consequently, groundwater cannot move from this portion of the Herman Creek recharge basin to the Oxbow Springs recharge basin.

The boundary between the Oxbow Springs and Dry Creek recharge basins is not as well defined by topography. The Oxbow Springs and Dry Creek recharge basins are at comparable elevations and it is reasonable to conclude that the flows in Oxbow Springs that are unaccounted for by recharge in the Oxbow Springs basin originate within the Dry Creek basin to the west and southwest (Figures 8a and 8b). Recharge that is contributed to the LSTS aquifer from the stream be-

low Dry Creek Falls (visually estimated to be several cfs or more based on PGG field reconnaissance during dry seasons) is much greater than observed flows at Dry Creek Springs, indicating that there are additional discharge points for water from this basin. As described in Section 2.2.1, during field reconnaissance in dry seasons, there was no observed stream flow between approximately 1,500 feet downstream of Dry Creek Falls and Dry Creek Springs. This observation suggests that the flow infiltrates the LSTS aquifer, which could subflow into the Oxbow Springs recharge basin and provide recharge that supports the springs. During the higher runoff winter months, some surface flow occurs within this reach of the stream.

The groundwater flow system upgradient of Oxbow Springs is a natural system that is controlled by recharge in the Oxbow Springs and Dry Creek topographic basins, and by discharges to springs, surface water, and evapotranspiration. Since moving to their present location in 1937, ODFW has been diverting a portion of the natural flow from Oxbow Springs to support hatchery operations (Section 3.1). However, this diversion has not increased the amount of water that is discharging naturally from the Oxbow Springs or Dry Creek basins since they only capture a portion of the natural flow that enters this area from upgradient recharge sources.

“Under predevelopment conditions, the ground-water system is in long-term equilibrium. That is, averaged over some period of time, the amount of water entering or recharging the system is approximately equal to the amount of water leaving or discharging from the system. Because the system is in equilibrium, the quantity of water stored in the system is constant or varies about some average condition in response to annual or longer-term climatic variations...Humans change the natural or predevelopment flow system by withdrawing (pumping) water for use, changing recharge patterns by irrigation and urban development, changing the type of vegetation, and other activities.” (Alley et. al. 1999).

The hatchery diversion has not, nor will it, alter the water balance for the Oxbow Springs and Dry Creek topographic recharge basins because it has not changed the amount of recharge to the system, the amount of evapotranspiration, the amount of water removed from storage (e.g. pumping withdrawals), nor the amount of water discharging from Oxbow Springs.

2.2.3 Herman Creek, Little Herman Creek, and Groundwater Interactions

The following discussions, figures, and tables are related to the streamflow statement on Slide 7/16 of the November 2010 presentation. Understanding interactions between Herman Creek, Little Herman Creek and groundwater in the PAA contributed significantly to developing the conceptual hydrogeologic model.

Streams interact with groundwater in two fundamental and natural ways: streams gain water by the inflow of groundwater (gaining stream, Figure 11a), or they lose water to groundwater by outflow through the streambed (losing stream, Figure 11b). One stream may have both gaining and losing reaches. For groundwater to flow into a stream channel, the elevation of the water table in the vicinity of the stream must be greater than the elevation of water in the stream. In contrast, for surface water to seep through the stream bed into groundwater, the elevation of water in the stream must be greater than the elevation of the water table in the vicinity of the stream. Surface water – groundwater interactions for losing stream reaches can be further characterized as

connected or disconnected. If sediments below a losing stream reach are saturated, the losing reach is connected to the groundwater system (Figure 11b). If sediments below a losing stream are unsaturated, the losing reach is disconnected from the groundwater system (Figure 11c). Again, both relationships occur naturally and in both cases water flows from the stream to groundwater. *“An important feature of streams that are disconnected from ground water is that pumping of shallow ground water near the stream does not affect the flow of the stream near the pumped wells”* (Winter et. al., 1998).

Several seepage studies were performed for the NRNA project to evaluate the interactions between Herman Creek, Little Herman Creek, and groundwater in the PAA. Seepage studies involve measuring stream flow at the endpoints of channel reaches (e.g. upstream of a tributary entering the main channel), which can be used to identify if flows are increasing (groundwater flowing in through the streambed) or decreasing (surface water flowing out through the streambed to the underlying aquifer). The seepage studies were performed by River Measurements of Vancouver, Washington. River Measurement staff involved in these studies include former USGS personnel, and they follow USGS protocols and quality assurance for stream gaging.

These seepage studies were conducted in September 2009, September and October 2010, and September and October 2011. The surveys involved measuring stream flow, or discharge, at select locations on Herman Creek and Little Herman Creek. The measurements were collected during the late summer and early fall when the streamflow rates were low, which minimizes error in seepage loss estimates. The seepage survey locations are identified in Figure 10 and discharge measurements are summarized in Table 2.

During the surveys, the amount of seepage from lower Herman Creek to the underlying aquifer between ODFW's upper and lower diversion dams (Figure 10) ranged from 3.6 to 10.8 cfs (Table 2, Survey #1-4). Surface water seepage below the lower ODFW diversion on the main Herman Creek channel (east channel) to the underlying aquifer was estimated during the October 2011 survey to be approximately 4.6 cfs (Table 2, Survey #5). Seepage along Little Herman Creek to the aquifer ranged between 0.13 and 0.35 cfs. Total seepage from Herman Creek and Little Herman Creek to the underlying aquifer is estimated to range between 8.3 to 15.7 cfs.

The City currently holds water rights that authorize withdrawal of 4 cfs from their wellfield. Based on the seepage studies, seepage of water from Herman Creek and Little Herman Creek to the underlying aquifer greatly exceeds the wellfield's potential rate of withdrawal from the same aquifer.

It is important to note that these seepage estimates likely represent the low end of actual recharge to the underlying aquifer from Herman Creek and Little Herman Creek seepage because they are based on flow measurements made in late summer and early fall when stream flows at the wetted perimeters of the streams are typically at their minimums. At wetter times of year the Herman Creek and Little Herman Creek channels occupy more area, which would increase the rate of seepage to the aquifer.

2.3 PAA PUMPING TEST

The following discussion is related to information on Slide 10/16 of the November 2010 presentation.

A pumping test is a field method used to estimate the capacity of an aquifer to transmit water. This is accomplished by pumping a well at a known, controlled rate and measuring how much water levels in the well draw down from the pre-test, or “static,” condition. Water levels during pumping tests are often measured in nearby non-pumping wells, where available, which are commonly referred to as observation wells.

A short-term pumping test was completed in City Well 1 on August 1, 2011 to assess aquifer properties for the PAA. The Fish Tank Supply Well installed for Nwana investigations was used as an observation well during the test. The Fish Tank Supply Well (Figure 4) is located approximately 175 feet from City Well 1 and was constructed to produce water from approximately the center depth of the aquifer that supplies the City wellfield (Appendix A, log for Hood 50735).

Water levels were measured in City Well 1 and the Fish Tank Supply Well for approximately 1 day prior to the test and during the pumping period. The test consisted of operating Well 1 at approximately 440 gpm using the existing pump. Discharge water was conveyed into the City’s supply system. The pumping period lasted for 12 minutes, at which time water levels in Well 1 appeared to have stabilized. There was no discernible drawdown in the Fish Tank Supply Well.

At the end of the pumping period, the water level in Well 1 had drawn down about 0.08 feet from the pre-test, or “static,” water level. Based on the rate of drawdown in Well 1 and aquifer thickness of about 45 feet (Appendix A), the hydraulic conductivity, or permeability, of the PAA is estimated to be about 28,750 feet/day near the City wellfield. This represents a very productive aquifer. For reference, this is close to the maximum hydraulic conductivity value tabulated in Freeze and Cherry’s range of values of hydraulic conductivity and permeability for rocks and unconsolidated deposits, and is within the range for open-framework gravel (Freeze et. al., 1979).

A longer term test completed during the construction of Well 1 in 1969 revealed a similar draw-down relationship, as reported on the driller’s well log (Appendix A). During that test, Well 1 was pumped for 24 hours at a rate of 1,000 gpm and had only 0.2 feet of total drawdown. The initial 1969 pumping test in Well 2 involved pumping the well for 8 hours at a rate of 390 gpm, which resulted in 1 foot of total drawdown (Appendix A). The greater amount of drawdown at a lower pumping rate observed in the Well 2 test relative to drawdown observed in Well 1 tests is because Well 2 is less efficient due to a smaller well diameter (8 inch diameter in Well 2 vs. 14 inch diameter in Well 1) and fewer number of perforations in the well casing that allow water to flow into the well (600 perforations in Well 2 vs. 1200 perforations in Well 1).

2.4 GROUNDWATER IN THE UNSATURATED ZONE

The following discussion is provided in response to inquiries regarding aquifer storage in the unsaturated zone.

The portion of the subsurface between land surface and the water table is referred to as the unsaturated, or vadose zone. The pore spaces between soil grains and rock in this zone usually contain both air and water. In contrast, pore spaces beneath the water table are filled with water.

Water in the upper portions of the unsaturated zones is used by plants and can also evaporate directly to the atmosphere. Some water is held in the unsaturated zone by surface tension forces. Water in excess of evapotranspiration and surface tension forces infiltrates downward to the water table by gravity where it recharges underlying aquifer zones.

“The unsaturated zone is not always considered a major storage component of the hydrologic cycle because it holds only a minute fraction of the earth’s fresh water and this water is usually difficult to extract. But it is of great importance for water and nutrients of the biosphere.” (USGS, 2013).

Water content and therefore storage in the unsaturated zone is dynamic, shifting between high degrees of saturation following significant precipitation events, to very low degrees of saturation during drier seasons. The movement, or flux, of water through the unsaturated zone is complex because contributing physical properties such as hydraulic conductivity and pressures due to the soil-water attraction are dependent on water content, which again is highly variable and dynamic.

3.0 SURFACE WATER MONITORING

Discussions, figures, and tables in the following sections are related to the streamflow statement on Slide 7/16 of the November 2010 presentation, and are related to inquiries about the 1977 drought.

The surface water monitoring network consists of gaging stations installed for the NRNA project that are operated and maintained by River Measurements of Vancouver, Washington. As discussed above, River Measurement staff that established and maintain the surface water monitoring network are former USGS personnel, and follow USGS protocols and quality assurance for stream gaging.

Periodic stream flow surveys are made at each gaging station by River Measurements to maintain rating curves. Stage readings are collected at 15-minute intervals and converted to flow readings using the rating curves. Gaging stations for the Cascade Locks vicinity are presented in Figure 10.

The Little Herman Creek gage is located on the north side of I-84 about 500 feet northeast of the Oxbow Springs Hatchery rearing ponds. Oxbow Springs is the primary source of water to Little Herman Creek; therefore, the gage provides a continuous record of total spring discharge.

The Herman Creek gage is located just upstream of the Upper Herman Creek hatchery diversion dam.

3.1 OXBOW SPRINGS FISH HATCHERY

The Oregon Department of Fish and Wildlife (ODFW) operate the Oxbow Springs Hatchery in Cascade Locks for interim egg incubation and early rearing of coho and sockeye salmon. No adult fish are collected or spawned at Oxbow Springs Hatchery and there are no fish released at the facility.

The hatchery obtains its water supply from Oxbow Springs, which emanate from the hillside south of the hatchery property (Figure 10). There are two major springs that have been developed by ODFW as well as other smaller seeps and springs that contribute flow to the headwaters of Little Herman Creek, which is also used for supply. Upper Oxbow Springs (also known as the Middle Spring) is at an elevation of about 240 feet above sea level whereas Lower Oxbow Springs (also known as the East Spring) is at an elevation of about 230 feet. Covered concrete collection boxes have been installed at both of these larger springs. The collection box for Upper Oxbow Springs discharges directly into a small open reservoir that is formed by a sheet-pile dam. A portion of the water from the spring collection areas is piped to a hatchery building and used for egg incubation and rearing of small fry. The supply line intake for Upper Oxbow Springs is located in the small open reservoir, whereas the intake for Lower Oxbow Spring is located in the collection box. Overflow from both springs' collection systems flows into Little Herman Creek and a small reservoir near the west side of the hatchery (Figure 10). The small reservoir, which also acts as a settling pond, feeds water via a headbox into a series of raceways that are used for fish rearing (Figure 10 inset). Discharge water from the raceways is collected in a series of overflow pipes which transport the water back to the Little Herman Creek channel at the northeast corner of the property. During high recharge periods when water levels in the aquifer are elevated, field tests indicate that the small hatchery abatement pond south of the raceways contributes about 0.1 cfs of additional flow to Little Herman Creek upstream of the gaging station. Little Herman Creek cascades over a steep channel just north of I-84 before it reaches the Herman Creek floodplain.

3.2 WEIR MEASUREMENTS

Discharge from Oxbow Springs have been measured by hatchery personnel since 1969, including the period of the 1977 drought (Figure 12a). Discharge measurements by hatchery personnel relative to data from the Little Herman Creek gage are presented in Figure 12b. ODFW flow estimates include two time periods: one from 1969 to 1992 and the other from 2000 to present. The pre-1992 data were collected using a Cipolletti weir (trapezoidal shape in cross section perpendicular to water flow) located on the upstream side of the raceway headbox and the post-2000 data were collected using a sharp-crested weir (rectangular shape in cross section perpendicular to water flow) that is located on the downstream side of the headbox.

Discrepancies between flows measured at the hatchery weir and at the Little Herman Creek gage are likely due to differences in the frequency of measurements between the two stations and due to the way measurements are made at the hatchery weir as described below.

Overflow from the spring collectors flows into Little Herman Creek and a settling pond west of the raceways (Section 3.1). Flow is then piped to a headbox that bisects the raceways. During normal operation, there are stop logs on the south side of the headbox that forces water into the raceways and ultimately discharges through a series of pipes to Little Herman Creek. Since 2000, when hatchery staff measure Oxbow Spring flow they drop the stop logs, which cuts off flow to the raceways. In this configuration, all flow through the headbox discharges through a rectangular shaped weir on the south side of the raceways and is then piped to Little Herman Creek.

In recent years, measurements have been made by hatchery personnel at the weir approximately weekly. Data at the Little Herman Creek gage for Nwana investigations are collected at 15 minute intervals. The differences in measurement frequency at the two stations could translate to dampening of flow measurements made at the weir relative to flows recorded at the Little Herman Creek gage if peak and low flows aren't coincident with weekly weir measurements.

The hatchery measurement point appears to be located too close to the weir, which leads to an underestimation of actual flow rates. The head on a weir is a key term used in calculating discharge rates.

"The head on the weir, h , is the difference in elevation between the crest of the weir and the surface of the flowing stream, measured far enough upstream from the weir to eliminate the effect of the increase in velocity as the water spills over the weir. Because small errors in determining h can make a large error in calculating the discharge, it is essential to make the head measurements from 3 to 8 ft (0.9 to 2.1 m) upstream of the crest." (Driscoll, 1986).

Stream flow at the Little Herman Creek gage, described below, is believed to be the most accurate data for quantifying flow from Oxbow Springs because it is based on USGS data collection and quality control protocols.

3.3 STREAM FLOW GAGING AND OXBOW SPRINGS MEASUREMENTS

3.3.1 Little Herman Creek

Stream flow in Little Herman Creek has been monitored for Nwana investigations since 2008. As described above, Oxbow Springs is the primary source of water to Little Herman Creek; therefore, the gage provides a continuous record of total spring discharge. Flow in Little Herman Creek is influenced by upstream operations at the Oxbow Springs hatchery. Staff open and close fish raceway ponds and make adjustments when cleaning or performing related activities. These practices introduce short-term variability in data collected at the Little Herman Creek gage. Therefore, the flow data presented for Little Herman Creek in Figures 9 and 12b are 24-hour averaged data to reduce the short-term variability.

3.3.2 Herman Creek

Stream flow in Herman Creek has been monitored since 2009. The data set is not continuous because a landslide occurred on June 2, 2010 that temporarily affected the applicability of the Herman Creek rating curve for higher-end flows. Therefore, stream flow data recorded between

June 2010 and June 2011 that are greater than 115 cfs are not reported. A new rating curve was established by June 2011 that provides quantification of the more recent higher flows at this gage.

The maximum stream flow recorded at the Herman Creek gaging station was approximately 1,270 cfs in March 2014 (Figure 9). The seasonal low flows over the monitoring period are approximately 20 cfs and occur between late August and November.

4.0 WATER QUALITY

Information in this section is related to water quality statements on Slide 7/16 and the figures on Slides 8/16 and 9/16 of the November 2010 presentation.

4.1 MAJOR CATION/ANION CHEMISTRY

Trilinear diagrams are often used to classify the chemistry of natural waters and are useful tools to illustrate how the major ion composition of water varies between different hydrogeologic systems. The diagrams plot the percentage composition in a sample of major cations (positively charged ions) in one triangle and the percentage composition of major anions (negatively charged ions) in a second triangle. Graphically, the major cation and anion composition of a sample are both plotted on a single diamond shape, which allows the major ion chemistry of different water samples to be compared.

A trilinear diagram representing the major ion chemistry in water quality samples collected from Oxbow Springs, Dry Creek, Herman Creek, Cascade Locks Well 1, and Columbia River between 2003 and 2009 was presented in Slide 8/16 of the November 2010 presentation. The water quality data used to generate the plot is presented in Table 3. The 2003 Columbia River sample represented in Slide 8/16 was collected by the USGS at the Warrendale, OR station.

An updated trilinear diagram is presented in Figure 13 and the data used to generate the plot are included in Table 3. Columbia River samples represented in Figure 13 were collected by PGG.

The trilinear diagrams indicate that the major ion chemistry of the springs, creeks, and Well 1 samples are distinct from the major ion chemistry of the Columbia River samples. This supports the conceptual model that recharge to the alluvial aquifer that supplies the Cascade Locks well-field originates as seepage losses from creeks flowing from the uplands, discharge from the LSTS aquifer, and infiltration of precipitation as opposed to induced recharge from the Columbia River. If the alluvial aquifer did receive a significant amount of recharge from the Columbia River, the major ion chemistry of Well 1 samples would be expected to be similar to that of the Columbia River, or to reflect some degree of mixing of Columbia River, springs, and creek water chemistry.

During water quality sampling for these investigations, laboratory prepared bottles were filled directly from the spring flow, creeks, and rivers; or from spigots closest to the wellheads. Samples were transported or shipped to the analytical labs in ice chests following standard chain-of-

custody procedures. Analytical services have been provided by certified labs throughout the United States.

4.2 DEUTERIUM AND OXYGEN-18 ISOTOPES

Much of the Columbia River basin is located in semi-arid to arid portions of Oregon and Washington located east of the Cascade Mountains. In general, precipitation becomes progressively lighter in the deuterium and oxygen-18 isotopes as it occurs farther from the ocean (Drever, 1988). As a result, water in the Columbia River is depleted in deuterium and oxygen-18 relative to precipitation that falls in the Cascade Locks area. These stable isotopes can be used as natural tracers to evaluate the hydraulic relationship between the Columbia River and adjacent aquifers (McCarthy et. al., 1991).

In May 2010 water quality samples were collected on behalf of NRNA for deuterium and oxygen-18 analyses from Oxbow Springs, Cascade Locks Fish Tank Well, Herman Creek, and the Columbia River. The samples were submitted to Isotech Laboratories, Inc. in Champaign, Illinois for analysis.

The global meteoric water line (GMWL) represents the average relationship between hydrogen and oxygen isotope ratios in global precipitation relative to standard mean ocean water. Precipitation samples will tend to group close to the GMWL. Deviations from the GMWL can be interpreted as precipitation that occurred during a warmer or colder climate than at present or by geochemical changes that occurred during flow through the subsurface (Fetter, 2001).

The analytical results of isotope analyses in Cascade Locks area water samples were presented relative to the GMWL in Slide 9/16 of the November 2010 presentation. The data are reproduced graphically in Figure 14 and are summarized in Table 4. The isotopic compositions of water sampled from Oxbow Springs, the Cascade Locks Fish Well, and Herman Creek fall within a cluster that is isotopically distinct (heavier) than the Columbia River water sample.

This supports the conceptual model that recharge to the alluvial aquifer that supplies the Cascade Locks wellfield originates as seepage losses from creeks flowing from the uplands, discharge from the LSTS aquifer, and infiltration of precipitation; as opposed to recharge from the Columbia River. If the alluvial aquifer did receive a significant amount of recharge from the Columbia River, the isotopic composition of Well 1 would be expected to be similar to that of the Columbia River, or to reflect some degree of mixing of Columbia River, springs, and creek isotopic compositions.

5.0 SURFACE WATER TEMPERATURES AND MODEL

The discussions in this section are related to the figures presented in Slides 12/16, 13/16, and 16/16 of the November 2010 presentation.

5.1 SURFACE WATER TEMPERATURE MONITORING

The monitoring network established for these investigations includes continuous temperature monitoring in Oxbow Springs, Little Herman Creek (just above the confluence with Herman Creek), Herman Creek, and the City's wellfield (Figure 10).

Temperature data collected in Herman Creek at the upper diversion dam and in Lower Herman Creek above the confluence with Little Herman Creek between September 2009 and October 2010 were presented in the November 2010 presentation relative to OAR 340-041-0028 criteria. These criteria are protective of spawning, rearing, and migration. The Herman Creek temperature plot has been updated in Figure 15. This updated figure only shows values for the upstream monitoring station since data for the downstream station are almost exactly the same. Temperatures at both stations during the five year monitoring period have not exceeded the spawning, rearing, and migration criteria.

5.2 THERMAL FLUX MODEL

A thermal flux model was used to estimate temperature changes to lower Herman Creek during the low flow period that extends from early summer through late fall based on the proposed water exchange envisioned between ODFW (spring source) and the City (well source). The modeling analysis assumed there would be an equal water exchange of 0.5 cfs between ODFW and the City year round.

The thermal flux for any point in the system is a product of both water temperature and flow rate. Knowledge of thermal flux of Herman Creek, Little Herman Creek, and the City supply allows modeling of the changes in the thermal flux in the lower reaches of these streams due to changes in the source of water (i.e. wellfield versus springs).

The streamflow and surface water temperature data collected between June 18, 2010 and January 1, 2011 were used as a basis for this analysis (Figures 9 and 15). Temperatures measured in City Well 1 and Oxbow Springs were also incorporated in the analysis (Figure 16, update of Slide 13/16).

The thermal flux model was performed for two water year conditions: the 2010 water year and a simulated "drought" water year. Monthly precipitation data collected at a station at Bonneville Dam, approximately 5 miles downstream from Oxbow Springs, was used in the model. Monthly precipitation at the Bonneville Dam station in the 2010 water year was about 9-percent greater than long-term average conditions at the station, and was therefore selected to represent long-term average conditions. Annual precipitation in water year 1977 was 40-percent less than annual precipitation in water year 2010, and was therefore selected to represent drought conditions.

Results of the thermal flux model were presented in Slide 16/16 of the November 2010 presentation and are re-produced graphically in Figure 17 and tabulated in Table 5. A more complete discussion of the thermal flux model and results are included in the *Temperature Characteristics of Herman Creek Cove and Its Function as a Cool-Water Refuge for Adult Salmon and Steelhead in the Columbia River* (Cramer Fish Sciences, 2010).

6.0 CLOSING

PGG hopes the data and technical information in this memorandum meets your needs to provide information to the City Council as requested during your discussion with Councilor Deanna Busdieker. Please feel free to contact us with any questions or additional needs.

7.0 REFERENCES

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Table 1a. Oxbow Springs Basin Water Balance Presented in Slide 5/6

Input	Value	Source
Oxbow Springs Watershed Precipitation	89 in/year	PRISM Climate Group, Oregon State University average annual precipitation 1971-2000 (Figure 8a). Average in Oxbow Basin calculated by GIS analysis of precipitation contours.
Evapotranspiration	23 in/year	Snyder and Brownell, 1996. Hydrogeologic Setting and Preliminary Estimates of Hydrologic Components for Bull Run Lake and the Bull Run Lake Drainage Basin, Multnomah and Clackamas Counties, Oregon U.S. Geological Survey Water Resources Investigations Report 96-4064
Runoff	0 in/year	Field reconnaissance
Net Recharge	66 in/year	Calculation, Precipitation - Evapotranspiration - Runoff
Oxbow Springs Drainage Area	0.25 sq miles	Drainage area boundaries estimated from topographic divides; area calculated by GIS analysis
Total Recharge	1.2 cfs	Calculation, Net Recharge x Drainage Area
Average Oxbow Springs Flow	4.7 cfs	Average flow measurements at Little Herman Creek gage available at time Slide 5/16 was prepared

Table 1b. Updated Oxbow Springs Basin Water Balance (1981-2010 Precipitation Data)

Input	Value	Source
Oxbow Springs Watershed Precipitation	76 in/year	PRISM Climate Group, Oregon State University average annual precipitation 1981-2010 (Figure 8b). Average in Oxbow Basin calculated by GIS analysis of precipitation contours.
Evapotranspiration	23 in/year	Snyder and Brownell, 1996. Hydrogeologic Setting and Preliminary Estimates of Hydrologic Components for Bull Run Lake and the Bull Run Lake Drainage Basin, Multnomah and Clackamas Counties, Oregon U.S. Geological Survey Water Resources Investigations Report 96-4064
Runoff	0 in/year	Field reconnaissance
Net Recharge	53 in/year	Calculation, Precipitation - Evapotranspiration - Runoff
Oxbow Springs Drainage Area	0.25 sq miles	Drainage area boundaries estimated from topographic divides; area calculated by GIS analysis
Total Recharge	1 cfs	Calculation
Average Oxbow Springs Flow	5 cfs	Average flow measurements at Little Herman Creek gage October 2009 – September 2014 (Figure 8)

Table 2 - Summary of Herman Creek Seepage Surveys, 2009 - 2011

Survey #	Site	Site Description	Date	Time	Discharge (cfs)
1	A	Herman Creek near Mouth	9/14/2009	13:20	19.6
1	B	Herman Creek above Upper Hatchery Intake	9/14/2009	14:40	27.7
1	C	Little Herman Creek at Confluence	9/14/2009	13:15	2.72
1	D	Little Herman Creek at Gage.	9/14/2009	12:10	3.04
Seepage loss along lower Herman Creek: Loss = B - (A - C)					10.82
Seepage loss along Little Herman Creek: Loss = D - C					0.32
Survey #	Site	Site Description	Date	Time	Discharge (cfs)
2	A	Herman Creek near Mouth	9/2/2010	16:30	26.5
2	B	Herman Creek above Upper Hatchery Intake	9/2/2010	19:00	27.2
2	C	Little Herman Creek at Confluence	9/2/2010	15:50	2.95
2	D	Little Herman Creek at Gage.	9/2/2010	17:55	3.30
Seepage loss along lower Herman Creek: Loss = B - (A - C)					3.65
Seepage loss along Little Herman Creek: Loss = D - C					0.35
Survey #	Site	Site Description	Date	Time	Discharge (cfs)
3	A	Herman Creek near Mouth	10/6/2010	14:00	21.1
3	B	Herman Creek above Upper Hatchery Intake	10/6/2010	13:40	24.7
3	D	Little Herman Creek at Gage	10/6/2010	15:20	3.19
Seepage loss along lower Herman Creek: Loss = B - (A - D)					6.79
Survey #	Site	Site Description	Date	Time	Discharge (cfs)
4	A	Herman Creek near Mouth	9/8/2011	14:30	22.8
4	B	Herman Creek above Upper Hatchery Intake	9/8/2011	13:20	23.6
4	C	Little Herman Creek at Confluence	9/8/2011	14:30	3.10
4	D	Little Herman Creek at Gage.	9/8/2011	12:15	3.23
Seepage loss along lower Herman Creek: Loss = B - (A - C)					3.90
Seepage loss along Little Herman Creek: Loss = D - C					0.13
Survey #	Site	Site Description	Date	Time	Discharge (cfs)
5	A	Herman Creek near Mouth	10/27/2011	11:50	11.3
5	E	Herman Creek at RM 0.2	10/27/2011	13:00	9.45
5	F	Herman Creek at Mouth	10/27/2011	13:55	6.69
Seepage loss from lower diversion dam to mouth = A - F					4.61

Notes:

Seepage surveys completed by River Measurements of Vancouver Washington.

Table 3. Major Anion and Cation Concentration Summary for Oxbow Springs, City Wellfield, Dry Creek, Herman Creek, and Columbia River used to Generate Trilinear Diagrams

Sample Location	Date	Bicarbonate Alkalinity as CaCO3		Carbonate Alkalinity as CaCO3	Carbonate as CO3	Chloride	Sulfate	Calcium, Magnesium, Total		Potassium, Total		Sodium, Total
		mg/L	mg/L					mg/L	mg/L	ug/L	ug/L	
Lower Oxbow Springs	6/7/08	25	2 U	2 U	1.1	0.9	4,440	1,870	1,370	2,690		
Lower Oxbow Springs	7/2/08	26	2 U	2 U	1.1	0.8	4,610	1,920	2,000 U	2,780		
Lower Oxbow Springs	1/28/09	20	1 U	1 U	0.55	1	4,600	1,800	1,300	3,000		
Lower Oxbow Springs	4/23/09	20	1 U	1 U	1.5	1.1	4,300	1,800	1,400	3,300		
Lower Oxbow Springs	7/20/09	24	1 U	1 U	1.8	0.08	4,700	1,800	1,100	3,200		
Lower Oxbow Springs	11/4/09	23	2 U	2 U	1.22	0.95	4,720	1,950	1,350	2,750		
Lower Oxbow Springs	5/19/10	25.7	2 U	2 U	1.2	0.87	4,470	1,810	1,360	2,710		
Lower Oxbow Springs	11/18/10	24	9 U	9 U	1.01	0.79	4,590	1,870	1,260	2,850		
Lower Oxbow Springs	9/21/11	30	30	2 U	1.0	0.88	4,700	2,000	1,400	3,000		
Lower Oxbow Springs	7/30/12	29	2 U	2 U	1	0.85	4,600	2,000	1,500	3,200		
Upper Oxbow Spring	7/2/08	24	2 U	2 U	1.1	0.8	4,680	1,940	2,000 U	2,830		
Upper Oxbow Spring	3/12/13	29	2 U	2 U	1	0.86	4,600	1,900	1,600	3,700		
Cascade Locks Well 1	1/28/09	22	1 U	1 U	0.96	1	5,600	2,000	1,200	3,500		
Cascade Locks Well 1	7/20/09	22	1 U	1 U	1.1	0.6	4,500	1,900	1,300	3,300		
Cascade Locks Well 1	11/4/09	26	2 U	2 U	1.47	1.08	5,480	2,060	1,350	3,100		
Cascade Locks Well 1	7/30/12	28	2 U	2 U	1.1	0.87	4,900	2,000	1,300	3,200		
Cascade Locks Well 1	3/12/13	29	2 U	2 U	1.3	1	5,100	2,000	1,500	3,900		
Cascade Locks Well 2	4/23/09	20	1 U	1 U	2	1.1	4,900	1,900	1,200	3,300		
Columbia River at Warrendale*	12/16/03	74	0	0	2.97	11.5	20,000	5,650	1,390	6,390		
Columbia River	11/3/09	61	2 U	2 U	3.08	12.4	18,100	5,110	1,340	5,970		
Columbia River	5/18/10	65.3	2 U	2 U	2.49	10.7	16,400	4,880	1,320	5,630		
Herman Creek	11/3/09	21.8	2 U	2 U	1.22	0.72	4,420	1,760	921	2,400		
Herman Creek	5/18/10	20.4	2 U	2 U	0.9	0.5	3,440	1,400	718	1,980		
Dry Creek Spring	9/19/08	23	10 U	10 U	1.1	1.1	6,790	2,650	2,150	4,290		
Dry Creek	11/3/09	20.8	2 U	2 U	1.2	0.41	4,670	1,840	321	1,810		
Dry Creek	5/18/10	21.6	2 U	2 U	1.02	0.35	3,800	1,530	332	1,750		

Bold: sample represented in Trilinear Diagram on Slide 8/16 of November 2010 Presentation
 U = non-detect at associated lab reporting limit

*Sample collected by USGS at Warrendale station, data available from NWIS; sample results reported as filtered; CO3 result reported as 0 mg/L

Table 4. Cascade Locks Area Isotope Chemistry, May 2010

Sample Name	Oxygen-18 $\delta^{18}\text{O H}_2\text{O}$ ‰	Deuterium $\delta\text{D H}_2\text{O}$ ‰
Herman Creek	-11.23	-77.0
Columbia River	-16.47	-119.3
Oxbow Springs	-11.07	-76.2
CL Wellfield - Fish Tank	-10.99	-75.8

Table 5. Estimated Temperature Changes in Herman Creek Due to Water Exchange, Thermal Flux Model Results

Estimated Temp. Changes (F)			Estimated Temp. Changes (F)			Estimated Temp. Changes (F)		
Date	2010	1977	Date	2010	1977	Date	2010	1977
	Conditions	Drought Conditions		Conditions	Drought Conditions		Conditions	Drought Conditions
6/17/10	0.008	0.013	8/3/10	0.053	0.104	9/19/10	0.070	0.132
6/18/10	0.009	0.015	8/4/10	0.049	0.096	9/20/10	0.053	0.096
6/19/10	0.010	0.017	8/5/10	0.056	0.110	9/21/10	0.085	0.163
6/20/10	0.010	0.018	8/6/10	0.058	0.113	9/22/10	0.103	0.204
6/21/10	0.012	0.020	8/7/10	0.056	0.110	9/23/10	0.112	0.225
6/22/10	0.012	0.020	8/8/10	0.056	0.110	9/24/10	0.110	0.220
6/23/10	0.013	0.023	8/9/10	0.064	0.126	9/25/10	0.119	0.243
6/24/10	0.015	0.026	8/10/10	0.063	0.125	9/26/10	0.125	0.255
6/25/10	0.014	0.025	8/11/10	0.062	0.123	9/27/10	0.120	0.243
6/26/10	0.016	0.028	8/12/10	0.066	0.130	9/28/10	0.128	0.263
6/27/10	0.017	0.030	8/13/10	0.069	0.138	9/29/10	0.132	0.272
6/28/10	0.016	0.028	8/14/10	0.070	0.140	9/30/10	0.127	0.263
6/29/10	0.018	0.031	8/15/10	0.069	0.139	10/1/10	0.140	0.288
6/30/10	0.020	0.035	8/16/10	0.075	0.151	10/2/10	0.139	0.288
7/1/10	0.020	0.036	8/17/10	0.078	0.159	10/3/10	0.139	0.290
7/2/10	0.018	0.033	8/18/10	0.076	0.153	10/4/10	0.147	0.306
7/3/10	0.021	0.037	8/19/10	0.079	0.161	10/5/10	0.143	0.300
7/4/10	0.022	0.039	8/20/10	0.083	0.169	10/6/10	0.153	0.321
7/5/10	0.022	0.039	8/21/10	0.084	0.172			
7/6/10	0.025	0.045	8/22/10	0.083	0.170			
7/7/10	0.023	0.041	8/23/10	0.091	0.187			
7/8/10	0.024	0.044	8/24/10	0.087	0.179			
7/9/10	0.026	0.048	8/25/10	0.089	0.184			
7/10/10	0.028	0.051	8/26/10	0.092	0.190			
7/11/10	0.027	0.050	8/27/10	0.089	0.184			
7/12/10	0.029	0.053	8/28/10	0.091	0.190			
7/13/10	0.030	0.055	8/29/10	0.101	0.211			
7/14/10	0.030	0.055	8/30/10	0.097	0.202			
7/15/10	0.031	0.058	8/31/10	0.096	0.199			
7/16/10	0.035	0.066	9/1/10	0.066	0.127			
7/17/10	0.033	0.061	9/2/10	0.085	0.169			
7/18/10	0.035	0.064	9/3/10	0.096	0.198			
7/19/10	0.036	0.068	9/4/10	0.108	0.224			
7/20/10	0.038	0.071	9/5/10	0.114	0.239			
7/21/10	0.037	0.069	9/6/10	0.108	0.226			
7/22/10	0.040	0.076	9/7/10	0.102	0.211			
7/23/10	0.040	0.076	9/8/10	0.104	0.214			
7/24/10	0.040	0.075	9/9/10	0.109	0.225			
7/25/10	0.043	0.082	9/10/10	0.112	0.233			
7/26/10	0.045	0.086	9/11/10	0.120	0.252			
7/27/10	0.043	0.082	9/12/10	0.119	0.249			
7/28/10	0.046	0.088	9/13/10	0.121	0.254			
7/29/10	0.048	0.093	9/14/10	0.129	0.273			
7/30/10	0.050	0.097	9/15/10	0.125	0.264			
7/31/10	0.048	0.092	9/16/10	0.115	0.237			
8/1/10	0.049	0.095	9/17/10	0.098	0.192			
8/2/10	0.051	0.098	9/18/10	0.062	0.114			

Surficial Geology*

- Qal - Quaternary Alluvial Deposits
- Qtc - Quaternary Thick Tails
- Qtv - High Cascades Volcanics
- Qww1 - Wind River Flows
- QTI - Intrusive Rock
- Tpr - Rhododendron Formation
- Tcr - Columbia River Basalt
- Tme - Eagle Creek Formation

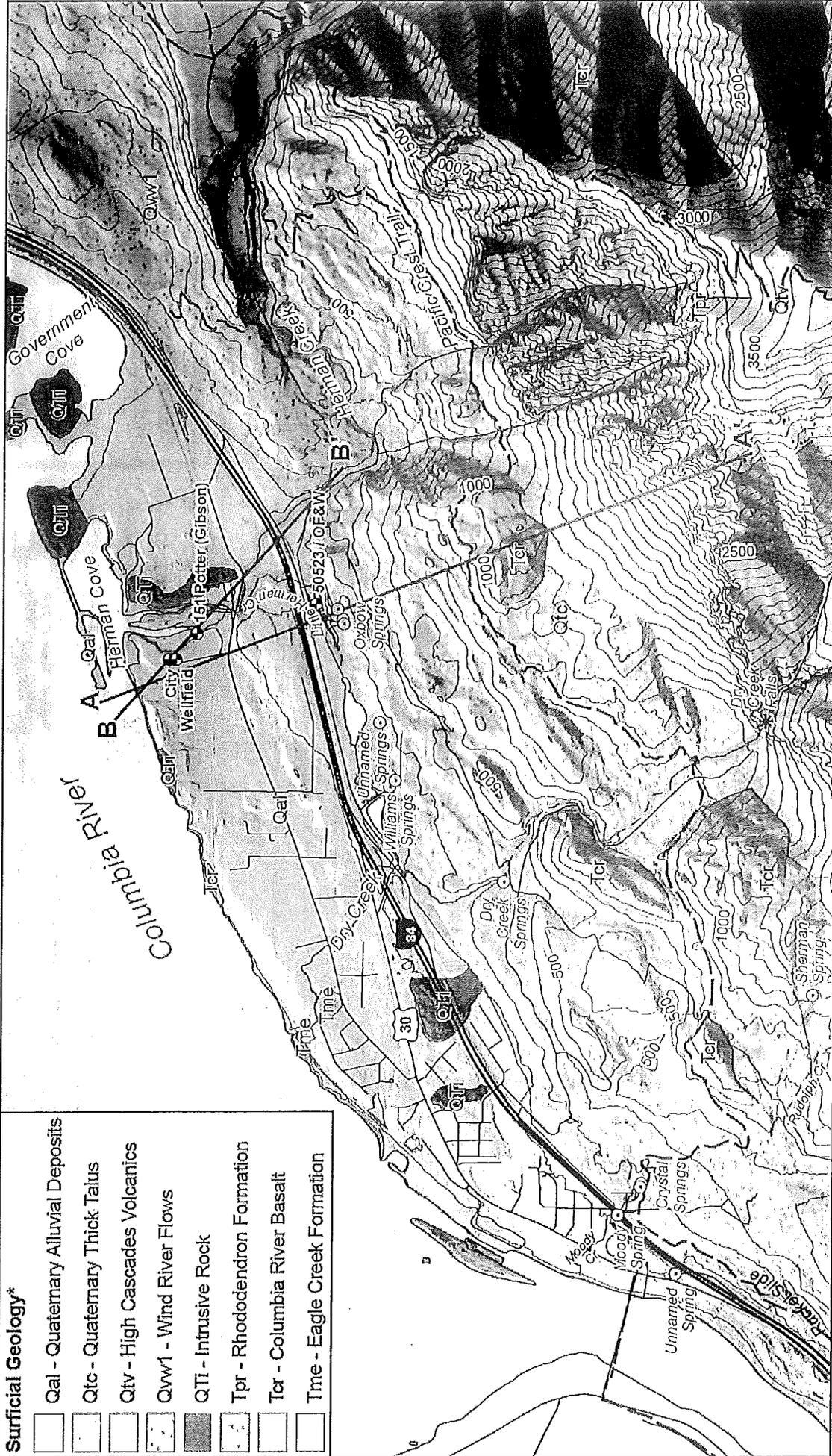


Figure 1
Surficial Geology of the
Cascade Locks Vicinity

* Modified from:
 Bulletin #91, Geologic hazards of parts of northern
 Hood River, Wasco, and Sherman Counties, Oregon
 by John D. Beaulieu, 1977

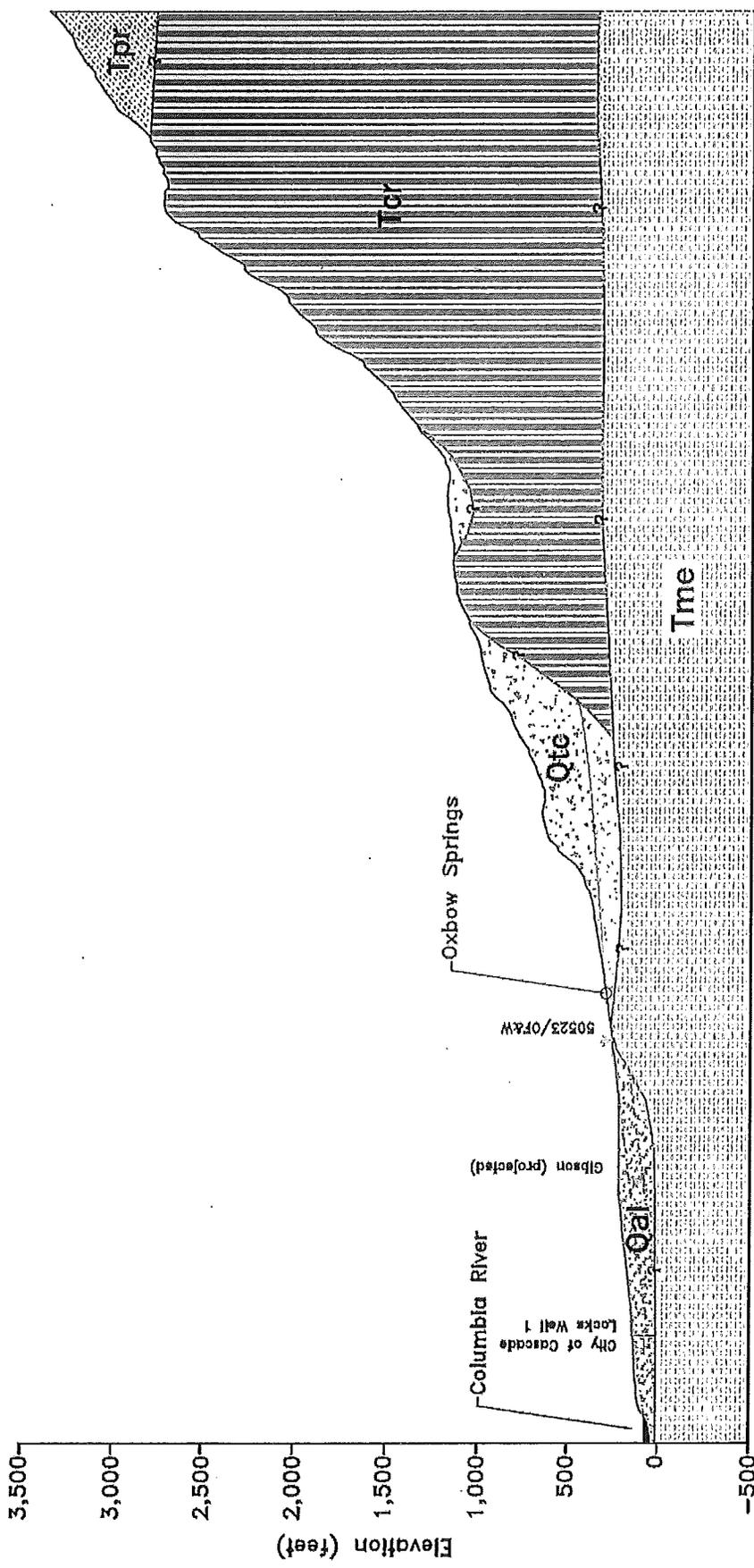
A Reconnaissance of the Ground-Water Resources of the
 Hood River Valley and the Cascade Locks Area, Hood River
 County, Oregon. State of Oregon Ground Water Report No. 10.
 by Jack E. Sceva, 1966

- Wells
- Spring Locations
- Losing Stream Reaches
- Trails
- 100-foot Land Surface Contours
- Cross Section Profile



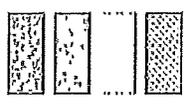
A (north)

A' (south)



Legend

- Well Completion
- Well ID/Owner Name
- Static Water Level



- Qal - Quaternary Alluvium
- Qtc - Quaternary Thick Talus
- Qtv - High Cascades Volcanics
- Tpr - Rhododendron Formation

- Tcr - Columbia River Basalt
- Tme - Eagle Creek Formation

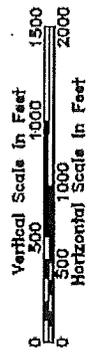
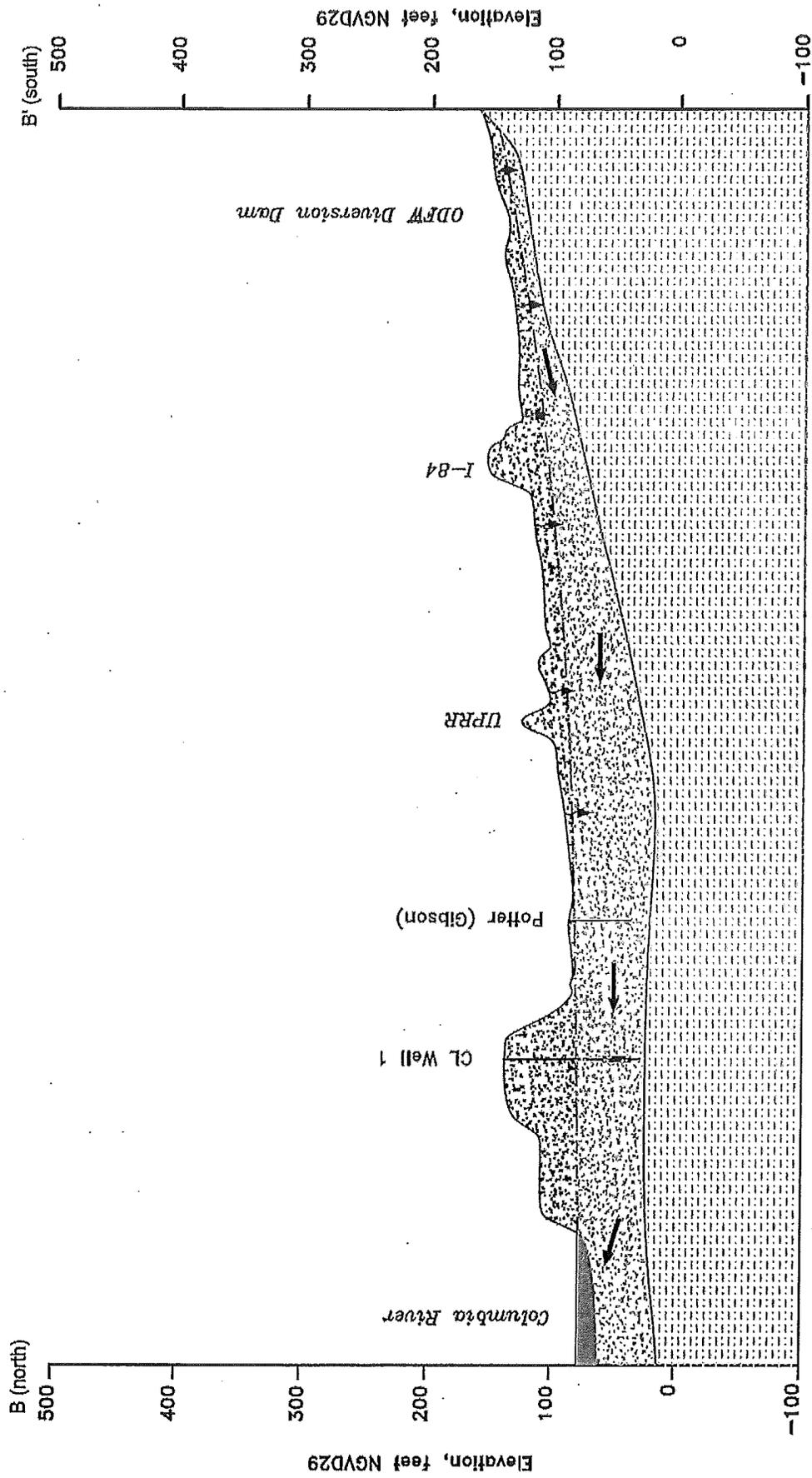


Figure 2
Hydrogeologic Cross Section A-A'



Technical Information Cascades Locks Visibility
 November 2010 Presentation
 JEO705.41_XsecA.dwg



LEGEND

- 
Well Owner/Names
- 
Static Water Level
- 
Open Interval
- 
Qcd - Quaternary Alluvium
- 
Qtc - Quaternary Thick Talus and Landslide Deposits
- 
Tms - Eggle Creek Formation
- 
Groundwater Flow Direction
- 
Herman Creek Seepage Loss to Aquifer
- 
Vertical Scale In Feet
0 50 100
- 
Horizontal Scale In Feet
0 250 500

Figure 3
Hydrogeologic Cross Section B-B'



Technical Information Cascade Locks Vicinity
 November 2010 Presentation
 20795.41, C.L.I. Profile, Jmm10/09

Columbia River

Heman Cove

Cascade Locks Wellfield

City Storage Building

Herman Creek Lane

Gramblett Way

Union Pacific Rail Line

Forest Lane

Herman Creek
Little Herman Creek

SE Corner of Section 6
T2N, R8E

Mountain View Drive

Frontage Road

84

Figure 4

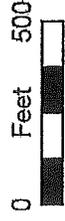
Cascade Locks Wellfield Site Map

PGG

- ▲ Fish Tank Supply Well*
- Existing City Wells
- ⊕ Potter (Gibson) Well
- ⊙ Port of Cascade Locks Well
- ▭ Buildings & Structures
- ▭ City of Cascade Locks Parcel
- 100-foot Contours
- 20-foot Contours

* Well Location Information:

1720 feet North and 710 feet West of the southeast corner of Section 6, Township 2 North, Range 8 East
 Easting: 963,808 Feet
 Northing: 1,435,927 Feet
 Projection: Oregon Statewide Lambert, NAD 83
 Vertical Datum: NAVD88



1 inch = 500 feet
 2005 Orthophoto



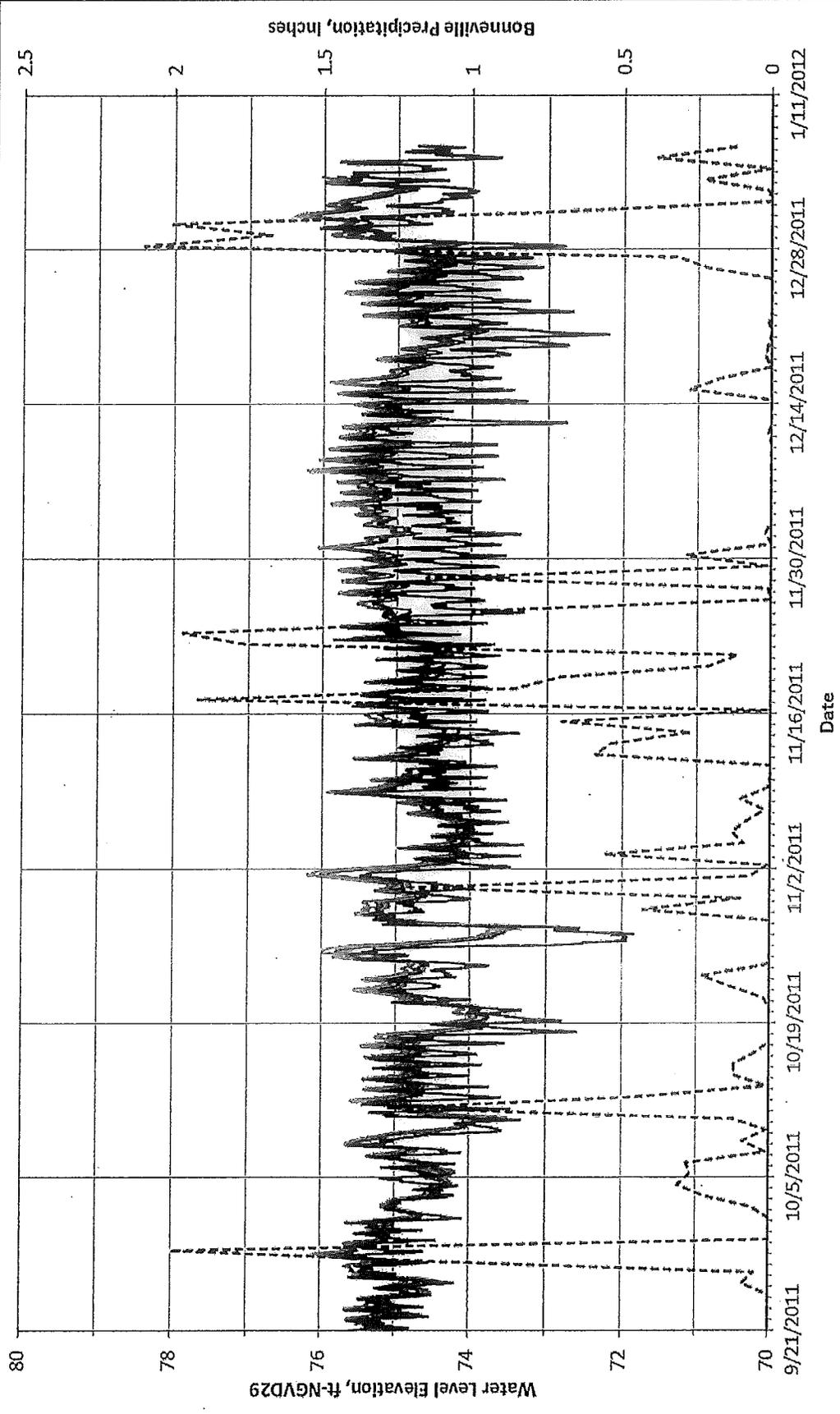
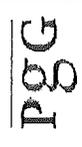


Figure 5a
Water Level and Precipitation Trends for the
Cascade Locks Wellfield Vicinity

Technical Information November 2010 Presentation
 All_MW_Data_v1.xls

City Well 1
 Fish Tank Well
 Port of CL
 Columbia River - Stevenson
 Bonneville Dam Daily Precipitation

Groundwater Level data available at www.nestlewaterpnw.com
 Columbia River Stevenson data available at http://waterdata.usgs.gov/nwis/inventory/?site_no=14128600&agency_cd=USGS
 USGS
 Bonneville Dam, Oregon (350897) precipitation data available from www.wrcc.dri.edu



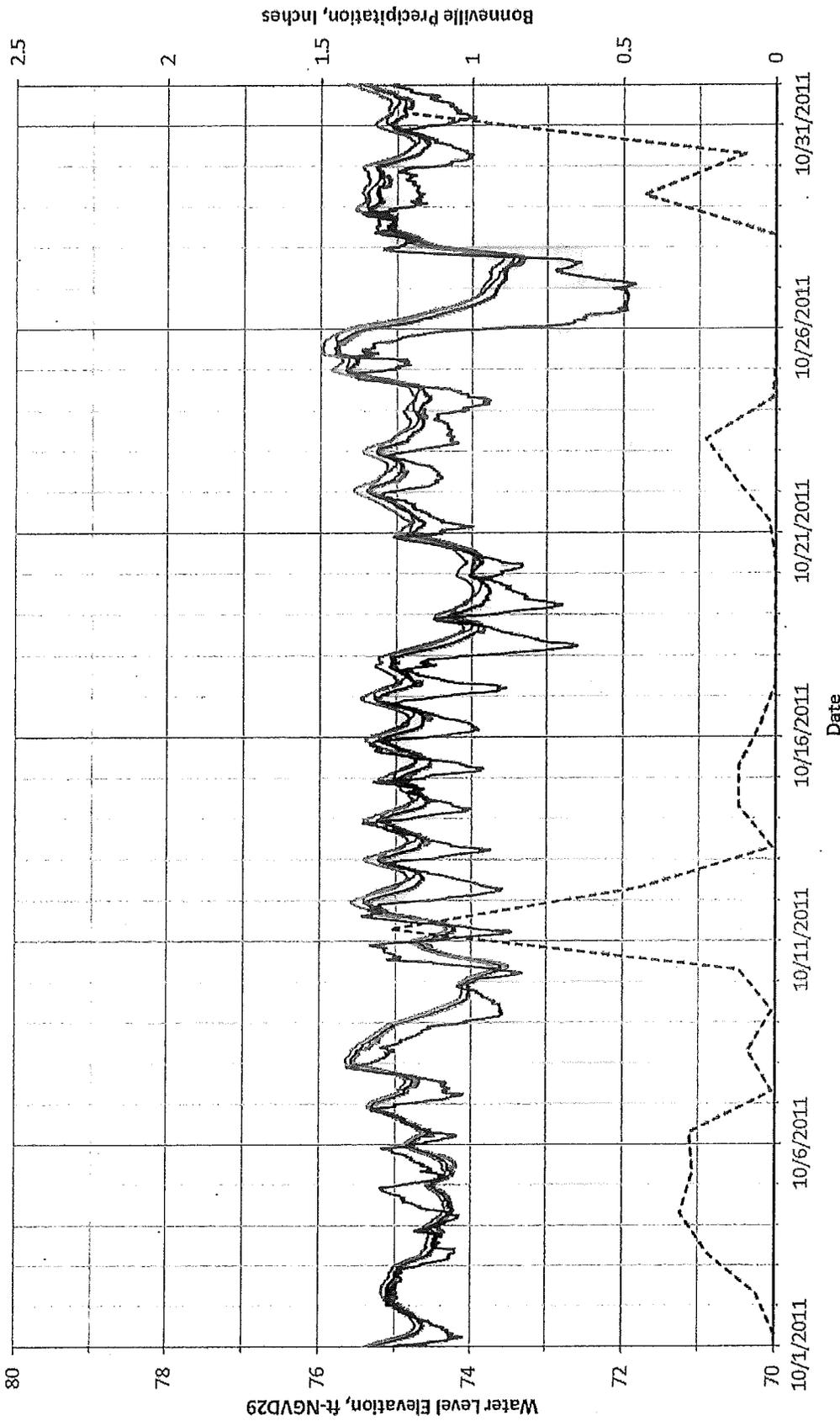


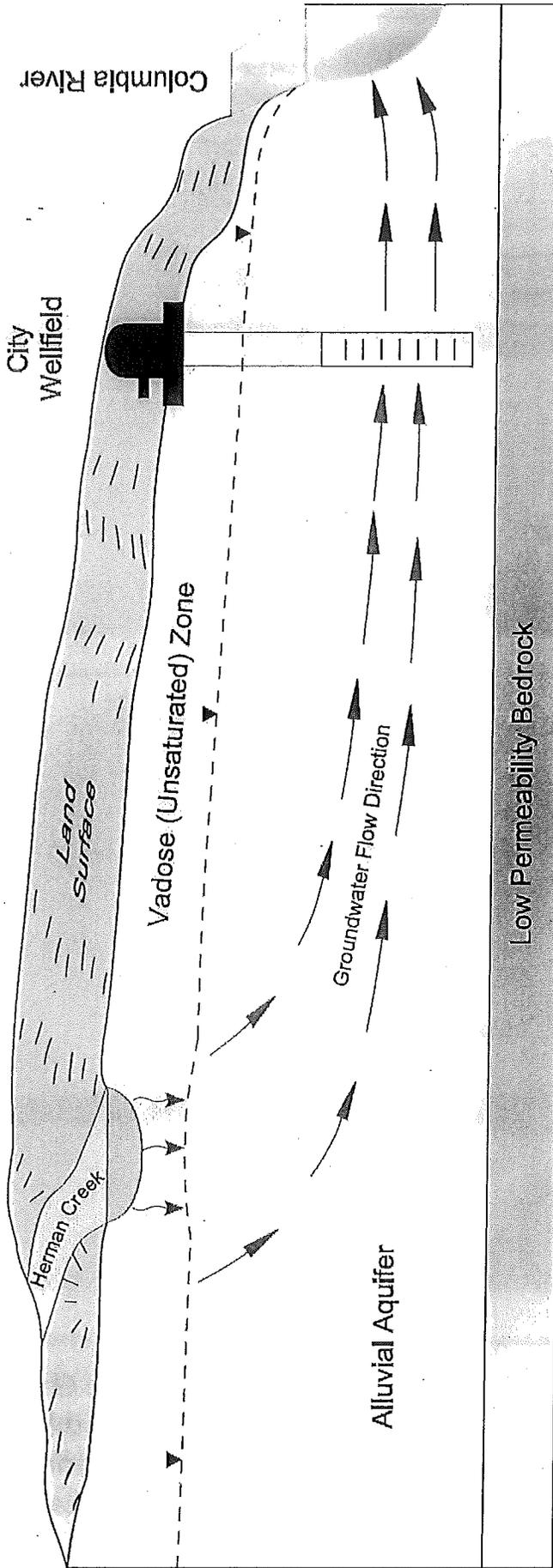
Figure 5b
Water Level and Precipitation Trends for the
Cascade Locks Wellfield Vicinity, October 2011

Technical Information November 2010 Presentation
 All_MW_Data_v1.xls



City Well 1
 Fish Tank Well
 Port of CL
 Columbia River - Stevenson
 Bonneville Dam Daily Precipitation

Groundwater Level data available at www.nestiewaterspnw.com
 Columbia River Stevenson data available at <http://waterdata.usgs.gov/nwis/inventory/?site no=14128600&agency cd=USGS>
 Bonneville Dam, Oregon (350897) precipitation data available from www.wrcc.dri.edu



Modified from USGS Circular 1186, Sustainability of Ground-Water Resources. W.M. Alley, Thomas E. Reilly, and O. Lehn Franke. 1999.

Figure 6a. Conceptual Model of Groundwater Flow from Herman Creek Seepage to City of Cascade Locks Wellfield under Non-Pumping Conditions

Conceptual Diagram, not to scale.

- - - Water Table

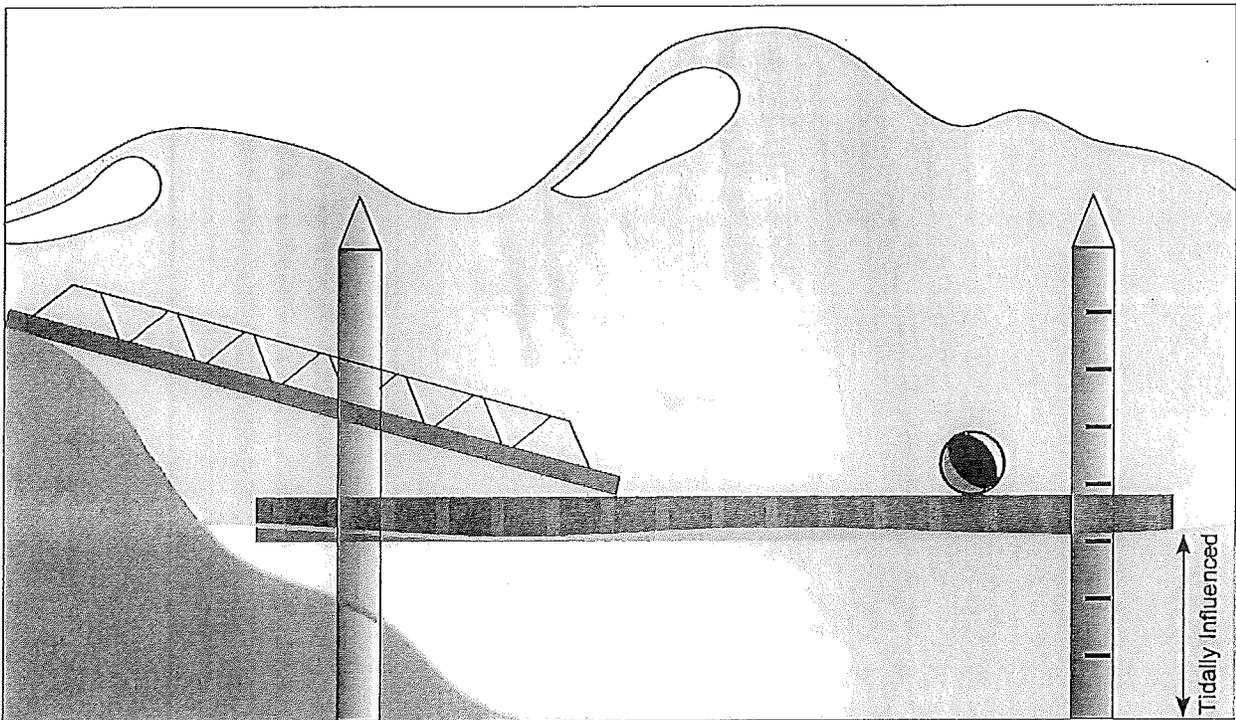
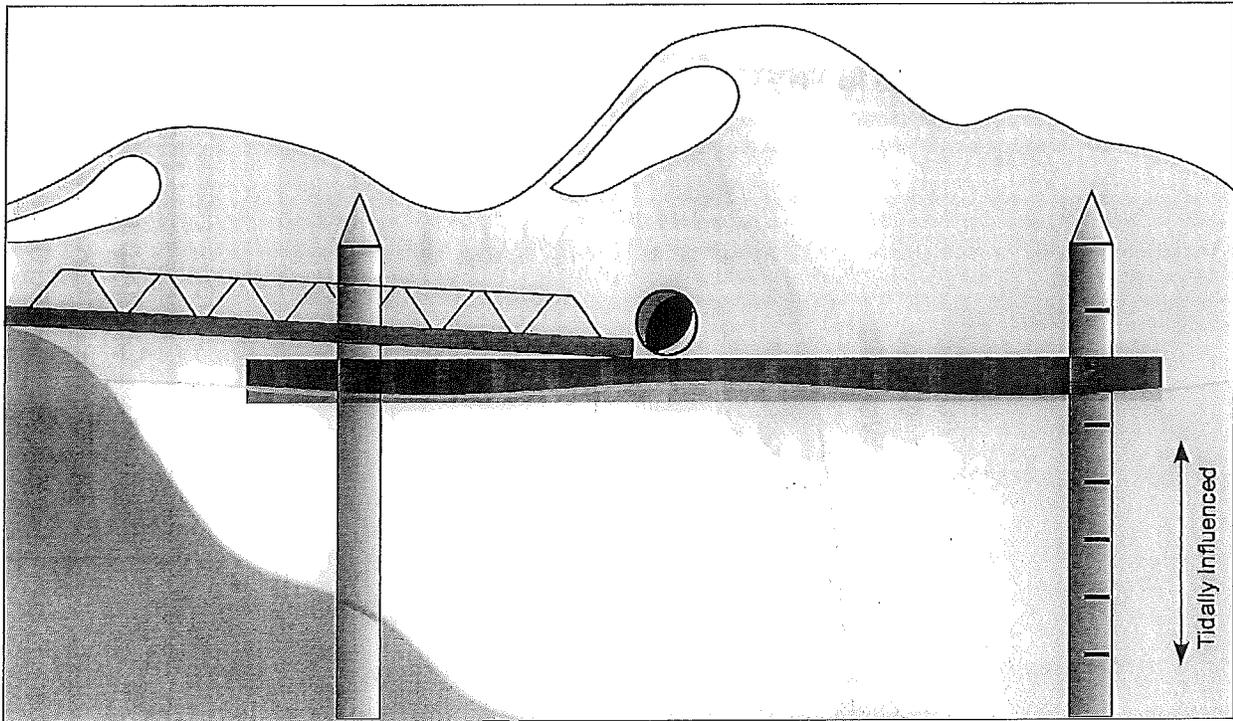
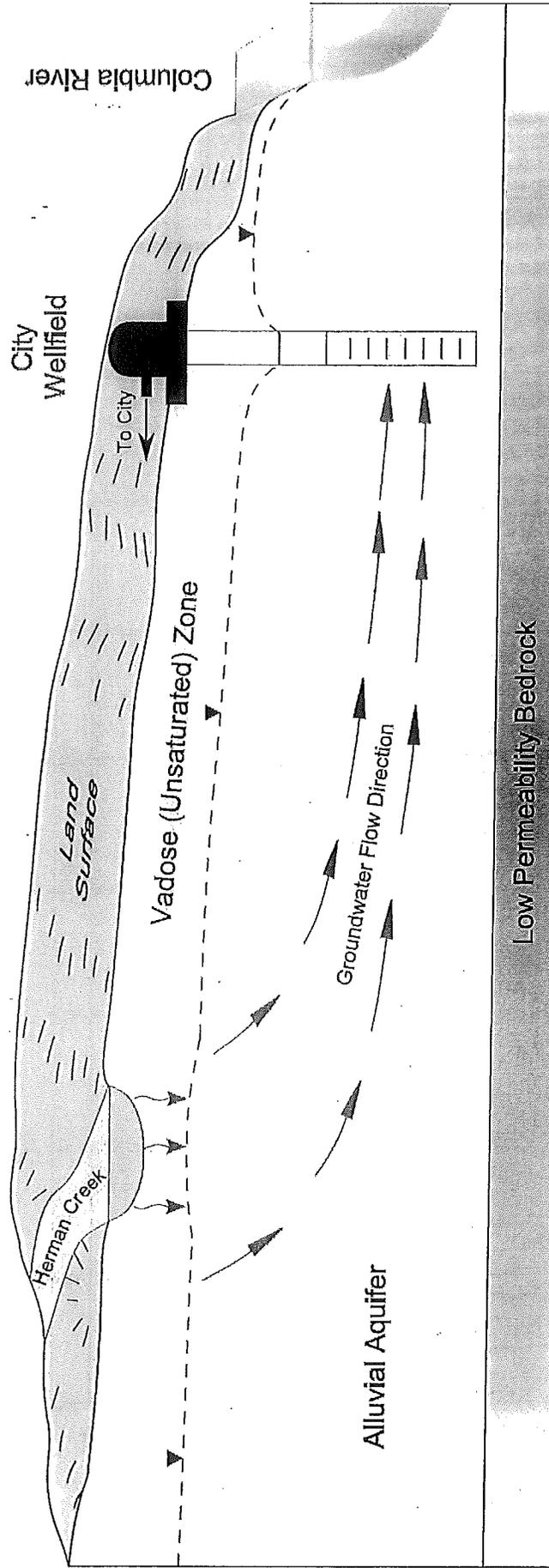


Figure 6b. Floating Boat Dock and Inclined Ramp Analogy to Columbia River and Water Table Slope in Cascade Locks Wellfield Vicinity



Modified from USGS Circular 1186, Sustainability of Ground-Water Resources. W.M. Alley, Thomas E. Reilly, and O. Lehn Franke. 1999.

Figure 6c. Conceptual Model of Groundwater Flow from Herman Creek Seepage to City of Cascade Locks Wellfield under Pumping Conditions

Conceptual Diagram, not to scale.

- - - Water Table

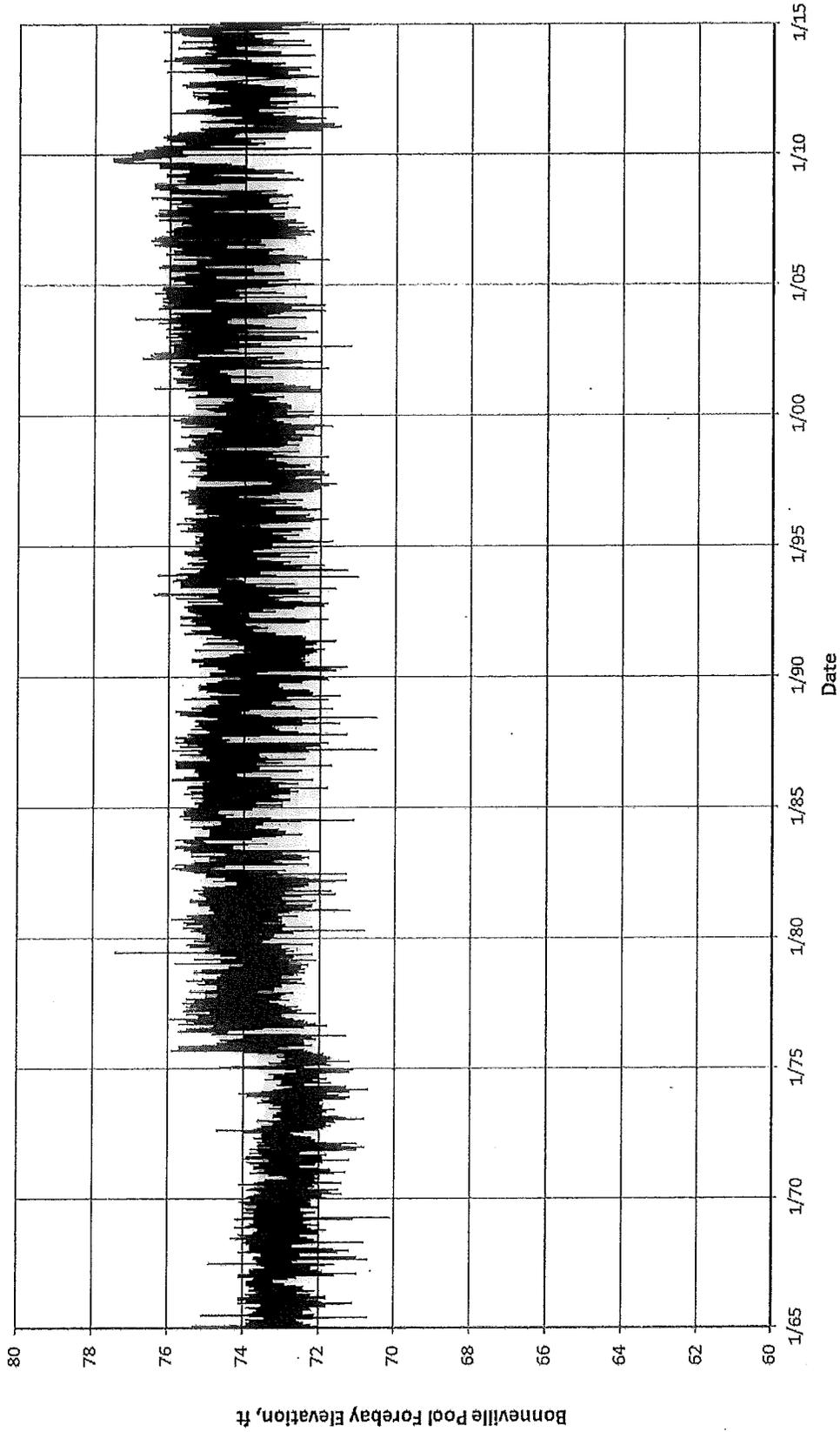


Figure 7
Bonneville Pool Elevation as Measured at
Bonneville Dam

Technical Information November 2010 Presentation
 Cascade Locks Vicinity
PGG

Columbia River at Bonneville Pool Forebay elevation daily, manual collection data available at :
<http://www.nwd-wc.usace.army.mil/cgi-bin/dataquery.pl?k=columbia+river+at+bonneville>

Figure 8a

Oxbow Springs, Dry Creek Drainage Basins and 1971-2000 Average Annual Precipitation

Cascade Locks Water Resources Investigation Summary Report



- City Wells
- Spring Locations
- City Limits

Topographic Recharge Basins

- Dry Creek Recharge Basin
- Oxbow Springs Recharge Basin
- Herman Creek Recharge Basin (extends beyond figure boundary)
- Average Annual Precipitation in inches (1971-2000, PRISM)



Inferred Recharge to LSTS Aquifer Supporting Spring Flows



0 Feet 2,000

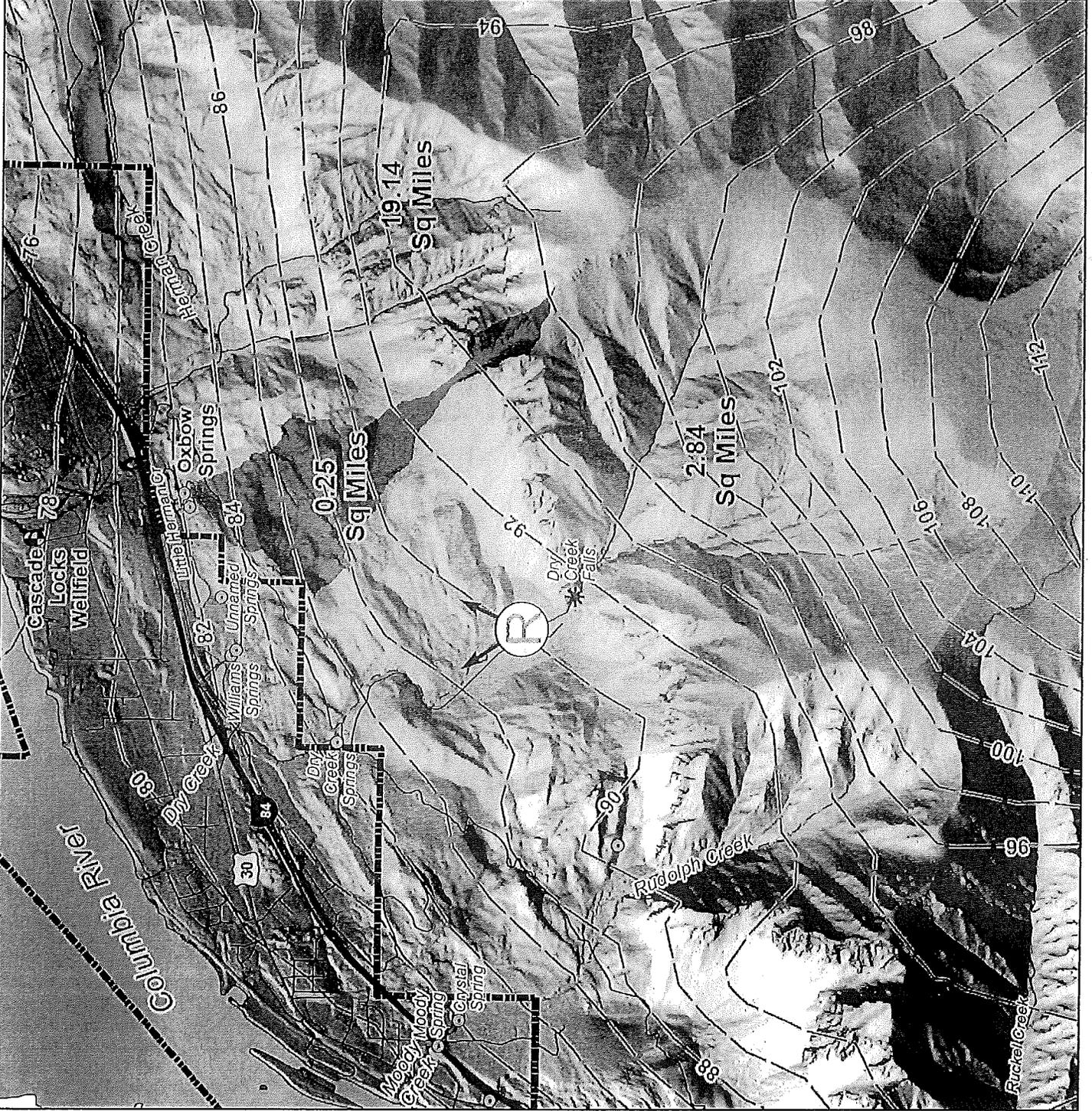


Figure 8b

Oxbow Springs, Dry Creek Drainage Basins and 1981-2010 Average Annual Precipitation

Cascade Locks
Water Resources Investigation
Summary Report

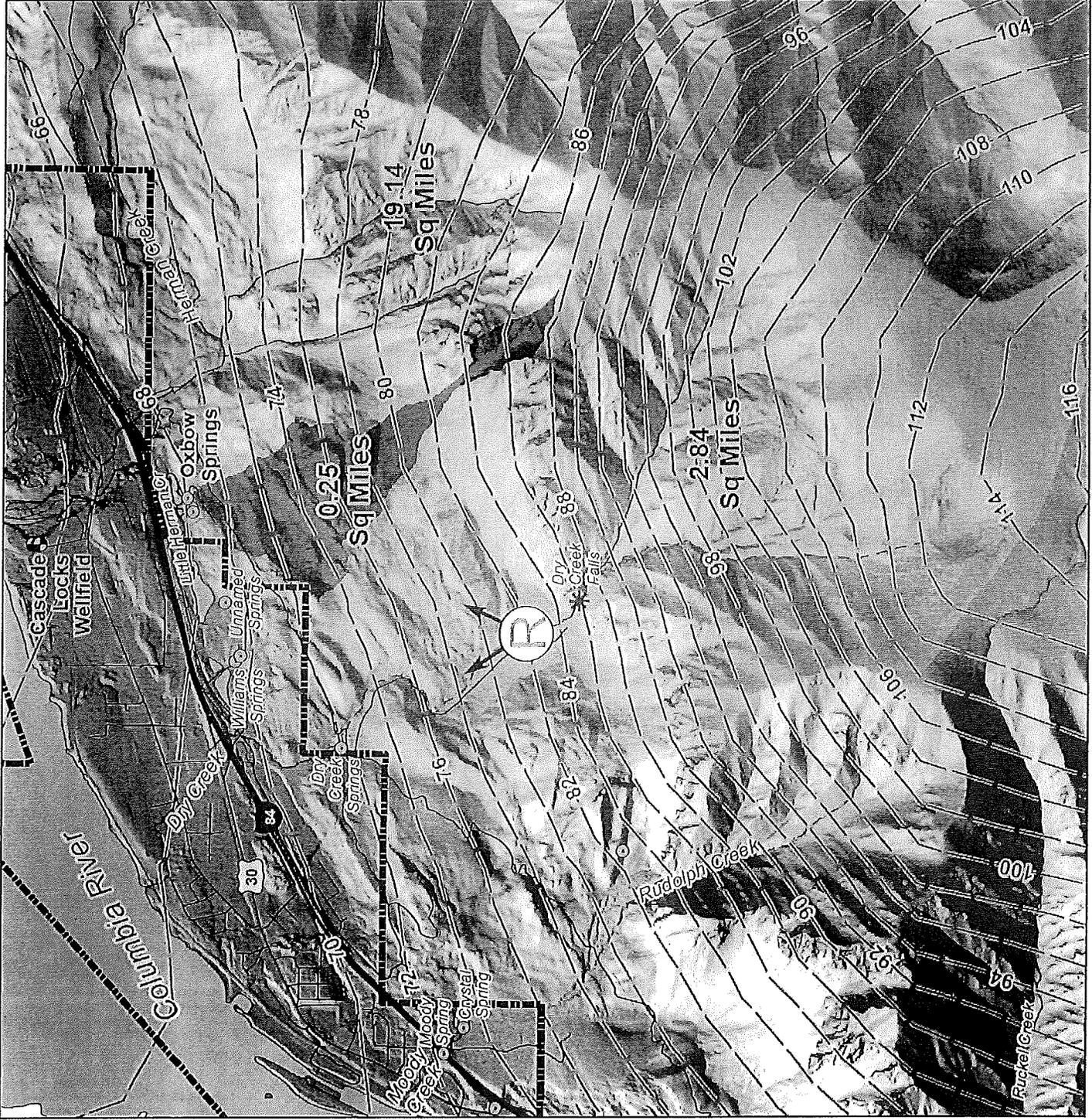
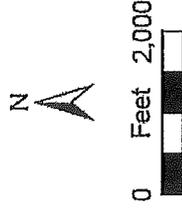


- City Wells
- Spring Locations
- City Limits

Topographic Recharge Basins

- Dry Creek Recharge Basin
- Oxbow Springs Recharge Basin
- Herman Creek Recharge Basin (extends beyond figure boundary)
- Average Annual Precipitation in inches (1981-2010, PRISM)

Inferred Recharge to LSTS Aquifer Supporting Spring Flows



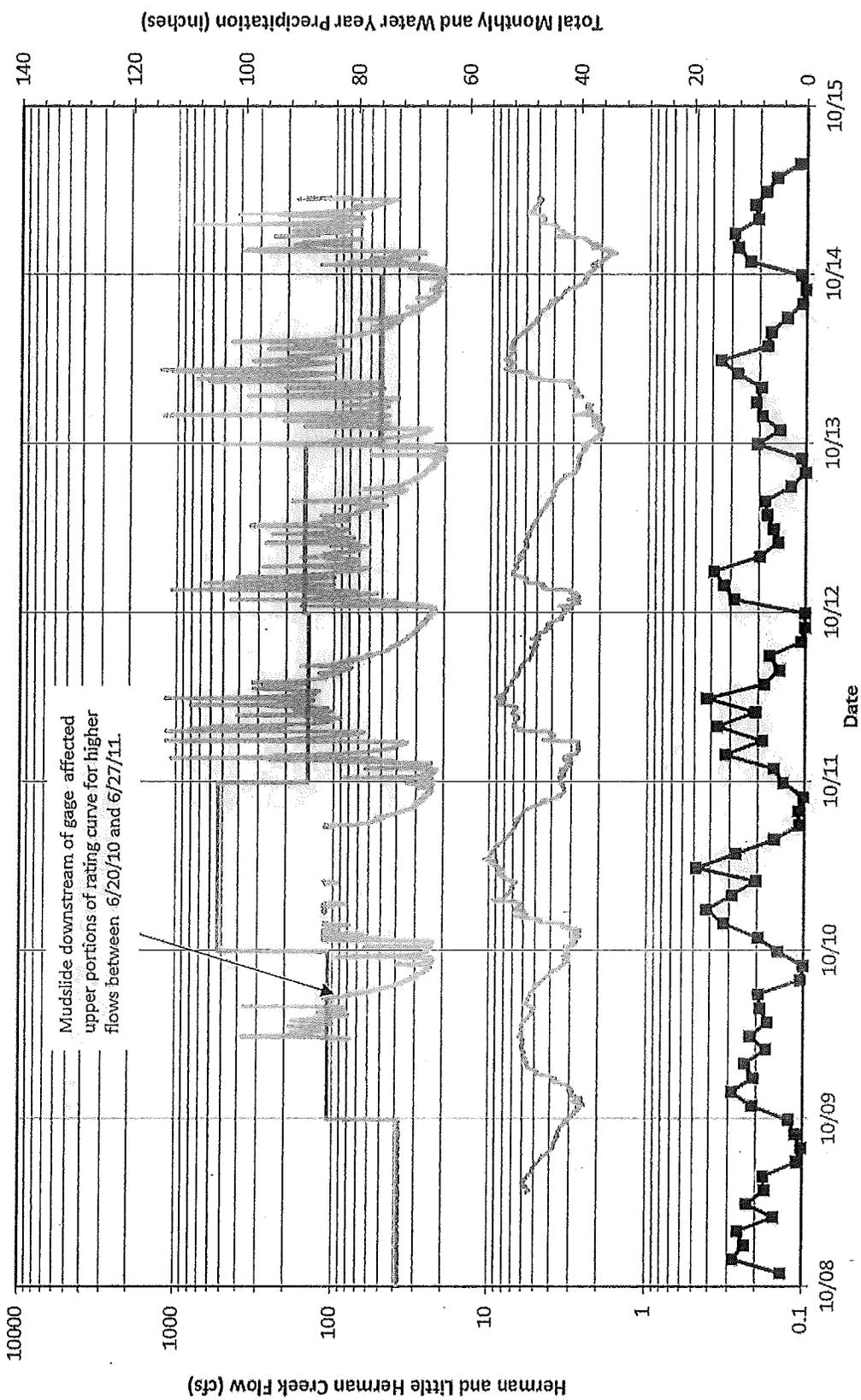
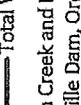


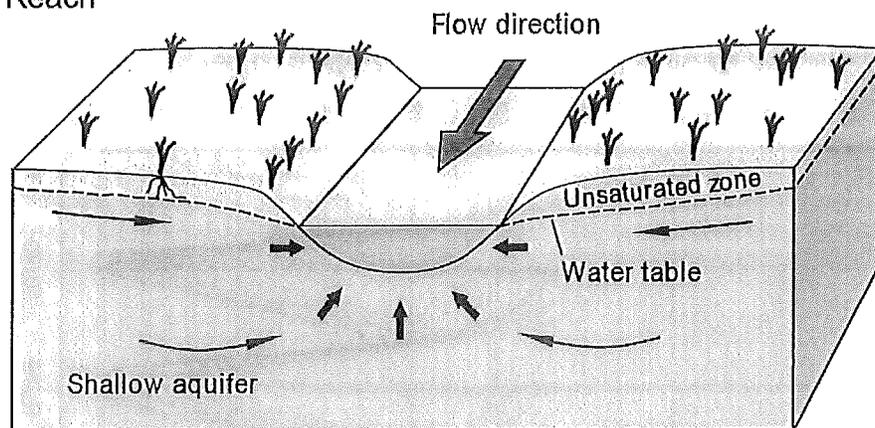
Figure 9
Flow Hydrographs for Herman Creek and Little Herman Creek

Technical Information November 2010 Presentation
hermanflow_hydro_12_6_11.xlsx

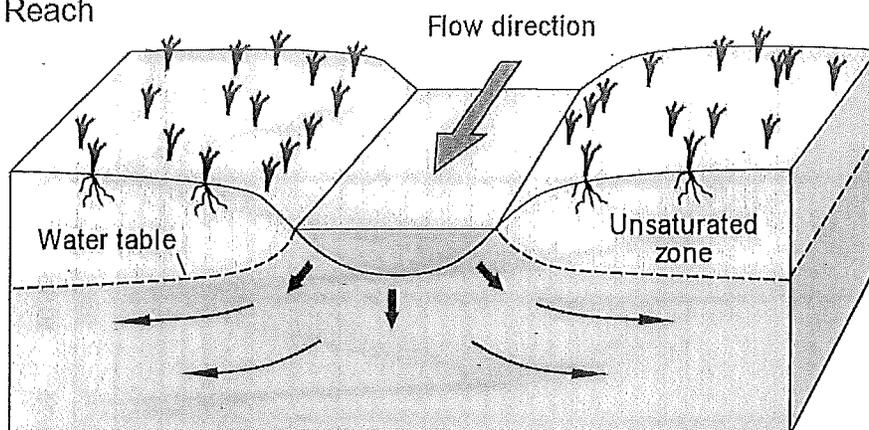
Herman Cr. Flow above Upper Diversion Dam
Little Herman Cr. Flow Downstream of Hatchery (24 hour running average)
Total Monthly Precipitation at Bonneville Dam
Total Water Year Precipitation at Bonneville Dam
Herman Creek and Little Herman Creek flow data available at www.nestlewaterspaw.com
Bonneville Dam, Oregon (350897) precipitation data available from www.wrcc.dri.edu



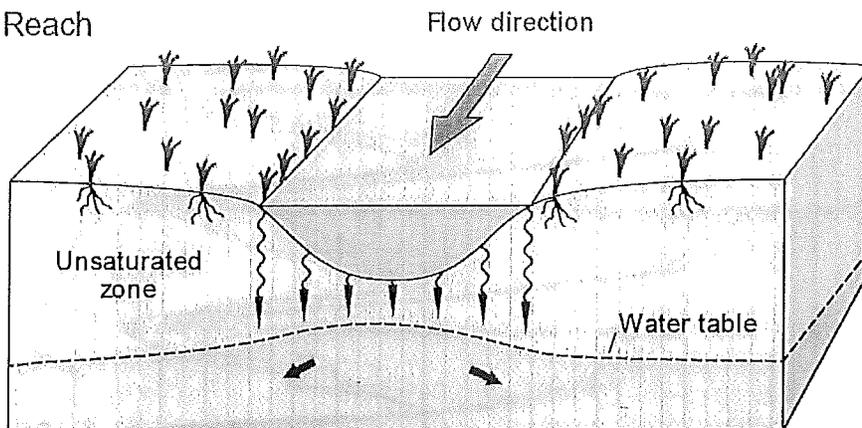
a. Gaining Stream Reach



b. Losing Stream Reach
(Connected)



c. Losing Stream Reach
(Disconnected)



From USGS Circular 1139 Ground Water and Surface Water A Single Resource. Winter et. al., 1999.

Figure 11. Schematic Diagram of Gaining, Losing, and Disconnected Streams

PGG

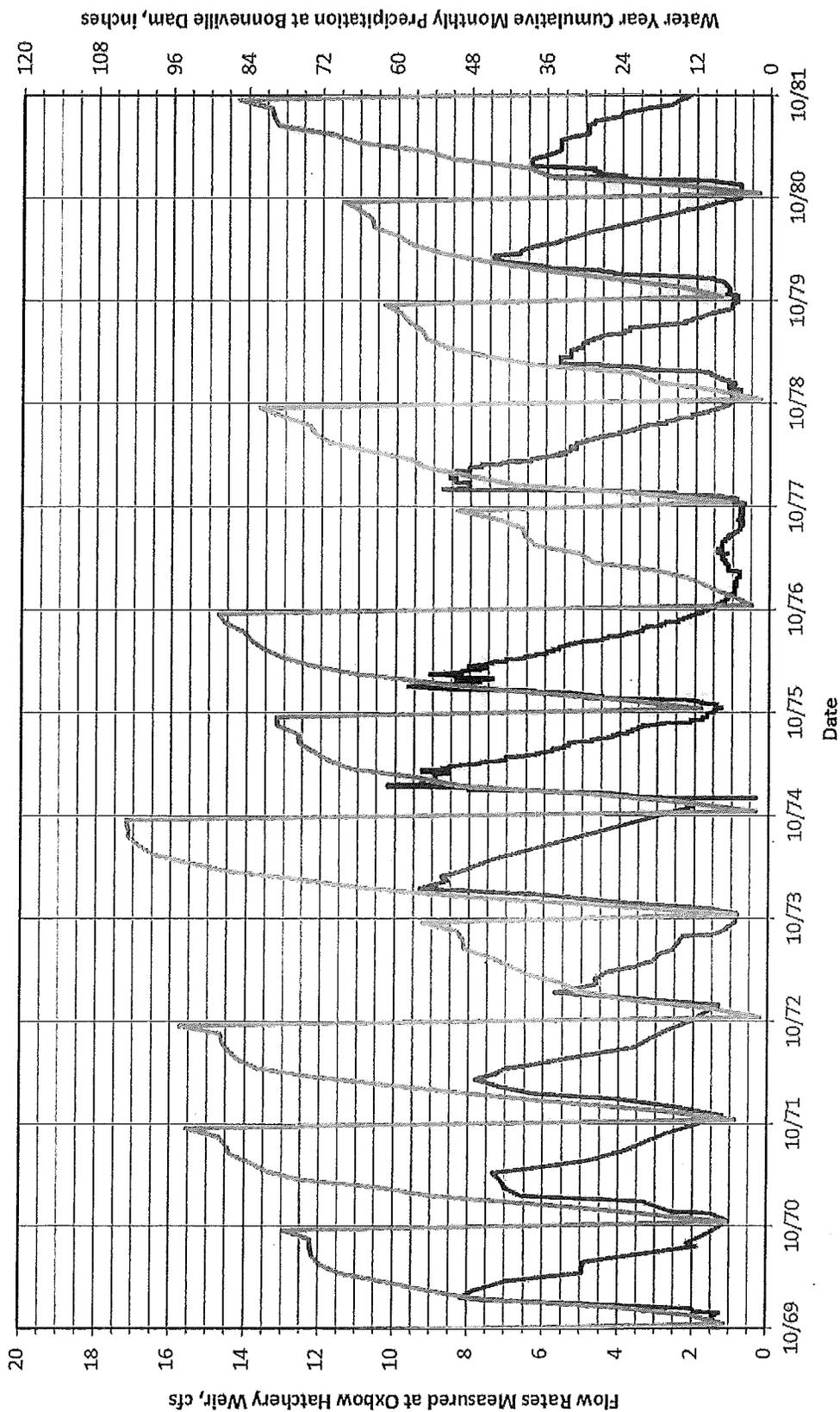


Figure 12a. Comparison of ODFW Flow Rates at Oxbow Hatchery and Precipitation at Bonneville Dam

— ODFW Measurements of Spring Flow at Hatchery Weir
 - - - Water Year Cumulative Monthly Precipitation at Bonneville Dam
 ODFW flow measurements available at www.nestlewaterspnw.com
 Bonneville Dam, Oregon (350897) precipitation data available from www.wrcc.dri.edu



Technical Information November 2010 Presentation
 hermanflow_hydro_12_6_11.xlsx

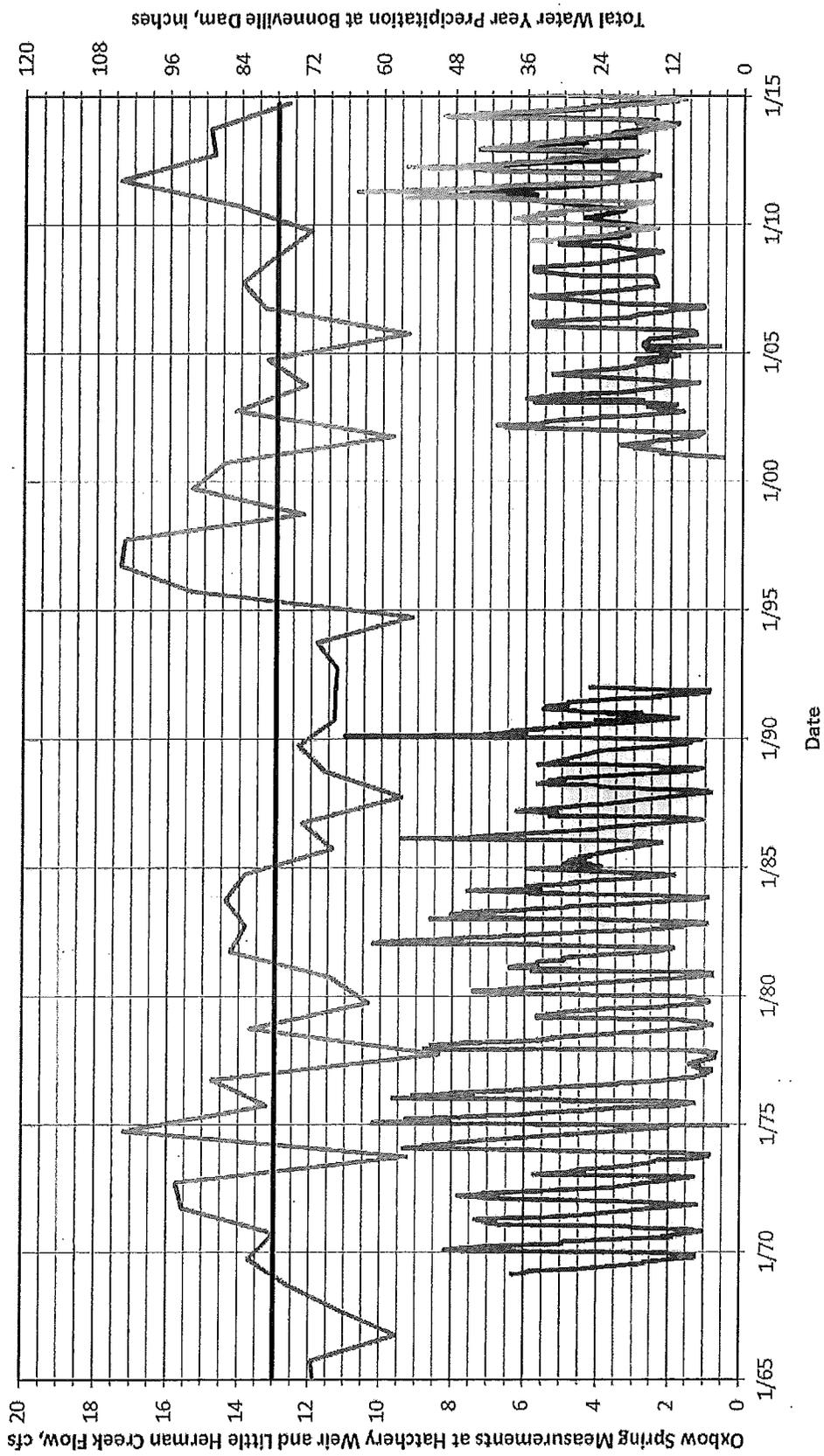
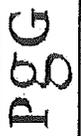


Figure 12b. Comparison of ODFW Flow Rates at Oxbow Hatchery and Little Herman Creek Flow Downstream of Hatchery



Technical Information November 2010 Presentation
hermanflow_hydro_12_6_11.xlsx

— ODFW Flow Measurements at Hatchery
 - - Little Herman Cr. Flow Downstream of Hatchery (24 hour running average)
 — Total Water Year Precipitation at Bonneville Dam
 — Long-Term Average Water Year Precipitation at Bonneville Dam
 ODFW Weir Measurements and Little Herman Creek flow data available at www.nestlewaterspnw.com
 Bonneville Dam, Oregon (350897) precipitation data available from www.wrcc.dri.edu

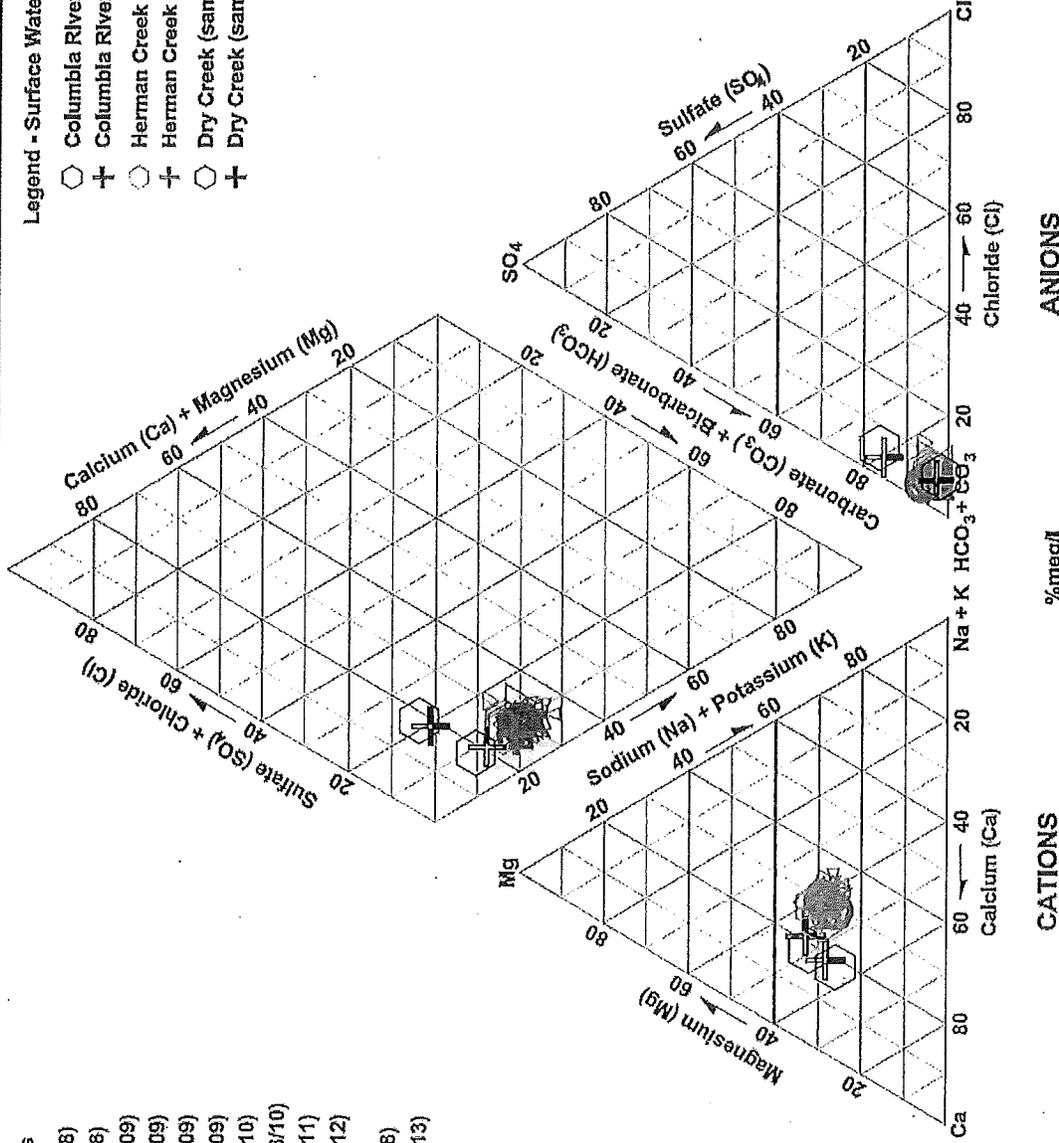
Legend - Spring and Groundwater Samples

- ◇ Lower Oxbow Spring (sample 6/7/08)
- Lower Oxbow Spring (sample 7/2/08)
- Lower Oxbow Spring (sample 1/28/09)
- ▽ Lower Oxbow Spring (sample 4/23/09)
- △ Lower Oxbow Spring (sample 7/20/09)
- Lower Oxbow Spring (sample 11/4/09)
- ⊕ Lower Oxbow Spring (sample 5/19/10)
- ⊗ Lower Oxbow Spring (sample 11/18/10)
- △ Lower Oxbow Spring (sample 9/21/11)
- ☆ Lower Oxbow Spring (sample 7/30/12)
- Upper Oxbow Spring (sample 7/2/08)
- ⊗ Upper Oxbow Spring (sample 3/12/13)

- Well 1 (sample 1/28/09)
- △ Well 1 (sample 7/20/09)
- Well 1 (sample 11/4/09)
- ☆ Well 1 (sample 7/30/12)
- ⊗ Well 1 (sample 3/12/13)
- ▽ Well 2 (sample 4/23/09)

Legend - Surface Water Samples

- Columbia River (sample 11/03/09)
- ⊕ Columbia River (sample 5/18/10)
- Herman Creek (sample 11/03/09)
- ⊕ Herman Creek (sample 5/18/10)
- Dry Creek (sample 11/03/09)
- ⊕ Dry Creek (sample 5/18/10)



ANIONS

CATIONS

FIGURE 13. Trilinear Diagram Representing Oxbow Springs, Test Wells, City Wellfield, Herman Creek, Dry Creek, and Columbia River Samples Collected 2008 - 2013



Technical Information November 2010 Presentation
May 2015

Non-detect results represented by 50-percent of the detection limit in calculations of milliequivalents per liter (%meq/l)

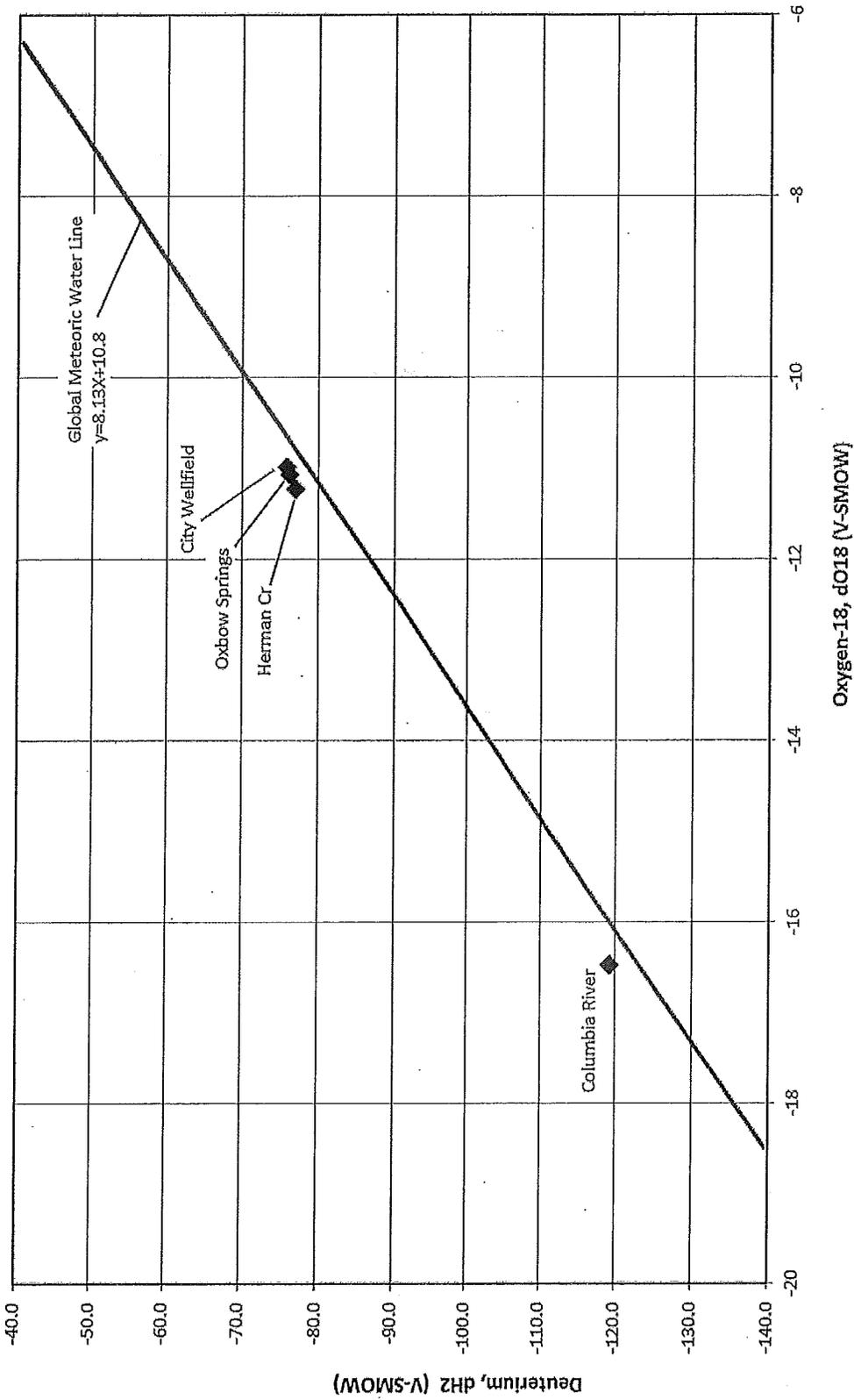


Figure 14. Deuterium and Oxygen-18 Ratios of Cascade Locks Samples

V-SMOW: Vienna Standard Mean Ocean Water (water standard defining the isotopic composition of fresh water)

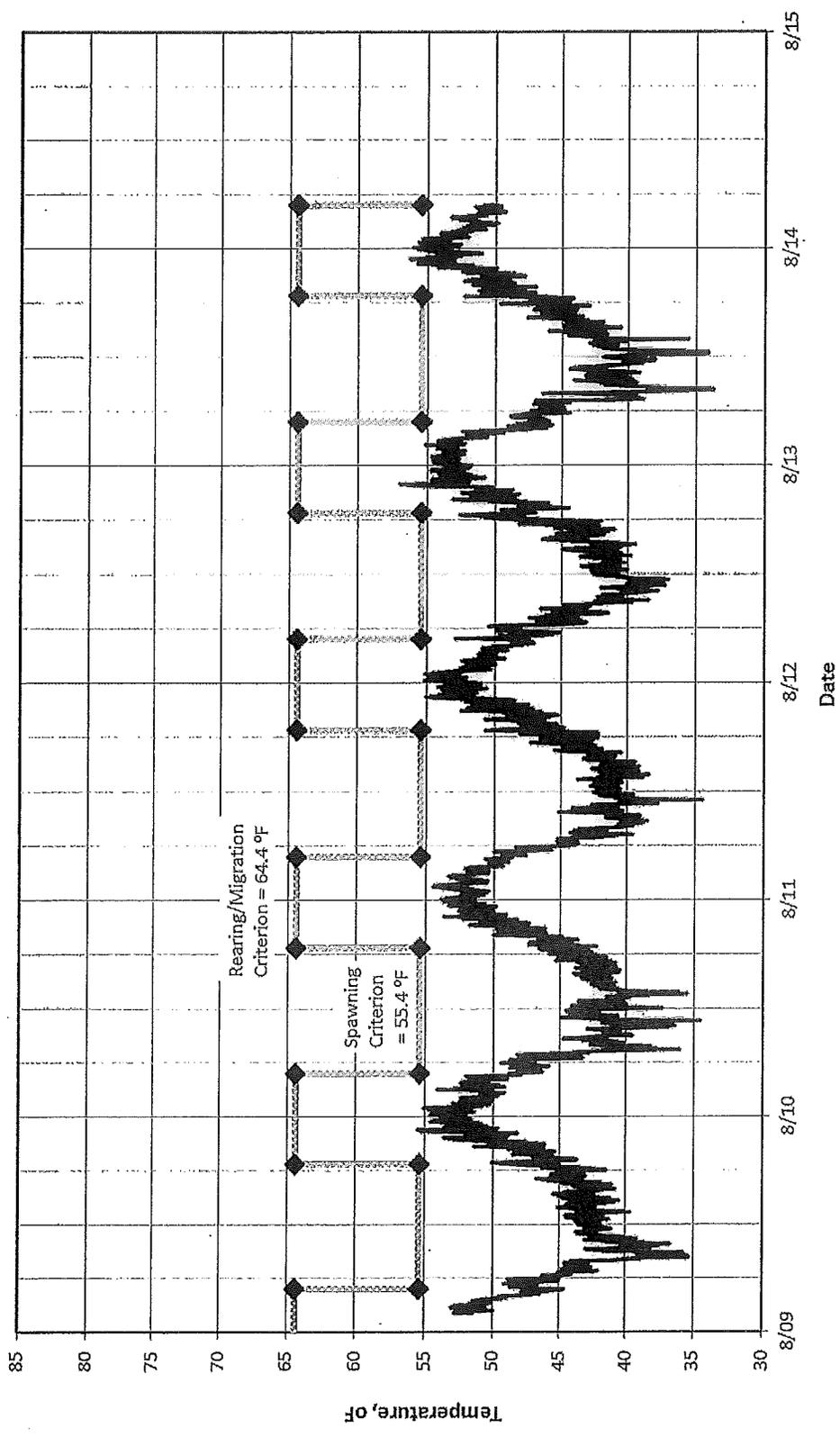


Figure 15. Temperature Trends for Herman Creek Relative to Regulatory Criteria

— Herman Creek at Upper Diversion Dam

◆ OAR 340-041-0028 Temperature Criteria

Herman Creek temperature data available at www.nestlewaterspnw.com

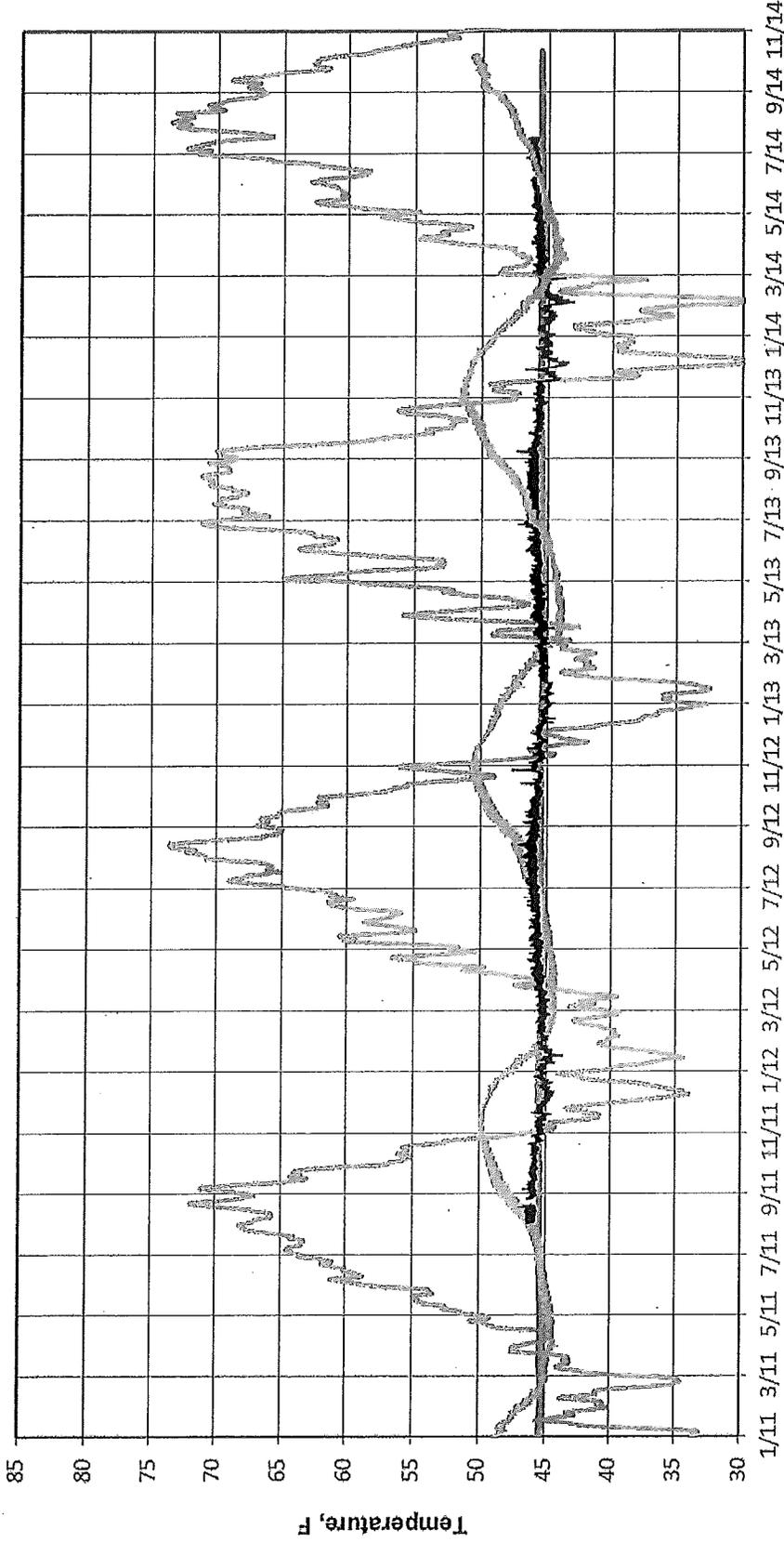


Figure 16. Temperature Trends for Oxbow Springs and Cascade Locks Well 1

- Oxbow Springs
- Cascade Locks Well 1
- Bonneville Air Temp (10-day average of Max. and Min. values)
- Oxbow Springs Reservoir

Oxbow Springs, Well 1, and Oxbow Springs Reservoir temperature data available at www.nestlewaterspnw.com
 Bonneville Dam air temperature data available at : www.nwd-wc.usace.army.mil/cgi-bin/dataquery.pl?k=Columbia-River+at+Bonneville

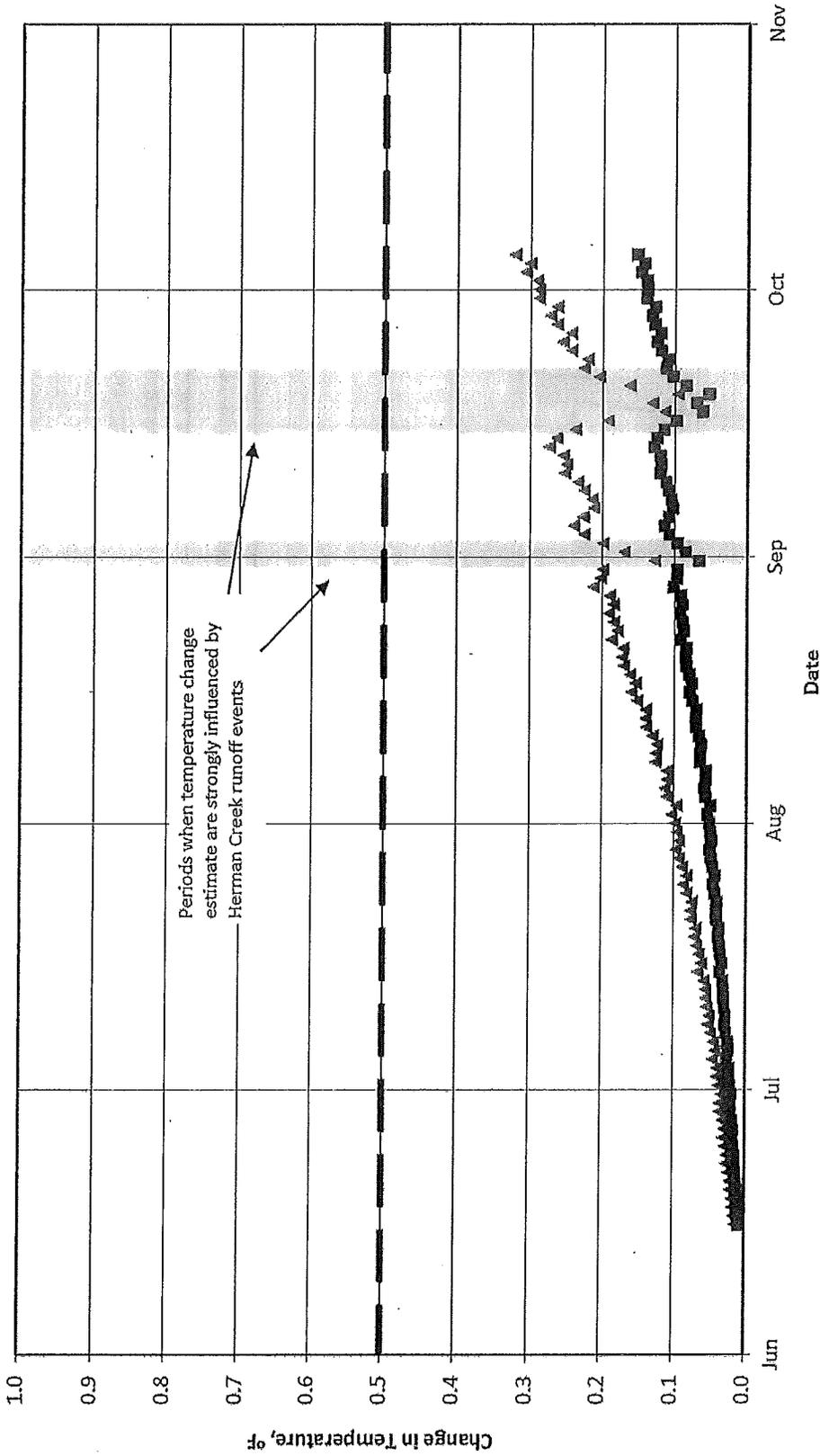


Figure 17. Potential Temperature Changes in Lower Herman Creek due to Water Exchange

Technical Information November 2010 Presentation
 HC_TemperatureAnalysis_y2.xls



- Estimated Temperature Change based on 2010 Conditions
- ▲ Estimated Temperature Change based on 1977 Drought Conditions
- OAR 340-041-0028 Cold Water Refuge Temperature Change Criteria

Cascade Project No POS-135-119

Oregon Water Resources Department (OWRD) requires completion of a Geotechnical Hole Report if any of the following apply:

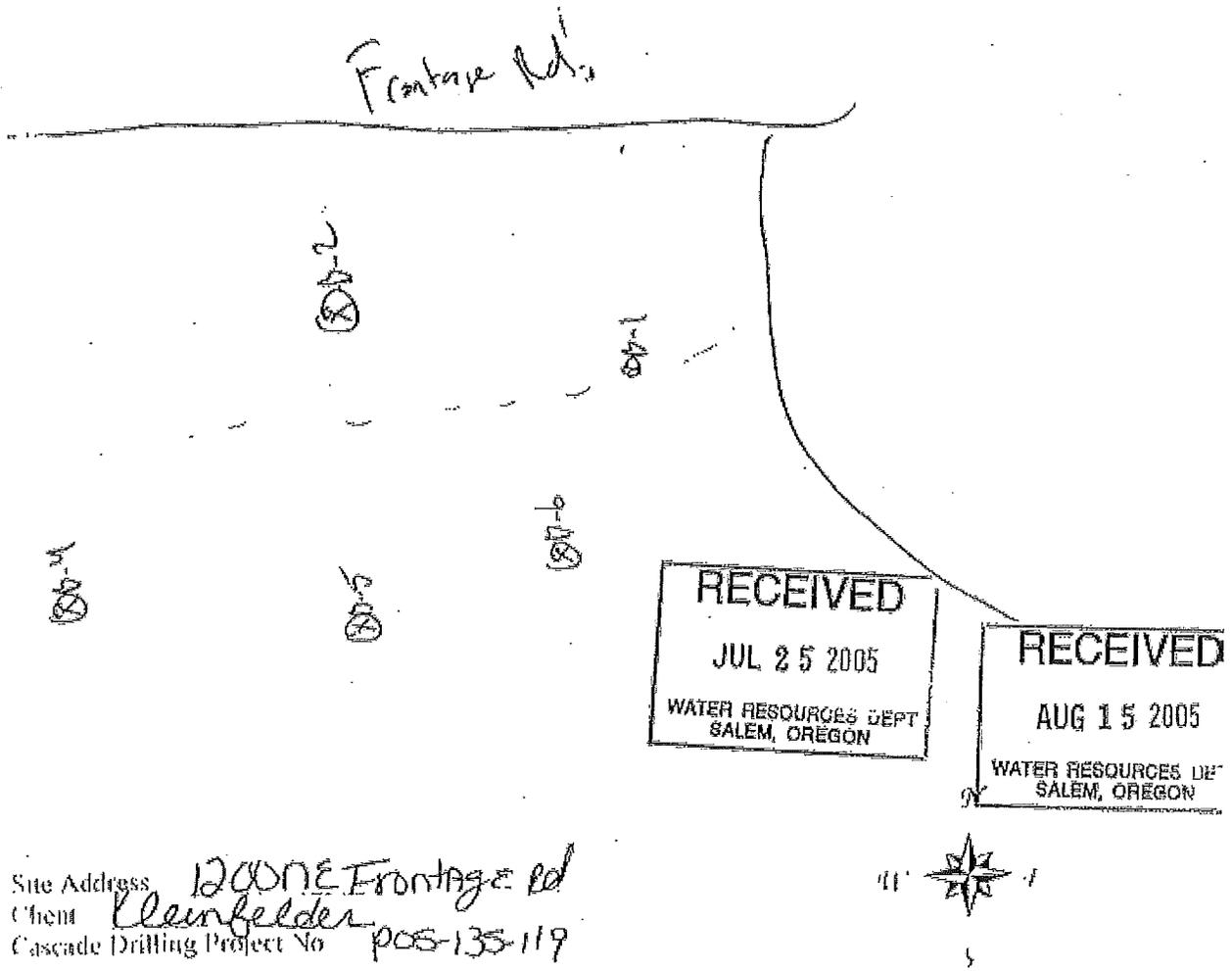
- Geotechnical hole is greater than 18 feet deep
- Within 50 feet of a water supply or monitoring well
- Used to make a determination of water quality.
- Constructed in an area of known or reasonably suspected contamination

In order to comply with OWRD requirements, please provide a Site Map

Map shall include an approximate scale of north arrow. Upon completion of well activities, a site map with each well location identified must be filed with each Geotechnical Hole Report (OR 690-240-035).

Thank You for your information and assistance on compliance with Oregon Administrative Rules

SITE MAP



Site Address 1200 NE Frontage Rd
 Client Kleinfelder
 Cascade Drilling Project No POS-135-119

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

Certificate No. 41302
WELL I.D. # L. 67396-76767
START CARD # W 205106

Instructions for completing this report are on the last page of this form.

(1) LAND OWNER Well Number _____
Name City of Cascade Locks C/O Pacific Groundwater Group
Address 2377 Eastlake Ave. E
City Seattle State WA Zip 98102

(2) TYPE OF WORK
 New Well Deepening Alteration (repair/recondition) Abandonment

(3) DRILL METHOD:
 Rotary Air Rotary Mud Cable Auger
 Other _____

(4) PROPOSED USE:
 Domestic Community Industrial Irrigation
 Thermal Injection Livestock Other Test

(5) BORE HOLE CONSTRUCTION:
Special Construction approval Yes No Depth of Completed Well 97 ft
Explosives used Yes No Type _____ Amount _____

HOLE			SEAL			
Diameter	From	To	Material	From	To	Sacks or pounds
12"	0	19	Bentonite chips	0	19	16 sks.

How was seal placed? Method A B C D E
 Other poured

Backfill placed from _____ ft. to _____ ft. Material _____
Gravel placed from _____ ft. to _____ ft. Size of gravel _____

Casing	Diameter	From	To	Gauge	Material			
					Steel	Plastic	Welded	Threaded
riser	8"	+2'	84'	2.250	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
tail	5"	80'6"	84'2"		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
liner	5"	89'2"	97'		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Drive Shoe used Inside Outside None
Final location of shoe(s) 84'6" B.G.

(7) PERFORATIONS/SCREENS:
 Perforations Method _____
 Screens Type Telescopic Material Stainless Steel

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
84'2"	89'2"	.025	1	5"		<input type="checkbox"/>	<input type="checkbox"/>
6 x 5" Neoprene packer w/							
6 x 5" concentric reducer							
to 5" riser pipe							

(8) WELL TESTS: Minimum testing time is 1 hour
 Pump Bailor Air Artesian
Yield 100 GPM Drawdown _____ Drill stem at 84' B.G. Flowing Time 1 hr.

Temperature of water _____ Depth Artesian Flow Found _____
Was a water analysis done? Yes By whom _____
Did any strata contain water not suitable for intended use? Too little
 Salty Muddy Odor Colored Other _____
Depth of strata: _____

(9) LOCATION OF WELL, by legal description:
County Hood River Latitude _____ Longitude _____
Township 2N N or S Range 8E E or W. WM
Section 6 NE 1/4 SE 1/4
Tax Lot 510 Lot _____ Block _____ Subdivision _____
Street Address of Well (or nearest address) 90 Herman Creek Lane Cascade Locks, OR

(10) STATIC WATER LEVEL:
57 ft. below land surface Date 1/10/10
Artesian pressure _____ lb. per square inch Date _____

(11) WATER BEARING ZONES:
Depth at which water was first found _____

From	To	Estimated Flow Rate	SWL
58'	98'	100 GPM	57'

(12) WELL LOG:
Ground Elevation _____

Material	From	To	SWL
Top soil	0	1	
Cobbles, boulders, silt	1	17	
Sand, gravel, little clay	17	22	
Sand & gravel, loose layers	22	97	57'
Brown sand	97	98	57'

RECEIVED

JAN 15 2010

WATER RESOURCES DEPT
SALEM, OREGON

Date started 1-4-10 Completed 1-6-10

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief. Timothy D. Jones
Signed Timothy D. Jones WWC Number 1446 Date 1-12-10

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief. Ronald C. Aspas
Signed Ronald C. Aspas WWC Number 1445 Date 1-12-10

F 206.329.0241 | F 206.329.6968

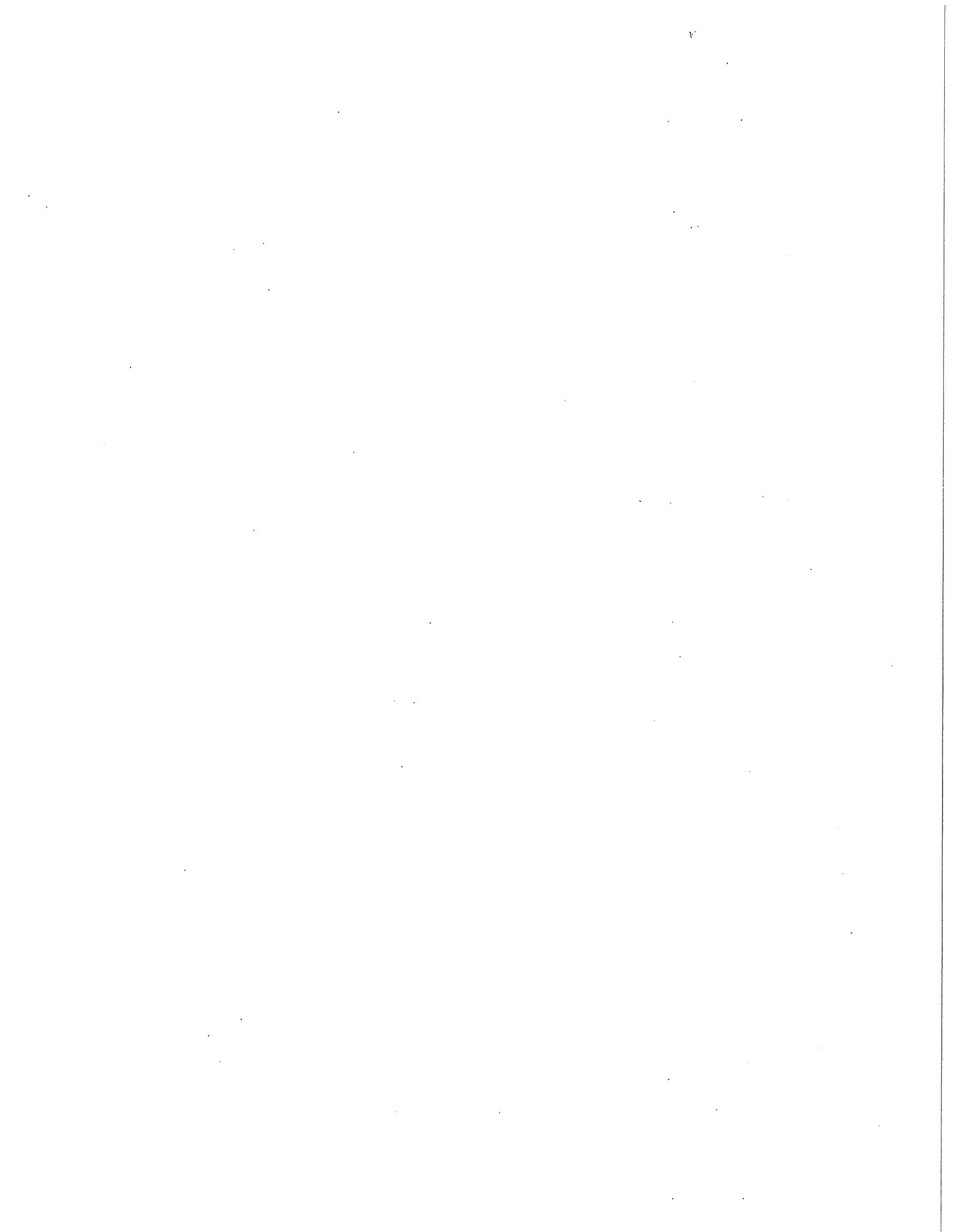
2577 Eastlake Avenue East | Seattle, WA 98102

F 360.570.3244 | F 360.570.0064

1627 Linwood Avenue SW | Tumwater, WA 98512

www.pgwg.com

pgg





(541) 374-8484

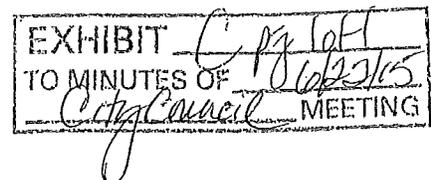
Fax: (541) 374-8752 TTY: 711

City Administrator Report to the City Council
Monday, June 22, 2015

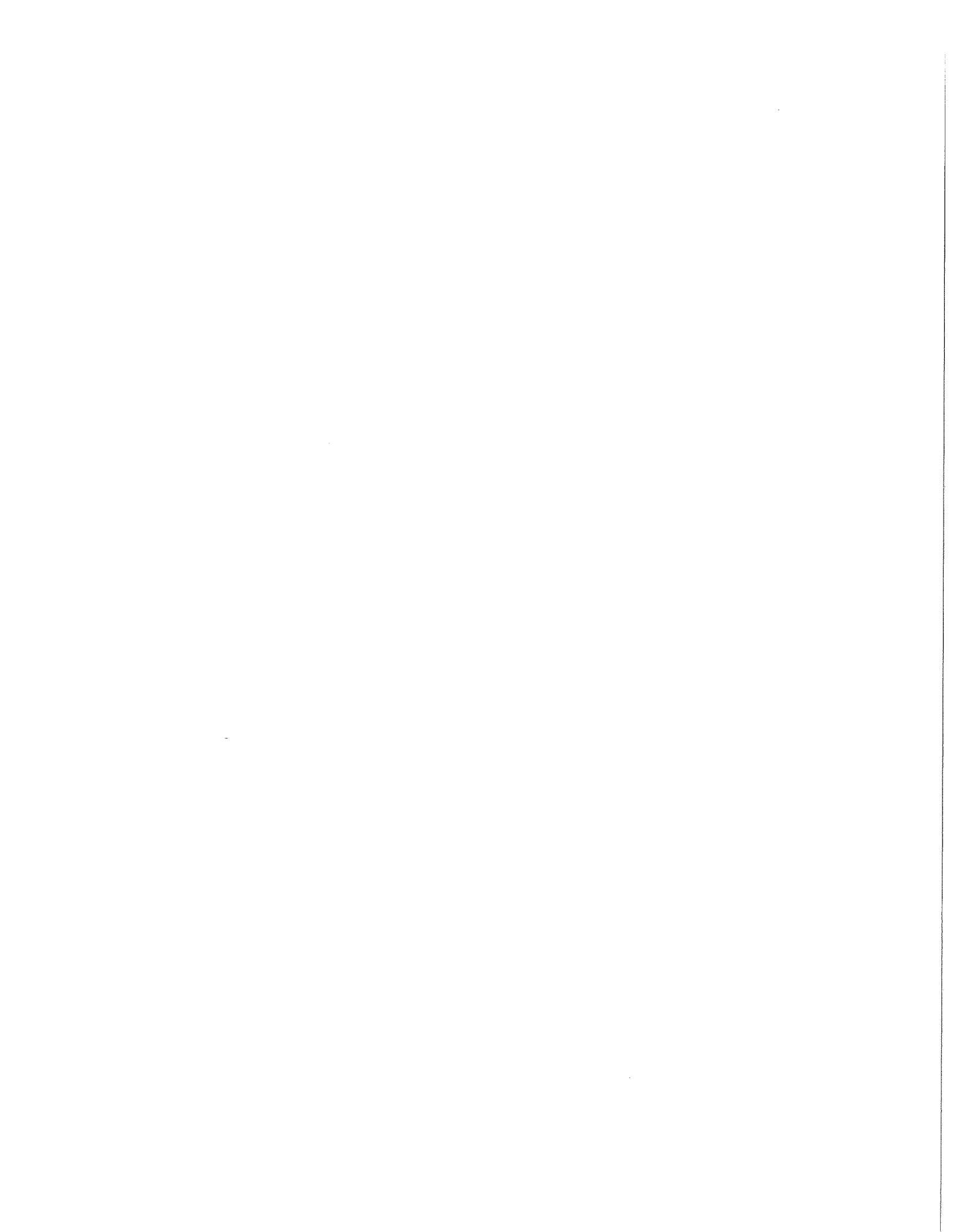
1. **Town Hall Discussion June 25:** There will be a town hall discussion concerning two subjects on Thursday, June 25, from 6:30 to 8:30 p.m. in the City Hall Gym. We will be providing an update on the status of the Water System Improvement Project and where we are with the potential for a Nestlé bottling plant. There will be a professional facilitator, Barbara Briggs, former County Commissioner and professional facilitator to assist with the meeting.
2. **Water System Improvement Project Notice:** The first part of the Town Hall meeting on Thursday will be to update us on the current status of the water project. The archeological investigation started today. We will be potholing in a few locations of the project to determine if there are any issues. The environmental notice for the project was published in last Saturday's Hood River News and will be republished in Wednesday's HRN.
3. **Wastewater Master Plan:** The Wastewater Master Plan was originally scheduled to be completed this coming October. Because of the lack of rainfall this past winter, we were unable to complete the TV camera review of the worst areas. The majority of the report is completed, but the TV survey work will not be able to be done until January or February. We have until March to complete the project. Our engineer is working with the State IFA office concerning this delay.
4. **OLCC Liquor License Request:** Shelley James of the Cascade Locks Ale House brought in an application for a temporary use liquor license for Sternwheeler Days this weekend. The Ale House has been doing this event for the last two years. We have not had any problems with this event following the required rules. May I sign the application on behalf of the City granting approval?
5. **Potential Noise Control Violation:** Darlene Sullenger of 119 Hassalo Street, has requested permission by the City Council to extend the hours of a band playing at a July 4 party by one hour beyond the normal noise control ordinance. Ms. Sullenger indicates that this has been approved in the past. The hours for the band playing would be from 7:00 p.m. to 11:00 p.m. on July 4. Section 4 of Ordinance 364 gives the City Council the ability to grant such a request. This did not reach the City in time to get on the regular Council agenda and there is no Council meeting before July 4. May I issue a permit for this Potential Noise Control Violation?
6. **Burn Ban:** The burn ban will be in effect July 1.

Thank you for all your effort on behalf of the City.

Gordon Zimmerman
Cascade Locks City Administrator



*Cascade Locks is where the Bridge of the Gods spans the Heart of the Gorge;
where mountain, wind, and water create the best sailing in the Northwest;
and where the "CL" on the license plate stands for Cascade Locks, the second largest city in Hood River County!
The City of Cascade Locks is an Equal Opportunity Provider.*



Barbara Briggs, Facilitator for the Town Hall, asked everyone to sign in. She said the City would be presenting information and primarily listening to the residents of Cascade Locks' questions, comments and concerns. Barbara explained that a presentation regarding Nestlé water bottling would be given and questions specific to the information given would be taken orally. She said questions not related to the specific information would still be given a chance. She asked for those to be written on the post it notes and put directly on the copy of the slide of the presentation and if not to the specific slide then on the blank pieces of paper on the wall.

1. **Water System Improvement Project.** Darrin Eckman, Tenneson Engineering, pointed out where the new water lines would be constructed in Cascade Locks. He said this installation will involve about 12,000 feet of water line, a 480,000 gallon water tank, upgrading Well No. 1, and the installation of a new well. He said an environmental assessment has also been done to look at impacts of various socio-economic and physical factors within the community.

Mr. Eckman said they look at a number of options such as different locations of water reservoirs, water distribution mains, different sources, and examine the impact the project alternatives have on land use, soils, flood plain, wetlands, cultural resources, biological resources, water quality, socio-economic, air quality, transportation, and noise. He said there is little to no impact on any of these but what is there is temporary during construction. Mr. Eckman described mitigation measures.

Mr. Eckman said construction is scheduled to begin this winter. He said the survey crews have been out identifying locations of different facilities. He said they are designing the project now and hope to get it out to bid this fall.

CA Zimmerman said power point slides will be presented to help answer some of the questions. He said the system is being upgraded because it is failing. He said this has to be done whether or not Nestlé or any other business comes to Cascade Locks. He explained to help with supply there is a need for a third well.

A question was asked about current capacity of the aquifer. CA Zimmerman said about eight cubic feet per second and the water right is for four cubic feet per second. Sandra Kelly asked if the third well was specifically to supply Nestlé. CA Zimmerman said information on the third well will be presented later on during the presentation. Terri Brigham asked about contacting the Native American Tribes. CA Zimmerman said part of the environmental review was contacting the Native American Tribes and asking for their comments. He said no comments were received. CA Zimmerman explained that pipe is being replaced with pipe that is already in the ground so the ground has already been disturbed. Jamie Antis made a comment about fast tracking.

Facilitator Briggs said she would end this part of the meeting as the questions were to be focused on the water system improvement project. She said CA Zimmerman would give his presentation on the next agenda item.

2. **The Proposed Water Bottling Plant.** CA Zimmerman gave a power point presentation assessing Nestlé project impacts. He said everyone would be able to comment and ask questions and reminded everyone to put their questions or comments on post it notes on the wall.

There were many comments and concerns voiced and several notes put on the copies of slides and the blank pieces of paper on the wall. A summary of questions and responses will be presented to Council at a later date.

Prepared by
Kathy Woosley, City Recorder

APPROVED

Tom Cramblett, Mayor

CASCADE LOCKS STAFF REPORT

Date Prepared: July 8, 2015

For City Council Meeting on: July 13, 2015

TO: Honorable Mayor and City Council

PREPARED BY: Gordon Zimmerman, City Administrator

SUBJECT: Approval of CH2M Contract to Operate the Wastewater Treatment Plant

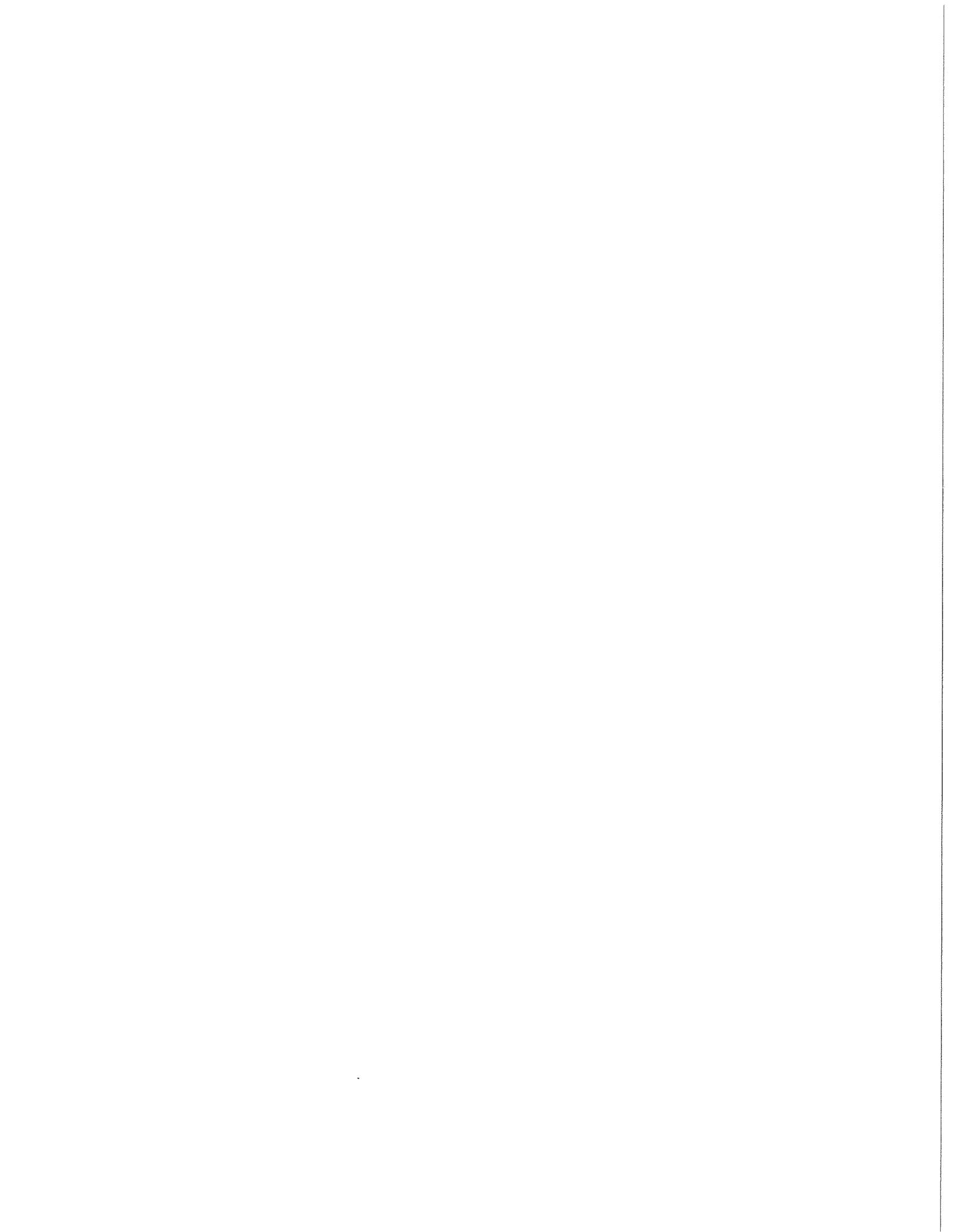
SYNOPSIS: CH2M, the parent company of OMI with whom we contract for the operation of our wastewater treatment plant, brought in their proposed contract for this next year. It is a slight 1.36% increase over last year's budget, but below what we had anticipated (and budgeted) in the adopted 2015-16 budget. They have also anticipated a \$4000 repair budget which is the same as last year.

During this next fiscal year, we will complete the wastewater master plan. Part of that plan will be a review of the operation of the wastewater plant by our engineer from Anderson/Perry. We may want to re-examine our relationship with CH2M after the completion of the master plan. It may be possible to fund an employee to operate the plant as it was designed at a lower cost than a contract operation.

CITY COUNCIL OPTIONS: Approve or reject the contract.

RECOMMENDED MOTION: "I move to approve the contract with CH2M for \$89,500 for the operation of the wastewater treatment plant."

Financial Review and Status: The City has budgeted \$92,300 for this expense.





CH2M

818 Riverside Drive

Hood River, OR 97031

Tel 541.386.2432

Fax 541.386.6236

June 26, 2015

Gordon Zimmerman
City Administrator
City of Cascade Locks
PO Box 308
Cascade Locks, OR 97014

Dear Mr. Zimmerman:

This letter is to advise you of the proposed fee for the contract period July 1, 2015 through June 30, 2016 for the operation and maintenance of the City of Cascade Locks' Wastewater Treatment Plant and lift stations. The proposed fee is \$89,500 which is a modest \$1,200 or 1.36% increase over the 2014-2015 contract year. CH2M is sensitive to the economic situation of our clients and strives to hold down costs wherever possible.

Explanations for the increased costs:

- Annual inflationary adjustments for labor, benefits and workers compensation. Labor costs are adjusted annually to keep the company competitive and reduce associate turnover. As you know the cost of health insurance continues to rise rapidly and to help hold down costs to our clients, CH2M associates continue co-paying a 25-27.5% share of benefit costs.
- The current repair budget of \$4,000 remains unchanged.

I would like to personally thank the City of Cascade Locks for allowing CH2M the opportunity of providing full contract services since 1984 and hope our partnership continues for many years to come.

Respectfully,

A handwritten signature in cursive script that reads 'Louie Hooks'.

Louie Hooks
Operations Supervisor, CH2M



CH2M
818 Riverside Drive
Hood River, OR 97031
Tel 541.386.2432
Fax 541.386.6236

June 26, 2015

Gordon Zimmerman
City Administrator
City of Cascade Locks
P.O. Box 308
Cascade Locks, OR 97014

RE: Contract Amendment #9 for Operations, Maintenance, and Management Services

Dear Mr. Zimmerman:

Attached are two copies of Amendment #9 to the Agreement for operations, maintenance and management of the City of Cascade Locks Wastewater Treatment Facility for the contract period July 1, 2015 through June 30, 2016.

Following review and approval please have Mayor Tom Cramblett sign both copies of the Amendment, retain one signed copy for City files and return one signed copy to Project Manager, Doug Nichols in Hood River.

We at CH2M value our long standing partnership with the City of Cascade Locks since 1984 and look forward to many more years. If you have any questions please feel free to contact me at 541.386.2432.

Respectfully,

A handwritten signature in cursive script that reads 'Louie Hooks'.

Louie Hooks
Operations Supervisor, CH2M

AMENDMENT NO. 9
to the
AGREEMENT FOR WASTEWATER FACILITIES
OPERATIONS, MAINTENANCE, AND MANAGEMENT SERVICES
for the
CITY OF CASCADE LOCKS, OREGON

This Amendment No. 9 (the "Amendment") to the Agreement for Wastewater Facilities Operations, Maintenance and Management Services for the City of Cascade Locks, Oregon, dated July 1, 2006 (the "Agreement") is made and entered into this ___ day of _____, 2015 by and between the City of Cascade Locks, Oregon (hereinafter "Owner") and Operations Management International, Inc. (hereinafter "CH2M HILL OMI").

NOW THEREFORE, Owner and CH2M HILL OMI agree to amend the Agreement as follows:

1. Article 4.1 is hereby deleted in its entirety and is replaced with the following:

Owner shall pay to CH2M HILL OMI as total compensation for services performed under this Agreement a Base Fee of Eighty Nine Thousand Five Hundred Dollars (\$89,500) for the contract year commencing on July 1, 2015 and ending June 30, 2016. Subsequent years' Base Fees shall be determined as hereinafter specified. Upon each contract year negotiation, CH2M HILL OMI shall continue to invoice Owner at the previous amount until the new contract price is agreed upon. Upon written notice agreement between the parties as to the new contract year base fee, CH2M HILL OMI shall issue an invoice retroactively adjusting the previous Base Fee amount.

3. Article 4.6 is hereby deleted in its entirety and is replaced with the following:

The total amount CH2M HILL OMI shall be required to pay for Repairs to the wastewater facilities specified herein shall not exceed the annual Repairs limit of Four Thousand Dollars (\$4,000.00) for the contract year set forth in Article 4.1 of this Agreement.

BALANCE OF THIS PAGE INTENTIONALLY LEFT BLANK

This Amendment together with all previous Amendments and the Agreement constitute the entire agreement between the Parties and supersedes all prior oral and written understandings with respect to the subject matter set forth herein. Unless specifically stated all other terms and conditions of the Agreement shall remain in full force and effect. Neither this Amendment nor the Agreement may be modified except in writing signed by an authorized representative of the Parties.

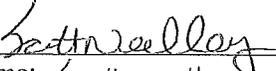
The Parties, intending to be legally bound, indicate their approval of this Amendment by their signatures below.

**OPERATIONS MANAGEMENT
INTERNATIONAL, INC.**

CITY OF CASCADE LOCKS, OREGON

Authorized Signature:

Authorized Signature:


Name: Scott McElley
Title: Vice President
Date: 6/24/15

Name: Tom Cramblett
Title: Mayor
Date: _____

CASCADE LOCKS STAFF REPORT

Date Prepared: July 8, 2015

For City Council Meeting on: July 13, 2015

TO: Honorable Mayor and City Council

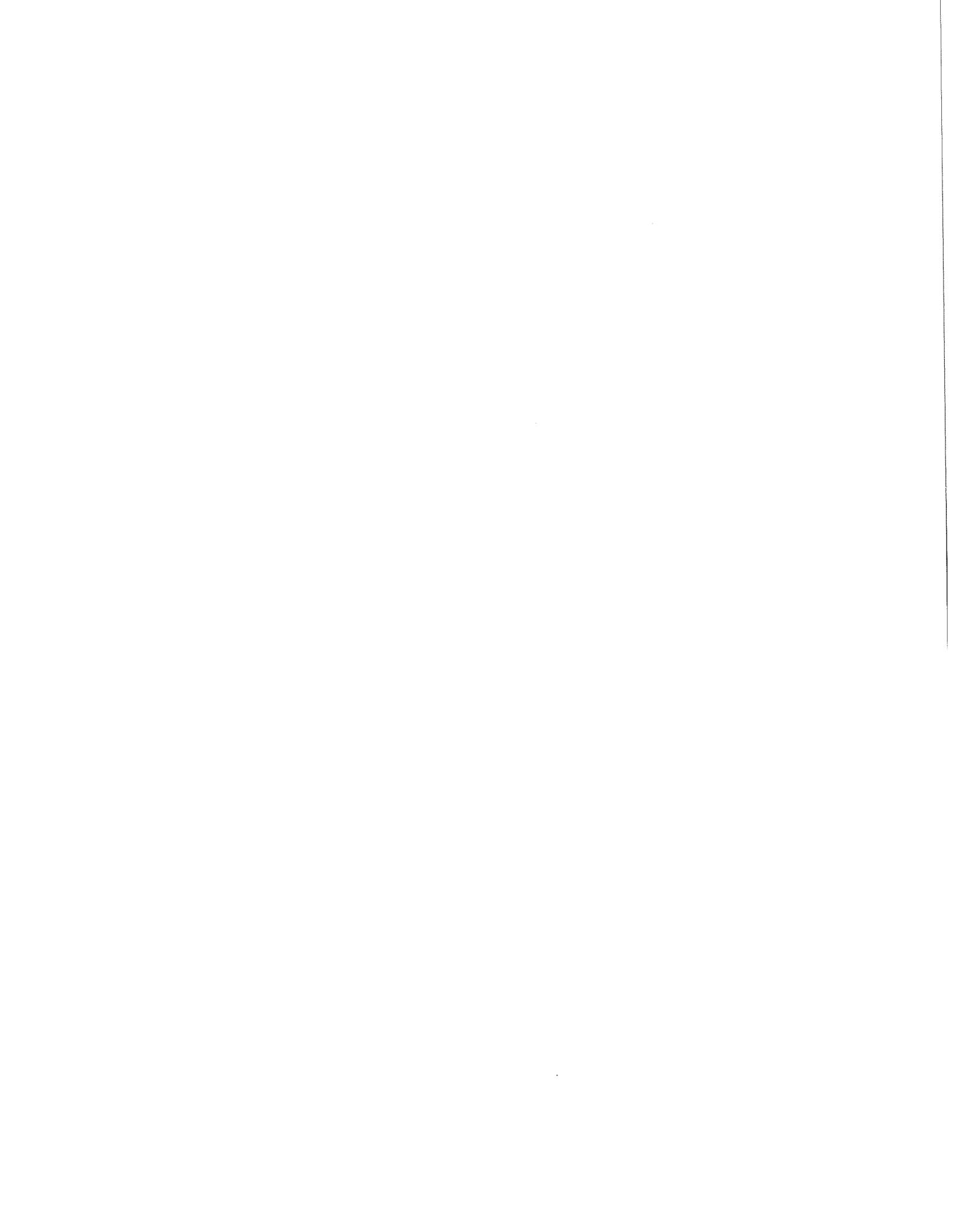
PREPARED BY: Gordon Zimmerman, City Administrator

SUBJECT: Approval of Mid-Columbia Home Repair Program IGA.

SYNOPSIS: The City of Cascade Locks along with 11 other cities and three counties in an intergovernmental agreement that provides home repairs for low and moderate income families through a Community Development Block Grant. This sponsorship helps low income families make needed repairs on their homes. It does not cost the City anything to be a cosponsor and it allows our citizens to participate in this program.

CITY COUNCIL OPTIONS: Approve or reject the IGA.

RECOMMENDED MOTION: "I move to approve the IGA with 11 other cities and two counties for the Mid-Columbia Home Repair Program."



**Intergovernmental Agreement In Support Of a Community Development Block Grant
From The 2015 Community Development Block Grant Program
Administered By the Oregon Business Development Department,
Infrastructure Finance Authority**

Agreement Title: Sponsorship of Mid Columbia Home Repair Program

Agreement Date: _____

Signatory parties: **Hood River County, Wasco County, Sherman County, Cities of: Cascade Locks, Hood River, Mosier, The Dalles, Dufur, Maupin, Moro, Grass Valley, Antelope, Shaniko, Rufus and Wasco**

Agreement: The above signatory parties agree to jointly sponsor a housing rehabilitation program provided through a Community Development Block Grant (CDBG), administered by the Oregon Business Development Department, Infrastructure Finance Authority and recognize Hood River County as the lead agency that will be responsible for applying, receiving and administering the CDBG award.

Grant Activity: The purpose of the proposed CDBG is to manage a housing rehabilitation revolving loan fund to provide assistance to low income homeowners to repair their homes.

Constraints: One-hundred percent (100%) of the benefitted owner occupied household occupants must have incomes below the federal low- and moderate-income limit (80% of the median family income as adjusted by family size).

Only persons who reside within the boundaries of the cities and unincorporated/nonentitlement county areas of the signatory parties are to receive the housing rehabilitation funding.

Columbia Cascade Housing Corporation will enter into a sub-recipient agreement with the lead agency, Hood River County, to manage the housing rehabilitation program.

Counterparts: This agreement may be signed in counterparts and each counterpart will be deemed an original. Copies of all signatures will be provided as part of the grant application and to each signator.

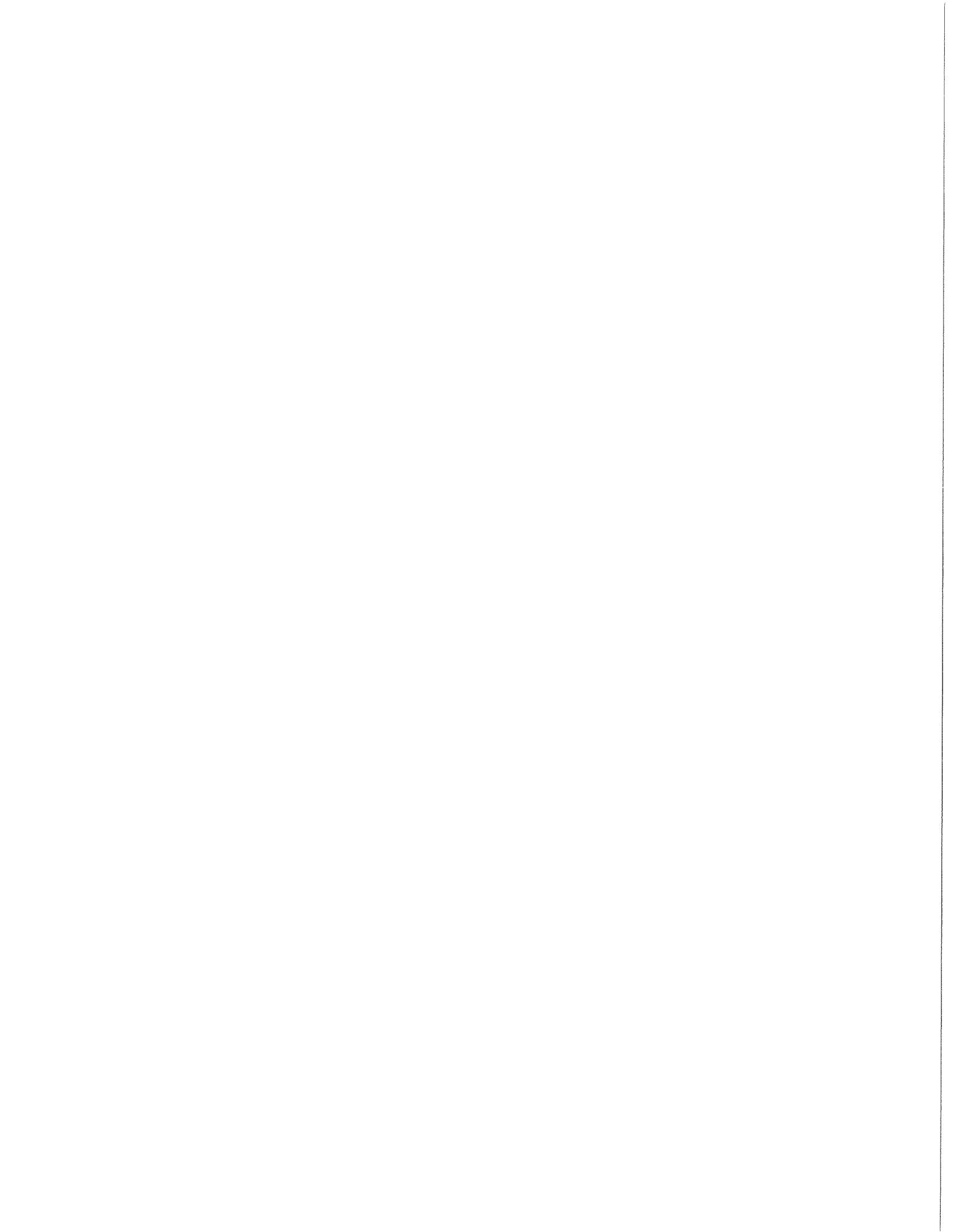
Multiple Parties: In the event that one or more of the signatories identified above decline to sign this agreement, it remains sufficient for all other signatories to receive the benefits of the agreement.

So Agreed:

Signed

Date

Title (Include Jurisdiction)



BLANKET VOUCHER APPROVAL

PAGE NO. 1

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DEPARTMENT: CITY OF CASCADE LOCKS
COVER SHEET AND SUMMARY

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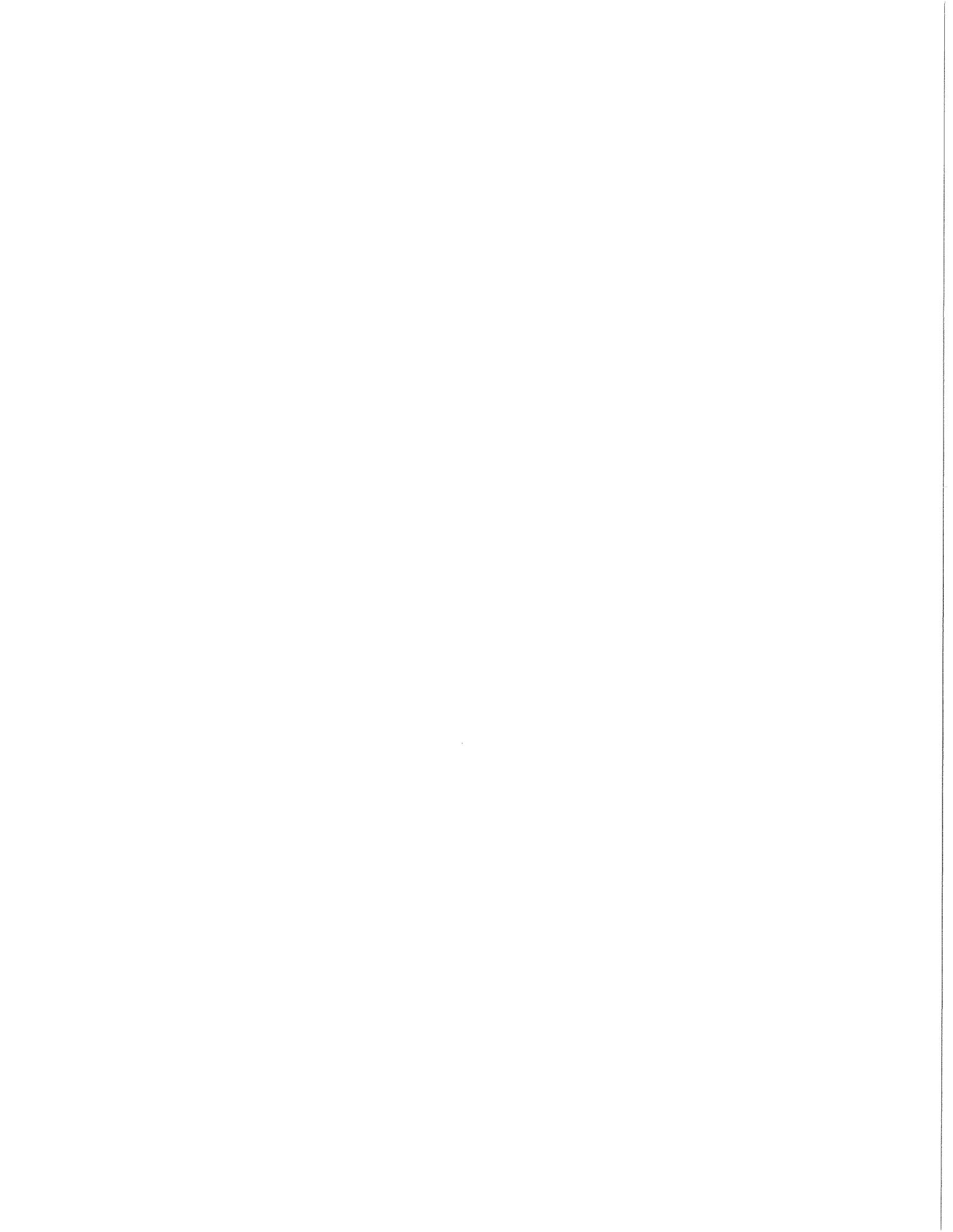
DATE:	DESCRIPTION:	AMOUNT:
6/26/2015	PR	\$ 49,257.47
6/30/2015	A/P	\$ 88,169.03

GRAND TOTAL \$ 137,426.50

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APPROVAL:

Mayor



Report Criteria:
Report type: GL detail

Check Number	GL Period	Check Issue Date	Vendor Number	Invoice No.	Payee	Description	GL Account	Amount
5968	06/15	06/30/2015	6820	55885	Anderson Perry & Associates Inc.	Collection System Eval	0740562131	1,161.12
Total 5968:								1,161.12
5969	06/15	06/30/2015	4910	100049003 C	Antonio Munoz	Refund Credit Balance on Account	5130543810	22.01
Total 5969:								22.01
5970	06/15	06/30/2015	6907	93152444	Arrow International	EZ10 needles	0540562351	379.81
Total 5970:								379.81
5971	06/15	06/30/2015	170	419066	ARROW SAFETY EQUIPMENT	Fire Extinguisher Service	0140462520	268.00
5971	06/15	06/30/2015	170	419066	ARROW SAFETY EQUIPMENT	Fire Extinguisher Service	2140562560	504.00
5971	06/15	06/30/2015	170	419067	ARROW SAFETY EQUIPMENT	Fire Extinguisher Service	5140562110	385.00
Total 5971:								1,157.00
5972	06/15	06/30/2015	6839	81812140	Bound Tree Medical, LLC	Med and supplies	0540562351	387.05
Total 5972:								387.05
5973	06/15	06/30/2015	440	BEERS 6/15/	BPA	Pay Weatherization Lien Victor Beers	5112011	2,600.00
Total 5973:								2,600.00
5974	06/15	06/30/2015	6900	V501885	BSK Associates	water testing	2140562150	45.00
Total 5974:								45.00
5975	06/15	06/30/2015	670	CCLLP 6/30/	CASCADE LOCKS LIGHT CO.	ccllp farmer	5140562138	150.00
5975	06/15	06/30/2015	670	CCLLP 6/30/	CASCADE LOCKS LIGHT CO.	ccllp star	5140562138	150.00
Total 5975:								300.00
5976	06/15	06/30/2015	790	313230273 6	CENTURYLINK	Fire Department Phones	0540562050	140.76
5976	06/15	06/30/2015	790	313401451 6	CENTURYLINK	Sewer	3140562050	116.10

Check Number	GL Period	Check Issue Date	Vendor Number	Invoice No.	Payee	Description	GL Account	Amount
5976	06/15	06/30/2015	790	313470082 6	CENTURYLINK	City Hall Phones	0140162050	381.22
5976	06/15	06/30/2015	790	313785538 6	CENTURYLINK	telemetry	2140562050	127.25
5976	06/15	06/30/2015	790	313785538 6	CENTURYLINK	telemetry	3140562050	127.24
5976	06/15	06/30/2015	790	313891134 6	CENTURYLINK	Emergency After Hours	5140562050	55.90
5976	06/15	06/30/2015	790	313891134 6	CENTURYLINK	Emergency After Hours	5140562050	13.97
5976	06/15	06/30/2015	790	314228414 6	CENTURYLINK	Lift Station	3140562050	38.49
5976	06/15	06/30/2015	790	320153997 6	CENTURYLINK	well house dialer	2140562050	8.02
Total 5976:								1,008.95
5977	06/15	06/30/2015	1120	A85481	COLUMBIA HARDWARE, LLC	paint brush	0140462520	18.48
5977	06/15	06/30/2015	1120	A85481	COLUMBIA HARDWARE, LLC	spray paint	2140562560	21.96
5977	06/15	06/30/2015	1120	A85481	COLUMBIA HARDWARE, LLC	spray paint	3140562560	16.47
5977	06/15	06/30/2015	1120	A86793	COLUMBIA HARDWARE, LLC	key	2140562560	9.95
5977	06/15	06/30/2015	1120	B105260	COLUMBIA HARDWARE, LLC	misc supplies	0140462520	15.10
5977	06/15	06/30/2015	1120	B105590	COLUMBIA HARDWARE, LLC	commercial weed bar	0140462520	48.99
5977	06/15	06/30/2015	1120	B105618	COLUMBIA HARDWARE, LLC	water service supplies	0140462520	18.88
Total 5977:								149.83
5978	06/15	06/30/2015	1360	130759	DAVID R. CUNNINGHAM	City Network	0140162082	720.00
5978	06/15	06/30/2015	1360	130760	DAVID R. CUNNINGHAM	fire dept. server/network repair	0140162082	450.00
Total 5978:								1,170.00
5979	06/15	06/30/2015	1420	1871	DENNIS V. SNYDER JR. CONTRACTO	labor for substation work	5645163941	800.00
Total 5979:								800.00
5980	06/15	06/30/2015	1510	3433 REISS	DISCOVERY AUTO GLASS, INC.	reissue check for in. 3433, vendor never	0340562441	85.00
Total 5980:								85.00
5981	06/15	06/30/2015	1530	JUNE 2015	DISH NETWORK	Programming	4140562740	400.00
Total 5981:								400.00
5982	06/15	06/30/2015	6854	062515	Gordon Zimmerman	reimbrse mileage	0140162020	58.00

Check Number	GL Period	Check Issue Date	Vendor Number	Invoice No.	Payee	Description	GL Account	Amount
Total 5982:								
5983	06/15	06/30/2015	6905	19843	Honald Crane Service	lift out structure	5645163941	337.50
Total 5983:								
5984	06/15	06/30/2015	2590	112925-3	HOOD RIVER SUPPLY ASSOC.	Kitchen faucet	0140462520	49.99
5984	06/15	06/30/2015	2590	113168/3	HOOD RIVER SUPPLY ASSOC.	tiedowns, rope, tarp	2140562560	68.96
5984	06/15	06/30/2015	2590	113765/3	HOOD RIVER SUPPLY ASSOC.	snap and clamps	5140562870	80.51
Total 5984:								
5985	06/15	06/30/2015	6938	ESF933	Jaco Analytical, Inc.	oils samples	5645163941	199.46
Total 5985:								
5986	06/15	06/30/2015	4910	103715401 6	Jeff Helfrich	Refund Deposit	5121130	83.42
Total 5986:								
5987	06/15	06/30/2015	3150	062915	MARIANNE BUMP	Reimburse Mileage	0140162020	23.00
Total 5987:								
5988	06/15	06/30/2015	3160	061615	MARIANNE BUMP/PETTY CASH	Reimburse Petty Cash	5140562870	61.00
5988	06/15	06/30/2015	3160	061915	MARIANNE BUMP/PETTY CASH	Reimburse Petty Cash	0140162010	29.76
Total 5988:								
5989	06/15	06/30/2015	4910	601304306 6	Mary Jensen	Refund Deposit	5121130	186.15
Total 5989:								
5990	06/15	06/30/2015	6946	712998	Meyers Custom Lumber	Lumber for substation	5645163941	134.36
Total 5990:								
5991	06/15	06/30/2015	3490	1896	MID-COLUMBIA ECONOMIC	Com. Development Block Grant	0740562131	5,000.00

Check Number	GL Period	Check Issue Date	Vendor Number	Invoice No.	Payee	Description	GL Account	Amount
Total 5991:								
5992	06/15	06/30/2015	6956	8584	Mike Schultz	substation concrete pour	5645163941	311.00
Total 5992:								
5993	06/15	06/30/2015	6954	609944	Ness & Campbell Crane, Inc.	Pick and Move Transformer	5645163941	6,500.00
Total 5993:								
5994	06/15	06/30/2015	4030	1401 2015-1	OHA-EMS	Ambulance Vehicle Renewal	0540562860	45.00
Total 5994:								
5995	06/15	06/30/2015	4530	9620664	PAPE MACHINERY	wheel for backhoe	2140562441	388.14
Total 5995:								
5996	06/15	06/30/2015	6920	59739057	Parr Lumber Co.	anchors, plywood and form clips	5645163941	793.56
5996	06/15	06/30/2015	6920	59739082	Parr Lumber Co.	form clips and snapies	5645163941	137.00
5996	06/15	06/30/2015	6920	6650744	Parr Lumber Co.	lumber, saw blades	5645163941	686.49
Total 5996:								
5997	06/15	06/30/2015	4620	7228430-JN1	PTTNEY BOWES - RENTAL	Rental	0140162120	154.47
Total 5997:								
5998	06/15	06/30/2015	4640	JUNE 2015	PTTNEY BOWES INC	Postage	0140162055	251.00
Total 5998:								
5999	06/15	06/30/2015	6780	19928790	Ricoh Americas Corporation	Lease	0140162120	236.80
Total 5999:								
6000	06/15	06/30/2015	4910	301877716 6	Sally Kaufman	Refund Deposit	5121130	300.00
6000	06/15	06/30/2015	4910	301877716 6	Sally Kaufman	Refund Credit Balance on Account	5130543810	34.19

Check Number	GL Period	Check Issue Date	Vendor Number	Invoice No.	Payee	Description	GL Account	Amount
Total 6000:								334.19
6001	06/15	06/30/2015	6957	1456	Shred4Less	document shredding	0140162110	78.00
Total 6001:								78.00
6002	06/15	06/30/2015	5510	8034819203	STAPLES CONTRACT & COMMERCIA	copy paper	0140162010	62.60
Total 6002:								62.60
6003	06/15	06/30/2015	5650	135486	T & R ELECTRIC SUPPLY CO.	100 KVA Single Phase Pad Mount	5140562780	1,913.00
Total 6003:								1,913.00
6004	06/15	06/30/2015	5720	15-177	Tenneson Engineering Corp	Water Right Time Extensions	2140562110	56.25
Total 6004:								56.25
6005	06/15	06/30/2015	6952	061515	The Oregon Community Foundation	refund unused funds from Grant #20229	0730543008	594.81
Total 6005:								594.81
6006	06/15	06/30/2015	6950	58081	Trus-Way Inc.	Trusses for New Shop	5645163941	2,855.00
Total 6006:								2,855.00
6007	06/15	06/30/2015	6110	JUNE 2015	U.S. POSTAL SERVICE	UB Postage	0140162055	281.19
Total 6007:								281.19
6008	06/15	06/30/2015	6937	JUNE 2015	US Bank Equipment Finance	contract payment	5645163941	1,293.61
Total 6008:								1,293.61
6009	06/15	06/30/2015	6955	0986000-IN	Westside Concrete Accessories	rebar cage for substation	5645163941	4,791.85
Total 6009:								4,791.85
6301501	06/15	06/30/2015	6080	MAY 2015	U S BANK	Bank Fees	0140162110	284.27

M = Manual Check, V = Void Check

Check Number	GL Period	Check Issue Date	Vendor Number	Invoice No.	Payee	Description	GL Account	Amount
Total 6301501:								
6301502	06/15	06/30/2015	6090	8789 5/15	U S BANK CC	mattreis for shop	5645163941	187.73 M
6301502	06/15	06/30/2015	6090	8789 5/15	U S BANK CC	Interest reversal	5645163941	75. M
Total 6301502: 186.98								
Total 6301503:								
6301503	06/15	06/30/2015	6090	2305 MAY 20	U S BANK CC	airline tickets, jesse paramedic testing	0540562022	505.60 M
6301503	06/15	06/30/2015	6090	2305 MAY 20	U S BANK CC	school books	0540562024	434.95 M
6301503	06/15	06/30/2015	6090	2305 MAY 20	U S BANK CC	leaf rake, spray bottle, brush	2140562560	45.37 M
6301503	06/15	06/30/2015	6090	2305 MAY 20	U S BANK CC	alum. screen	2140562560	44.97 M
6301503	06/15	06/30/2015	6090	2305 MAY 20	U S BANK CC	flowers and supplies for front sign	2140562560	237.40 M
6301503	06/15	06/30/2015	6090	2305 MAY 20	U S BANK CC	spray paint	5140562770	43.14 M
6301503	06/15	06/30/2015	6090	2305 MAY 20	U S BANK CC	flags	5140562870	234.50 M
6301503	06/15	06/30/2015	6090	2305 MAY 20	U S BANK CC	riggering products, nc. - substation	5645163941	120.00 M
6301503	06/15	06/30/2015	6090	2305 MAY 20	U S BANK CC	supplies for substation	5645163941	258.57 M
Total 6301503: 1,924.50								
Total 6301504:								
6301504	06/15	06/30/2015	6090	4393 MAY 20	U S BANK CC	supplies for shop	5645163941	1,938.91 M
Total 6301504: 1,938.91								
Total 6301505:								
6301505	06/15	06/30/2015	440	MAY15-PWR	BPA	June Power Bill	5140562820	30,794.00 M
6301505	06/15	06/30/2015	440	MAY15-PWR	BPA	June Power Bill	5140562820	5,580.00 M
Total 6301505: 36,374.00								
Total 6301506:								
6301506	06/15	06/30/2015	6090	2974 MAY 20	U S BANK CC	ipad data plan	0540562050	14.99 M
6301506	06/15	06/30/2015	6090	2974 MAY 20	U S BANK CC	supplies for shop	5645163941	900.00 M
Total 6301506: 914.99								
Total 6301507:								
6301507	06/15	06/30/2015	440	MAY15-TRN	BPA	June Transmission Bill	5140562821	7,583.00 M
6301507	06/15	06/30/2015	440	MAY15-TRN	BPA	June Transmission Bill	5140562821	1,374.00 M
Total 6301507: 8,957.00								

City of Cascade Locks

Check Register - By Check No.
Check Issue Dates: 6/30/2015 - 6/30/2015

Page: 7
Jun 29, 2015 03:18PM

Check Number	GL Period	Check Issue Date	Vendor Number	Invoice No.	Payee	Description	GL Account	Amount
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Grand Totals:

88,169.03

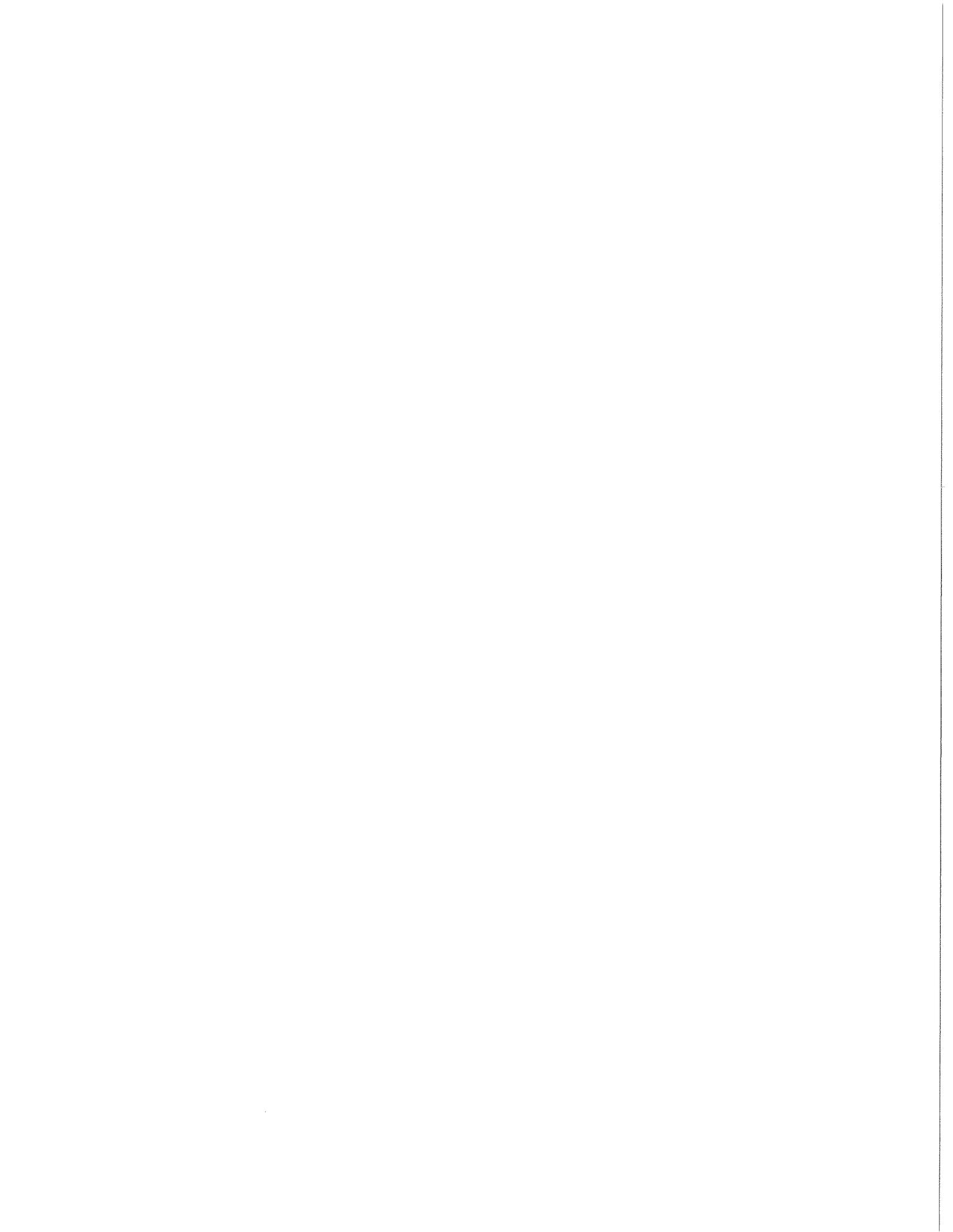
Summary by General Ledger Account Number

GL Account	Debit	Credit	Proof
01-21010	.00	3,429.75-	3,429.75-
01-401-62010	92.36	.00	92.36
01-401-62020	81.00	.00	81.00
01-401-62050	381.22	.00	381.22
01-401-62055	532.19	.00	532.19
01-401-62082	1,170.00	.00	1,170.00
01-401-62110	362.27	.00	362.27
01-401-62120	391.27	.00	391.27
01-404-62520	419.44	.00	419.44
03-21010	.00	85.00-	85.00-
03-405-62441	85.00	.00	85.00
05-21010	.00	1,908.16-	1,908.16-
05-405-62022	505.60	.00	505.60
05-405-62024	434.95	.00	434.95
05-405-62050	155.75	.00	155.75
05-405-62351	766.86	.00	766.86
05-405-62860	45.00	.00	45.00
07-21010	.00	6,755.93-	6,755.93-
07-305-43008	594.81	.00	594.81
07-405-62131	6,161.12	.00	6,161.12
21-21010	.00	1,557.27-	1,557.27-
21-405-62050	135.27	.00	135.27
21-405-62110	56.25	.00	56.25
21-405-62150	45.00	.00	45.00
21-405-62441	388.14	.00	388.14
21-405-62560	932.61	.00	932.61
31-21010	.00	298.30-	298.30-
31-405-62050	281.83	.00	281.83
31-405-62560	16.47	.00	16.47
41-21010	.00	400.00-	400.00-
41-405-62740	400.00	.00	400.00
51-12011	2,600.00	.00	2,600.00
51-21010	.00	51,643.79-	51,643.79-
51-21130	569.57	.00	569.57
51-305-43810	56.20	.00	56.20
51-405-62050	55.90	.00	55.90
51-405-62110	385.00	.00	385.00
51-405-62138	300.00	.00	300.00

M = Manual Check, V = Void Check

GL Account	Debit	Credit	Proof
51-405-62770	43.14	.00	43.14
51-405-62780	1,913.00	.00	1,913.00
51-405-62820	30,794.00	.00	30,794.00
51-405-62821	7,583.00	.00	7,583.00
51-405-62870	376.01	.00	376.01
51-406-62050	13.97	.00	13.97
51-406-62820	5,580.00	.00	5,580.00
51-406-62821	1,374.00	.00	1,374.00
56-21010	.75	22,091.58-	22,090.83-
56-451-63941	22,091.58	.75-	22,090.83
Grand Totals:	88,170.53	88,170.53-	.00

Report Criteria:
 Report type: GL detail



ORDINANCE NO. 439

AN ORDINANCE REGULATING THE OPERATION OF MARIJUANA FACILITIES.

THE CITY OF CASCADE LOCKS, HOOD RIVER COUNTY, OREGON, ORDAINS AS FOLLOWS:

A. General Provisions

(1) Purpose and Intent.

a. State law authorizes the operation of medical marijuana facilities and provides those facilities with immunity from state criminal prosecution;

b. State law may authorize the operation of recreational marijuana facilities in the future;

c. Although the State of Oregon has passed legislation authorizing medical marijuana facilities and providing criminal immunity under state law, and may do the same in the future with respect to recreational marijuana facilities, the operation of those facilities remains illegal under federal law;

d. The City Council has home rule authority to decide whether, and under what conditions, certain commercial conduct should be regulated with the City and subject to the general and police powers of the City, except when local action has been clearly and unambiguously preempted by state statute;

e. Whether and where certain business should operate within the local jurisdiction are local government decisions, and local governments may enforce those decisions through the general and police powers of the jurisdiction.

f. The City Council wants to regulate the operation in the City of medical marijuana facilities now, and recreational marijuana facilities in the future when authorized by state law, in ways that protect and benefit the public health, safety and welfare of existing and future residents and businesses in the City.

(2) Definitions.

“Marijuana” means all part of the plant Cannabis family Moraceae, whether growing or not; the resin extracted from any part of the plant; and every compound, manufacture, salt, derivative, mixture, or preparation of the plant or its resin. It does not include the mature stalks of the plant, fiber produced from the stalks, oil or cake made from the seeds of the plant, any other compound, manufacture, salt, derivative, mixture or preparation of the mature stalks (except the resin extracted therefrom), fiber, oil or cake, or the sterilized seed of the plant which is incapable of germination.

“Medical marijuana” refers to marijuana dried, produced, processed, kept, stored, delivered, transferred, dispensed or otherwise provided for the exclusive benefit of and use by a person to mitigate symptoms or effects of person’s debilitating medical condition as defined in ORS 475.302, including any amendments thereto.

“Marijuana facility” means any facility or operation designed, intended or used for the purpose of delivering, dispensing or transferring marijuana or medical marijuana.

“Operator” means a person who owns, operates or otherwise has legal responsibility for a marijuana facility. All operators must meet the qualifications established by the Oregon Health Authority, if any, and be approved by the Oregon Health Authority to operate a registry, if applicable.

“Principal” means members, partners, or corporate officers, and all stockholders holding more than 10 percent of the voting stock for any operator who is not a natural person.

“Registration identification card” means a document issued by the Oregon Health Authority that identifies a person authorized to engage in the medical use of marijuana, and the person’s designated caregiver, if any.

“School” means a public or private elementary, secondary, or career school as those terms are defined by the Oregon Health Authority.

B. Standards of Operation

(1) Registration and Compliance With Oregon Health Authority Rules. Marijuana facilities must comply with the registration requirements of the laws of the State of Oregon and must be in good standing with the Oregon Health Authority. All facilities must comply with all applicable laws and regulations administered by the Oregon Health Authority for facilities.

(2) Compliance With Other Laws. Facilities must comply with all applicable laws and regulations, including, but not limited to, the building and fire codes.

(3) Public View Into Facility. All doorways, windows and other openings shall be located, covered or screened in such a manner to prevent a view into the interior from any exterior public or semipublic area.

(4) Odors. Facilities must use an air filtration and ventilation system which, to the greatest extent feasible, confines all objectionable odors associated with the facility to the premises. The standard for judging “objectionable odors” is that of an average, reasonable person with ordinary sensibilities after taking into account the character of the neighborhood in which the odor is made and detected.

(5) Lighting. Facilities must maintain adequate outdoor lighting over each exterior door.

(6) On-Site Use. Marijuana and tobacco products may not be smoked, ingested, consumed, or otherwise used on facility’s premises.

(7) On-Site Manufacturing. Manufacturing or production of any extracts, oils, resins or similar derivatives of marijuana is prohibited at a facility. Use of open flames or gases in the preparation of any products is prohibited at a facility.

(8) Storage and Disposal. Outdoor storage of merchandise, raw materials or other materials associated with marijuana use is prohibited. Facilities must securely dispose of marijuana remnants or by-products; marijuana remnants or byproducts may not be disposed of in exterior refuse containers.

(9) Home Occupation. A facility may not be operated as a home occupation.

C. Location Restrictions

(1) Distance From Schools and Other Premises. In addition to complying with the location requirements established by the Oregon Health Authority that the proposed facility not locate within 1,000 feet of a school, a facility shall not locate within 1,000 feet of any premises where minors are likely to congregate. For purposes of this section, premises where minors are likely to congregate include, but are not limited to, public or private parks, playgrounds, recreational facilities, pre-schools, and day cares.

(2) Distances. For purposes of this section, all distances shall be measured in a straight line from the closest edge of each property line.

(3) Closure. In addition to the requirement established by the Oregon Health Authority that a facility be closed if a school is found to be within 1,000 feet of a facility, a facility shall also be required to close if premises where minors are likely to congregate are found to be within 1,000 feet of a facility.

D. Emergency Clause This act being necessary for the immediate preservation of the public peace, health and safety, an emergency is declared to exist and this ordinance shall be in full force and effect on July 13, 2015.

ADOPTED by the City Council this 13th day of July, 2015.

APPROVED by the Mayor this 13th day of July, 2015.

Tom Cramblett, Mayor

ATTEST:

City Recorder

First Reading: June 22, 2015

Second Reading Approved: July 13 Ayes _____; Nays _____

Locations of Medical Marijuana Facilities

(1) In order to be registered a facility must be located in an area that is zoned by the local governing agency for commercial, industrial or mixed use or as agricultural land.

(2) Registration by the Authority is not a guarantee that a facility is permitted to operate under applicable land use or other local government laws where the facility is located.

(3) A facility may not be located:

- (a) At the same address as a registered marijuana grow site;
- (b) Within 1,000 feet of the real property comprising a public or private elementary, secondary or career school attended primarily by minors; or
- (c) Within 1,000 feet of another medical marijuana facility.

(4) For purposes of implementing ORS 475.314(3)(c), the Authority will consider a location to be a school if it has at least the following characteristics:

- (a) Is a public or private elementary, secondary or career school as those terms are defined OAR 333-008-1010;
- (b) There is a building or physical space where students gather together for education purposes on a regular basis;
- (c) A curriculum is provided;
- (d) Attendance at the location meets Oregon's mandatory attendance law, ORS 339.010 or an exemption under ORS 339.030(1)(a); and
- (e) Faculty is present to teach or guide student education.

(5) For purposes of determining the distance between a facility and a school referenced in subsection (3)(b) of this rule, "within 1,000 feet" means a straight line measurement in a radius extending for 1,000 feet or less in any direction from the closest point anywhere on the boundary line of the real property comprising an existing public or private elementary, secondary or career school to the closest point of the premises of a facility. If any portion of the premises of a proposed or registered facility is within 1,000 feet of a public or private elementary, secondary or career school it may not be registered.

(6) For purposes of determining the distance between a facility and another registered facility "within 1,000 feet" means a straight line measurement in a radius extending for 1,000 feet or less in every direction from the closest point anywhere on the premises of a registered facility to the closest point anywhere on the premises of a proposed facility. If any portion of the premises of a proposed facility is within 1,000 feet of a registered facility it may not be registered.

(7) In order to be registered a facility must operate at a particular location as specified in the application and may not be mobile.

Stat. Auth.: ORS 475.314 & 475.338; Stats. Implemented: ORS 475.314; Hist.: PH 2-2014(Temp), f. 1-14-14, cert. ef. 1-15-14 thru 7-13-14; PH 20-2014, f. & cert. ef. 7-11-14; PH 4-2015, f. & cert. ef. 1-28-15

CASCADE LOCKS STAFF REPORT

Date Prepared: July 7, 2015

For City Council Meeting on: July 13, 2015

TO: Honorable Mayor and City Council

PREPARED BY: Gordon Zimmerman, City Administrator

SUBJECT: Approve Aquifer Study

SYNOPSIS: As the City has been working on the Nestlé project, and with the information received from the recent town hall meeting, the Mayor was reviewing some of the reports we have received. One of those reports was completed in October of 2012 by Aspect Consulting (see attached). That report indicates that "the sand and gravel alluvial aquifer tapped by the City's two water wells is highly productive and is capable of sustaining withdrawals well in excess of the City's current water use." But the report does not quantify what "well in excess" means. The report continues with "Increased withdrawals to serve the fish hatchery and future growth in City demand are not expected to result in significant reductions in groundwater elevations or otherwise reduce availability of water from the aquifer."

But no modeling was done to verify that conclusion or to determine the extent the well field could be influenced by "induced flow from the Columbia River during pumping of the production wells" at a higher volume.

The City has approached Aspect Consulting to request a quote on doing that computer modeling to determine the capacity of the aquifer and the potential for induced flow from the Columbia and its impact on our water system. This report could give the City the confidence in its well fields or determine that the City does not have the ability to perfect its full water right of 4 cfs without being influenced by the Columbia River which would require a different treatment process for the well water.

The City could wait for the decision of the Oregon Water Resources Department concerning the cross transfer before making this decision. If the cross transfer is not approved, we do not need the study. If the cross transfer is approved, this study should be done as part of the due diligence process.

This study would require four to six weeks to complete.

CITY COUNCIL OPTIONS:

1. Approve the contract order
2. Seek alternative vendors
3. Do nothing at this time

RECOMMENDED MOTION: "I move to approve the Contract Order from Aspect Engineering for up to \$19,500 for modeling the effects of increased groundwater withdrawals."

Financial Review and Status: To pay for this study, the Council would need to repurpose funds within the Water Department budget to cover the cost of the study (not to exceed \$19,500). The potential line items to repurpose are:

1. Materials, Parts, and Supplies: \$50,680 available.
2. Misc. and Legal Expenses: \$21,000 available.
3. Transfer to Capital Reserve: \$30,000 available.
4. Contingency: \$38,897 available.
5. Capital Reserve Funds: \$137,550 available.
6. Seek partners' participation.
7. Any combination of the above.



MEMORANDUM

Project No.: 120117

October 25, 2012

To: Paul Koch, Interim City Administrator – City of Cascade Locks

From: Joseph N. Morrice, LHG
Associate Hydrogeologist

Timothy J. Flynn, LHG, CGWP
Principal Hydrogeologist

Re: City of Cascade Locks Well Capacity and Aquifer Sustainability Evaluation

Introduction

This memorandum presents an evaluation of the capacity of existing water supply wells (well field) owned by the City of Cascade Locks, Oregon (City) and the sustainability of the aquifer tapped by those wells. This memorandum was prepared by Aspect Consulting, LLC at the direction of the City to evaluate concerns about the impacts of increased demands on the City's water supply system in light of potential economic development opportunities for the City and Port of Cascade Locks.

It is our understanding that the City is considering a source exchange with the Oregon Department of Fish and Wildlife (ODFW) and Nestle Waters North America (Nestle) where the City would supply water from their well field to an ODFW fish hatchery and in turn a portion of water from Oxbow Spring currently serving the hatchery would be available for bottling by Nestle. This source exchange would provide economic development opportunities to the City and Port of Cascade Locks, while also providing ODFW with a more reliable water supply source for hatchery. The quantity of water planned for the source exchange is up to 0.5 cubic feet per second (cfs), or about 224 gallons per minute (gpm), as needed, based on hatchery requirements. Based on the water right exchange application filed with the Oregon Water Resources Department, increased deliveries of water from the City's system would be expected to occur from April through October.

Summary of Results

The sand and gravel alluvial aquifer tapped by the City's two water supply wells (Well No. 1 and Well No. 2) is highly productive and is capable of sustaining withdrawals well in excess of the City's current water use. The aquifer is recharged by water infiltrating from Herman Creek and likely to a lesser extent by induced flow from the Columbia River during pumping of the production wells. Increased withdrawals to serve the fish hatchery and future growth in City demand are not expected to result in significant reductions in groundwater elevations or otherwise reduce availability of water from the aquifer.

The extent to which increased well production will increase the flow induced from the Columbia River during pumping is uncertain and would require more detailed analysis (e.g., groundwater modeling), which is beyond the current scope of this work. However, given the magnitude of the



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October 25, 2012

increased well production required to meet the projected future demand under the source exchange proposal, the potential increased capture of Columbia River water may affect water quality of the City's well field.

The primary constraint on the City's production capacity is the maximum pump size that can be installed in the existing wells. The City's wells are highly efficient, showing minimal drawdown (decrease in water level) during pumping. The City's water supply wells (Well No. 1 and Well No. 2) are equipped with pumps reportedly capable of producing 450 and 500 gpm, respectively. Sizing of pumps to increase yield is beyond the current scope of work; however, it is expected that yield from the larger diameter Well No. 1 (14-inch diameter) could be increased to 1,000 gpm or more by replacing the existing pump. It is unclear whether a higher capacity pump could be installed in Well No. 2, but this option should be considered if the City needs to further increase well yields. Alternatively, constructing a third production well tapping the same aquifer would readily increase the City's water supply capacity with minimal impacts to water levels in the aquifer.

The following sections provide an overview of hydrogeologic conditions and well construction and testing that form the basis of the conclusions discussed above.

Hydrogeologic Conditions

The City's water supply wells (Well No. 1 and Well No. 2) are completed in a shallow, highly productive, sand and gravel alluvial aquifer. The aquifer is formed by alluvial deposits along the banks of the Columbia River, and overlies Columbia River Basalts and consolidated mudflow deposits of the Eagle Creek Formation. The unconsolidated alluvial deposits are at least 100 feet thick near the City's wells, with a saturated thickness of at least 50 feet. Based on the surficial geology of the area and driller's logs of nearby wells, the alluvial aquifer appears to form a wedge that pinches out about 2,000 feet south of the City's wells near Interstate Highway 84.

The alluvial aquifer is recharged by infiltration of precipitation, infiltration of surface water from Herman Creek, and likely from groundwater discharge from the underlying basalt and from springs along the southern margin of alluvium. Based on groundwater levels and the elevation of Herman Creek, the creek appears to be perched above the saturated alluvial aquifer, rather than in direct connection with the aquifer. As a result, water is expected to be lost from the creek to the aquifer along much of the creek channel. Pacific Groundwater Group (PGG) measured stream flows in Herman Creek in September and October of 2010 and 2011 and estimated losses from the creek to the aquifer on the order of about 4 to 10 cfs (1,800 to 4,500 gpm). These measurements coincide with expected low flows in Herman Creek, and similar or higher losses from the creek to the aquifer are expected during winter and springtime flows.

The alluvial aquifer is hydraulically connected to the Columbia River. Water level monitoring data collected by PGG from City Well No. 1 and a well owned by the Port of Cascade Locks from September 2011 to January 2012 show groundwater levels in the aquifer responding to changes in Columbia River stage. Because of this connection, pumping of the City's wells may induce flow of water from Columbia River into the aquifer. However, based on a comparison of available river versus aquifer water quality, water from the Columbia River does not appear to be reaching the City's wells and affecting water quality under current pumping conditions.

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Project No.: 120117

October 25, 2012

The driller's logs for the City's wells indicate depth to water at the time of drilling (1969) was about 61 feet below ground surface (bgs). On August 31, 2011, PGG measured depth to water in Well No. 1 as about 60 feet bgs, or slightly higher than when the wells were first drilled. There do not appear to be any long-term declines in aquifer water levels, as would be expected given the recharge from Herman Creek and hydraulic connection to the Columbia River.

Conventional water chemistry data (e.g., chloride, sulfate, calcium, magnesium, etc.) from Well No. 1, Oxbow Springs, Herman Creek, and the Columbia River were assembled by PGG and plotted on what is known as a Piper diagram, or trilinear plot. Piper diagrams allow for easy visual comparison of water chemistry data from different sources. The data presented by PGG indicate that water from Oxbow Springs, Herman Creek, and Well No. 1 have the same conventional chemistry signatures, including low total dissolved solids (TDS) concentrations. Water from the Columbia River has a different water quality signature and significantly higher TDS concentrations than that observed in groundwater. These data support the conclusion that groundwater withdrawn by the City's wells at the current level of production to meet demand, is primarily recharged by Herman Creek and Oxbow Springs, with little to no contribution from the Columbia River.

One concern expressed by the City Council is whether increased production will induce additional flow from the Columbia River and affect water quality captured by the City's wells. This concern is difficult to definitively address without a more intensive evaluation, such as numerical groundwater flow modeling. However, comparison of current groundwater withdrawals to the increased demand from the hatchery use gives some indication of the potential for inducing flow from the Columbia River. Based on a conversation with City staff, withdrawals currently average about 8 million gallons per month, or about 260,000 gallons per day (gpd). Assuming continuous use by the hatchery, 0.5 cfs equates to an increase in demand of about 320,000 gpd, more than doubling current demand. Given the magnitude of the increased demand relative to current demand, there is a potential for increased capture of Columbia River water that may affect water quality of the City's well field.

Well Construction and Options to Increase Production

The City's two supply wells are located approximately 700 feet from the Columbia River. Well No. 1 is a 14-inch diameter, 110-foot deep well, with slotted casing open to the alluvial aquifer between depths of 80 and 103 feet. Well No. 2 is an 8-inch diameter, 104-foot deep well, with slotted casing open to the aquifer between depths of 75 and 100 feet. Both wells were completed in 1969. Depth to water in each well was about 61 feet at the time of construction.

The driller's log for Well No. 1 indicates that a pumping test was conducted in 1969 at a rate of 1,000 gpm with 0.2 feet of drawdown after 24 hours. This equates to a specific capacity (pumping rate divided by drawdown) of 5,000 gallons per minute per foot (gpm/ft). The driller's log for Well No. 2 indicates it was originally tested at a rate of 600 gpm, with 1 foot of drawdown after 8 hours, equating to a specific capacity of 600 gpm/ft. Based on a conversation with City staff, Well No. 1 is currently equipped with a pump capable of producing 450 gpm, and Well No. 2 is equipped with a pump capable of producing 500 gpm.

In August 2011, PGG performed a very short-duration (12 minute) pumping test at Well No. 1. The well was pumped at a rate of approximately 440 gpm using the existing pump. Drawdown stabilized at about 0.08 feet, for a specific capacity of about 5,500 gpm/ft. Based on these results, the specific capacity and efficiency of Well No. 1 do not appear to have decreased over time.

October 25, 2012

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Project No.: 120117

Given the minimal drawdown observed during pumping of the City's wells, the water transmitting capacity (transmissivity) of the aquifer and the efficiency of the wells are not limiting factors on the maximum withdrawal rates that could be sustained. Instead, the primary constraint is the well casing diameter and the resulting pump size that can be installed in the wells. Sizing of pumps is beyond the scope of this work, but based on the diameter of Well No. 1 and the relatively shallow depth to water, we expect that yields of 1,000 gpm or greater could be realized from this well with minimal increases in drawdown and without reducing long-term availability of water from the aquifer.

Limitations

Work for this project was performed and this memorandum 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 are intended solely for City of Cascade Locks and apply only to the services described in the Agreement with Client. Any use or reuse by Client for purposes outside of the scope of Client's Agreement is at the sole risk of Client and without liability to Aspect Consulting. Aspect Consulting shall not be liable for any third parties' use of the deliverables provided by 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.

W:\120117.GW Source Yield Capacity\Deliverables\Cascade Locks Hydro Memo\Cascade Locks Hydro Memo.docx

Aspect Consulting, LLC

Terms and Conditions

1. RIGHT OF ENTRY AND PROPERTY RESPONSIBILITY

The Client will obtain right of entry to the property where the Services are to be performed ("Property"). The right of entry shall allow Aspect Consulting and its subcontractors to enter the Property to perform the Services. Aspect Consulting is responsible for its own activities, but has no responsibility for the Property, for third party safety precautions, or for the safety or control of third parties.

2. SUBSURFACE RISKS AND SITE DAMAGES

Client recognizes special risks exist whenever professional consulting services are employed to determine the composition of a site's subsurface or to determine the existence or non-existence of any man-made or natural subsurface features, including, but not limited to, hazardous substances. Client shall disclose to Aspect Consulting all known conditions, substances, or features in writing or in maps, plans or drawings. Even with adequate disclosure by Client, Client acknowledges that the use of exploration and testing equipment may unavoidably damage or alter the Property surface or subsurface and Client accepts this risk. Client assumes responsibility for claims and/or damages arising from changed or differing site conditions or to subsurface structures, including buried utility lines, pipes, tanks, tunnels, or other conditions and agrees to hold harmless, defend and indemnify Aspect Consulting and its subcontractors from any such claims and/or damages, including attorney fees, except to the extent directly caused by the negligence of Aspect Consulting or its subcontractors.

3. HAZARDOUS SUBSTANCES

Client shall provide Aspect Consulting with all information available to Client concerning past and present use of the Property and the nature and extent of any known or suspected hazardous substances or conditions, prior to Aspect Consulting performing the Services. Unless expressly stated otherwise in the Agreement, Client acknowledges that Aspect Consulting has no liability as a generator, operator, transporter, disposer, or arranger of the transportation and/or disposal of hazardous substances from the Property. Client agrees to hold harmless, defend and indemnify Aspect Consulting and its subcontractors from any claims and/or damages, including attorney fees, arising out of the presence, release, or threatened release of hazardous substances on or from the Property, except to the extent directly caused by the negligence of Aspect Consulting or its subcontractors.

4. SLOPE STABILITY

Client recognizes risks are inherent with any site involving slopes. Client accepts full responsibility for these risks. Client acknowledges that the information obtained or recommendations made by Aspect Consulting may help to reduce Client's risk but no amount of engineering or geologic analysis can assure slope stability. Therefore, Client agrees to hold harmless, defend and indemnify Aspect Consulting and its subcontractors from any claims and/or damages, including attorney fees, arising out of or related to slope movement, except to the extent directly caused by the negligence of Aspect Consulting or its subcontractors.

5. SAMPLE DISPOSAL / WELL DECOMMISSIONING

5.1 Aspect Consulting may dispose of any samples obtained from the Property 30 calendar days after the issuance of any document that includes the data obtained from the sample, unless other arrangements are mutually agreed upon in writing. Unless expressly stated otherwise in the description of Services, the disposal cost for samples is not included in any cost estimate for the Services. Client acknowledges the difficulty in determining disposal costs in advance and authorizes Aspect Consulting to bill Client for expenses incurred in disposing of samples obtained from the Property.

5.2 Any wells installed as part of Aspect Consulting's work may later need to be properly decommissioned and recorded in accordance with applicable law. Unless expressly stated otherwise in the description of Services, well decommissioning and recording are not included in the Services to be performed by Aspect Consulting.

6. OWNERSHIP OF DOCUMENTS / WORK PRODUCT

6.1 Data, reports or information provided by Aspect Consulting under this Agreement shall only become the property of Client upon full payment for the Services. After full payment, Aspect Consulting shall retain joint ownership of all such information. Aspect Consulting shall retain copies of the original electronic files and/or hardcopy versions of information provided by Aspect Consulting or by Client. Aspect Consulting's originals shall govern in the event of any dispute regarding the content of electronic media furnished to others.

6.2 All reports prepared by Aspect Consulting under this Agreement are intended solely for the Client and apply only to the Services. Any use or reuse by Client for purposes outside of this Agreement is at the sole risk of Client and without liability to Aspect Consulting. Aspect Consulting shall not be liable for any third parties' use of the deliverables provided by Aspect Consulting.

6.3 Aspect Consulting is entitled to rely upon the completeness and accuracy of reports, documents, drawings, plans and other information furnished by Client concerning the Property or the project that is the subject of this Agreement.

6.4 In the event Aspect Consulting is required to respond to legal process related to the Services for Client, Client agrees to reimburse Aspect Consulting its current hourly charges for personnel involved in the response and attorney fees reasonably incurred in obtaining advice concerning the response, preparation to testify, and appearances related to the legal process, travel and all reasonable expenses associated with the litigation.

6.5 Unless a different time period is stated in the Agreement, Aspect Consulting shall retain records in accordance with Aspect Consulting's records retention policy.

7. PAYMENT TERMS

Invoices shall be submitted to Client upon completion of the Services, or if Services extend beyond 30 days, on a monthly basis for the preceding months work. Billing corrections must be requested within 30 days of invoice date. Payment terms are net 30 days from the date of invoice. All overdue payments are subject to an additional interest and service charge of one and one-half percent (1.5%) (or the maximum rate permissible by law, whichever is lesser) per month or portion thereof from the due date until the date of payment. All fees will be charged or billed directly to Client. Aspect Consulting will not bill a third party without a statement, signed by the third party, accepting payment responsibility. In the event a third party fails to pay, Client shall remain liable for all unpaid invoices for the Services. Aspect Consulting may suspend work and/or withhold delivery of data for Services in the event Client fails to pay its invoices. Client shall be responsible for all costs and expenses of collection including reasonable attorney's fees.

8. PERFORMANCE AND WARRANTY LIMITATION

Aspect Consulting will perform all Services consistent with recognized standards of professionals in the same locality and involving similar conditions. **ASPECT CONSULTING MAKES NO OTHER WARRANTIES OR GUARANTEES OF ANY KIND, EXPRESS OR IMPLIED, IN CONNECTION WITH THE SERVICES.** No representative of Aspect Consulting is authorized to give or make any other representation or warranty in any way, in connection with the Services. Aspect Consulting shall not be liable for any failure or delay in performance by Aspect Consulting resulting, in whole or in part, from any cause beyond the reasonable control of Aspect Consulting.

9. INSURANCE / LIMITATION OF LIABILITY

9.1 Aspect Consulting maintains primary General Liability Insurance for bodily injury and property damage with a limit of \$1,000,000 per occurrence and \$2,000,000 aggregate. Aspect Consulting maintains Professional Liability insurance to provide coverage for liability resulting from professional errors and omissions.

9.2 Aspect Consulting's liability to Client for bodily injury or property damage covered by Aspect's General Liability Insurance policy shall be limited to the proceeds available from the primary General Liability Insurance policy. The liability of Aspect Consulting, its manager, members, professionals, employees, and subcontractors to the Client for damages, including attorney fees, resulting from an act, error or omission in providing or failing to provide professional services, whether based in tort (including negligence) or in contract, shall be limited to the greater of \$50,000 or the amount of compensation paid to Aspect Consulting under this Agreement, unless higher limits are agreed upon in writing. In no event shall either party be liable to the other party, for any consequential or incidental damages, including, without limitation, damages for loss of income, loss of profits and/or loss or restriction of use of the Property.

10. TERMINATION

Suspension or termination of all or any part of the Services may be initiated by Client; however Client shall be responsible for all fees owed Aspect Consulting for Services performed by Aspect Consulting, including all direct costs and all expenses incurred or committed that cannot be cancelled without penalty as well as reasonable termination expenses, prior to Aspect Consulting's receipt of written notice from Client. Either party may terminate this Agreement for cause in the event of the other party's substantial or material failure to perform in accordance with the terms hereof, through no fault of the terminating party. Except for termination arising out of delinquency in payment, a termination for cause shall not be effective unless: (i) not less than seven days' written notice of intent to terminate has been provided; (ii) the notice specifies all reasons for the termination; and (iii) the notified party is given an opportunity to consult with the terminating party to discuss the termination and to cure the substantial failure before the expiration of the period specified in the written notice.

11. MISCELLANEOUS PROVISIONS

11.1 These Terms and Conditions, together with the Contract Agreement, the Schedule of Charges, and any additions or revisions agreed upon in writing by the parties, form the entire Agreement and control over all previous communications, representations, or agreements, either verbal or written, between Client and Aspect Consulting.

11.2 Client and Aspect Consulting agree to use their best efforts to resolve any disputes, claims or other matters in controversy arising under or related to this Agreement.

11.3 These Terms and Conditions shall be governed by the laws of the State of Washington. The sole venue for any legal action related to this Agreement shall be King County, Washington.

11.4 The unenforceability of any term or condition herein shall not affect the validity or enforceability of the remainder to these Terms and Conditions; the intent of the parties being the provisions be severable. The section headings of these Terms and Conditions are intended solely for convenience and do not define or affect these Terms and Conditions or their interpretation. No waiver by either party of any provision, term or condition hereof or of any obligation of the other party hereunder shall constitute a waiver of any subsequent breach or other obligation.

Effective January 2015

**ASPECT CONSULTING, LLC
SCHEDULE OF CHARGES**

Unless otherwise stated in the proposal or services agreement, current rates are as follows:

Personnel Charges – Engineers and Scientists

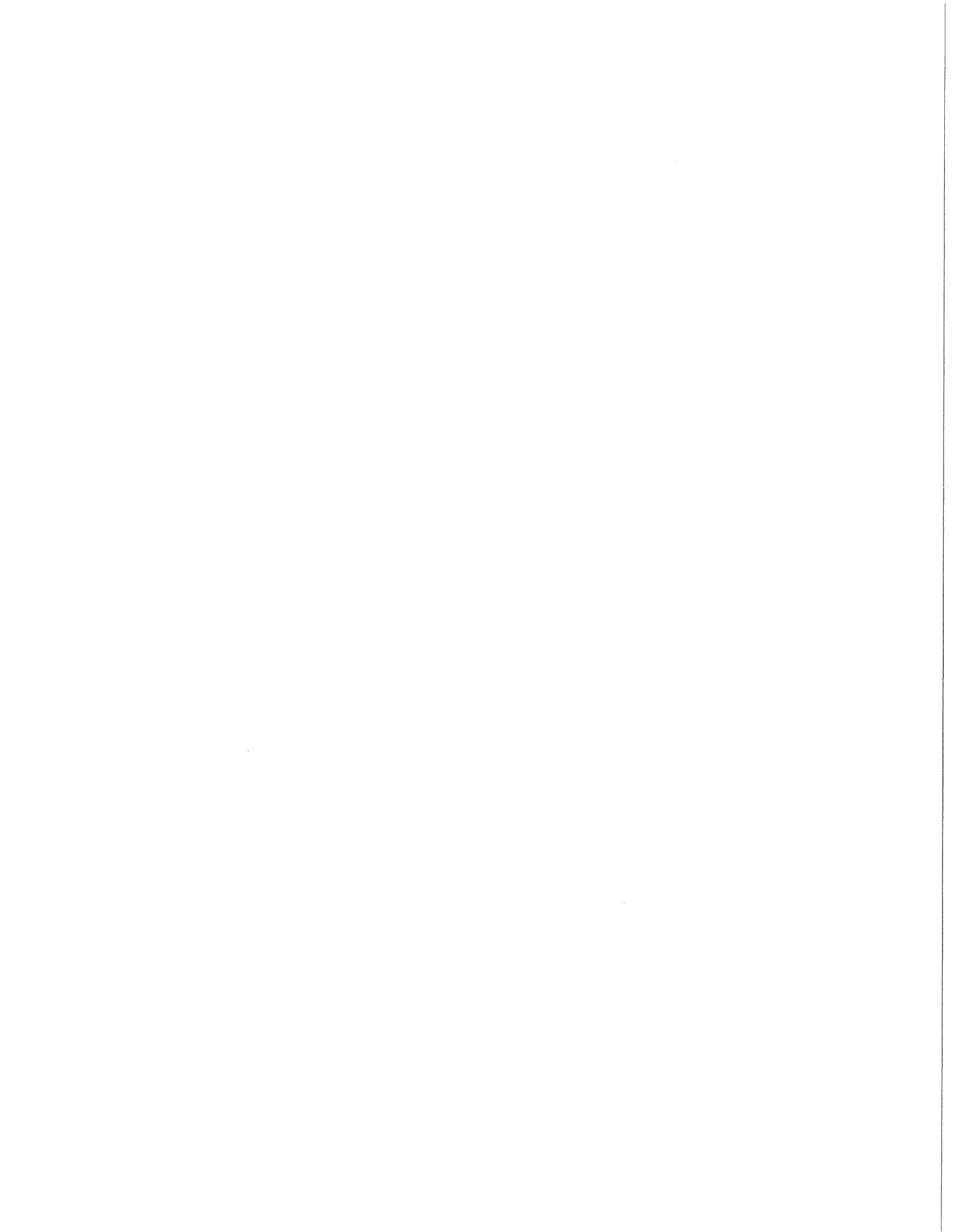
Principal	\$201.00 to \$209.00/hour
Sr. Associate	\$188.00/hour
Associate	\$175.00/hour
Senior	\$151.00/hour
Sr. Project.....	\$141.00/hour
Project	\$129.00/hour
Sr. Staff.....	\$113.00/hour
Staff.....	\$99.00/hour
Construction Supervisor.....	\$101.00/hour
Technician.....	\$77.00/hour
Legal Testimony (4-hour minimum).....	\$300.00/hour

Other Personnel and Disbursement Charges

Sr. GIS/CAD Specialist	\$104.00/hour
GIS/CAD Specialist.....	\$94.00/hour
Sr. Technical Editor	\$100.00/hour
Project Assistant	\$76.00/hour
Four-wheel Drive Field Vehicle	\$110.00/day (w/up to 100 miles)
Mileage	federal gov't rate plus 15%
Subcontractors and Miscellaneous Expenses.....	cost plus 15%
Communications Charge (phones, fax, computer, in-house [B/W] reproduction, mailing).....	4% of total labor

Oversize CAD/GIS Plots..... \$2.00/Sq. Ft.

Other equipment rental and expenses will be provided on a per job basis.





AGENDA ITEM NO 5e

STAFF REPORT

Date Prepared: 07-06-15

For City Council Meeting on: 7/13/2015

TO: Honorable Mayor and City Council

PREPARED BY: Captain Jesse Metheny

APPROVED BY: Gordon Zimmerman

SUBJECT: Leave of Absence August 17th –December 1st 2015

SYNOPSIS: “Action expresses priorities.” — Mahatma Gandhi

This report is to inform you of some temporary adjustments to the Station Captain position with the Emergency Services Department.

I would like to accept an assignment with my faith based organization to help where the need is greater for a period of approximately 3 months this fall. I am requesting a leave of absence to begin August 17, 2015. I would return to work as soon as our assignment is finished, likely the first week of December. During my sabbatical, I can be contacted remotely through email or telephone to help support the Emergency Services Department.

If this leave is approved, one of our volunteer Lieutenants, Jessica Bennett, would be offered a temporary position under a Personal Services Agreement to assist with management and other duties in my absence. A contract price of \$2,000 per month would be reasonable as we are also paying for her school full time and have an internship agreement in place for covering station duties and calls. Along with our Firefighter Paramedic, Gary Stallings, these two individuals should be able to manage the day to day operation in my absence. They have demonstrated professional competence and have a proven track record of community loyalty and professionalism. Our call volume generally decreases after August and stays below average through November as cool and wet weather sets in.

BACKGROUND INFORMATION:

My faith and strong spiritual convictions have made me who I am today and continue to be the guiding force in my life and decisions. I truly enjoy my career here with the City because I am able to help so many in their time of need. I have been there for our citizen's best, and worst, days of their lives. I feel that I can help them on a temporary basis to relieve pain and suffering, improve their quality of life, or help make them safe and comfortable for the time I am with them.

By sharing my faith with others I feel I can have a much more lasting impact on their lives. There is a greater need in many areas of the world for not only the care a paramedic can provide, but also for the spiritual comfort and hope one needs to survive. I have always felt that my wife and I need to strive to keep our priorities in life, faith, family, and work all in their proper place. This sabbatical I am requesting



will help us keep our priorities firmly fixed in our minds as well as giving us the opportunity to help others gain life sustaining help. I hope that I am always available to assist others who need help while my wife and I have the youth and energy to do these things.

I realize the inconvenience and problems that come with leaving for an extended period of time and understand whatever decisions the council may come to in the best interest of the City. I love calling Cascade Locks home and will return upon completion of this temporary assignment to my regular duties.

Thank you for your time and consideration.

Station Captain Jesse Metheny

Hood River County Sheriff's Office
 Statistical Information
 City of Cascade Locks
 June 2015

Case Numbers associated with Cascade Locks			Call Breakdown
Case #	Date	Officer	Classification
S150493	06/03/15	18	Assault
S150494	06/03/15	13	Unattended death
S150496	06/05/15	14	Domestic
S150497	06/05/15	14	Vehicle stop
S150503	06/08/15	15	Property
S150504	06/08/15	15	Vandalism
S150517	06/12/15	14	Vehicle stop
S150521	06/14/15	11	Animal control
S150527	06/16/15	15	Request for assistance
S150532	06/18/15	14	Warrant service
S150534	06/20/15	14	Warrant service
S150535	06/20/15	5	Search and rescue
S150547	06/24/15	14	Officer initiated
S150546	06/24/15	14	Burglary
S150548	06/24/15	15	Search and rescue
S150551	06/25/15	14	Order violation
S150556	06/26/15	14	Vehicle stop
S150565	06/28/15	5	Search and rescue
S150567	06/29/15	27	Nuisance
Total			19

Total Number of Cascade Locks patrols

65

Total Calls for Service

(includes followup, OFCR initiated, agency assist, SAR, etc.)

162

Hours worked by Deputy Harvey

106.00
82.67

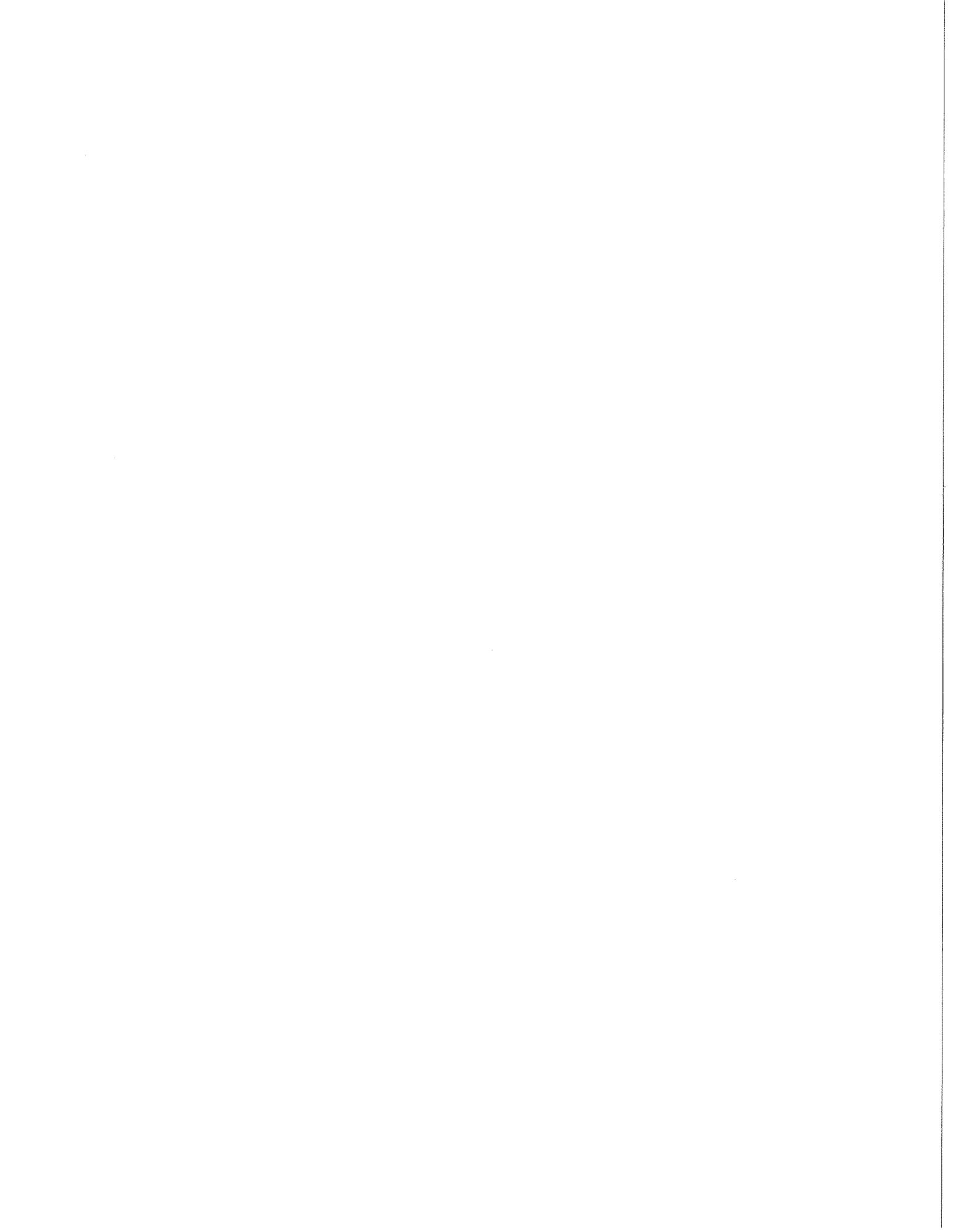
Hours worked by other personnel

104 Total

3	Alarms
6	Animal Control
1	Assault
1	Burglary
1	Civil Issue
5	Disturbance / Nuisance
2	Domestic Situation
0	Drug Activity
3	Harassment
1	Hit & Run
0	Juvenile Problem - MIP, Missing, etc.
0	Marine
0	Mental / Suicide
1	Missing Person
14	MVC / Traffic Complaint / Assist.
2	Order Violation - Restraining, No Contact, etc.
2	Property - Lost/Found
1	Paper Service & Attempts
15	Request for Assistance / 911 Hangups/Welfare
0	Robbery
0	Sex Crimes / Rape
0	Subject Stop
6	Suspicious Activity / Prowler / UEMV
2	Theft (inc SV/UJMV)
32	Traffic Stops
0	Trespass / Unwanted Subject
1	Unattended Deaths
1	Vandalism
3	Warrant Service & Attempts
1	Weapons / Shots Fired

Brian Rockett, Chief Deputy

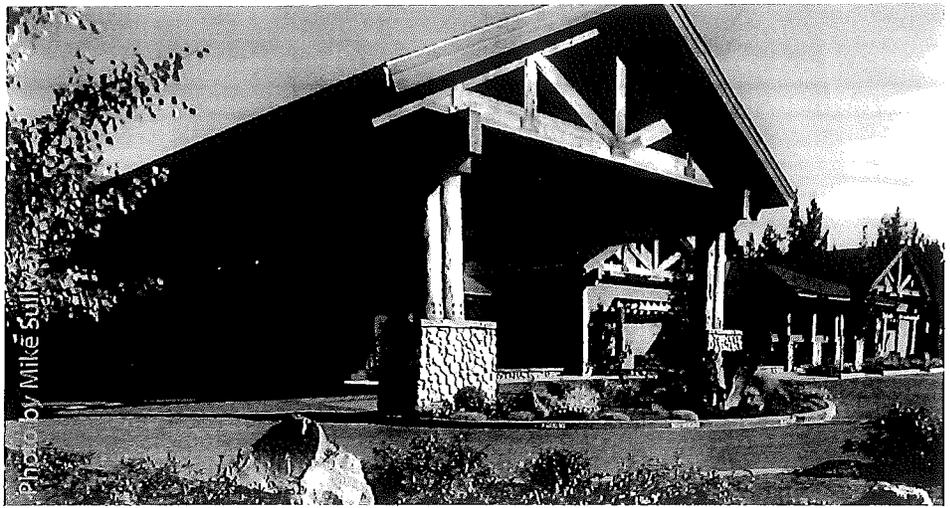




Concurrent Sessions – A Preview

These 90-minute workshops are designed to deliver hands-on training, practical tools and best practice case studies for attendees. This year the topics will include:

- Nuts and Bolts Ethics
- Marijuana
- Diverse Housing Options
- Property Taxes
- Water Supply and Drought Conditions
- Sharing Staff Between Governments
- Tourism
- Finance and Economic Development Tools
- 2015 Legislative Session Recap
- Homelessness
- Natural Disaster Planning
- Telecommunications and Right-of-Way Management
- Nuisance and Code Enforcement
- Healthy Communities
- Infrastructure Finance Work Session
- Effective Utility Management
- The Media
- Understanding Generational Differences
- Latino Voices – Including Everyone
- And more – check www.orcities.org/conference for titles, descriptions and speakers, updated regularly



Conference Lodging

The Riverhouse Hotel & Convention Center is the headquarters hotel for this year's conference. Room reservations will open at all hotels on **July 1, 2015**.

When making lodging reservations, please reference the League of Oregon Cities to get the conference room rate. Complimentary parking is available at all hotels. The cut-off date for making lodging reservations is **August 28, 2015**.

HEADQUARTERS HOTEL

The Riverhouse Hotel & Convention Center
3075 US 97 Business
Bend, OR 97701
866-453-4480
541-389-3111

On July 1, cities can reserve up to five (5) rooms under the city name. Attendee names must be assigned to those rooms within 21 days of the reservation. Reservations for more than five rooms will need to be booked through the League. Contact Ginger Harville at gharville@orcities.org.

OVERFLOW HOTELS

Fairfield Inns & Suites
1626 NW Wall
541-318-1747
www.bendsuites.com

TownePlace Suites
755 SW 13th Place
541-382-5006
www.bendsuites.com

Shilo Inn Suites Hotel
3105 O.B. Riley Road
541-389-9600
www.shiloinns.com

Holiday Inn Express & Suites
20615 Grandview Drive
541-317-8500
www.hiexpress.com

Red Lion Inn & Suites
1415 NE Third Street
541-382-7011
www.redlion.com/bend

Quality Inn
20600 Grandview Drive
541-318-0848 (ask for Kathy)
www.bendqualityinn.com

Bend Inn & Suites
15 NE Butler Market Road
541-388-4114
www.bendinnsuites.com

