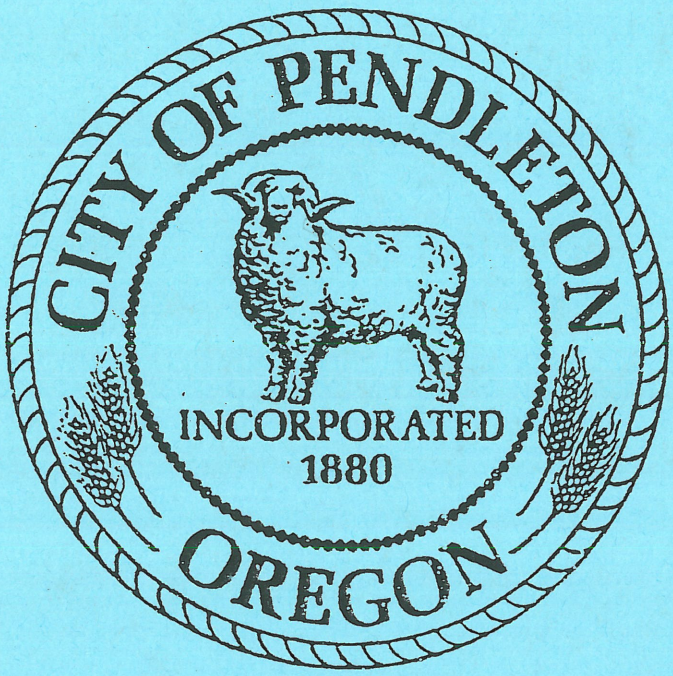


Draft
Water System Master Plan
Addendum

Draft
Water System Master Plan
Addendum

Table of Contents

City of Pendleton
Draft Water System Master Plan Addendum
Approval of WSMP

Enclosed is a copy of the City Council Minutes for its regular meeting held August 1, 1995 and for a special work session held August 8, 1995.

August 1, 1995

The public hearing concerning the WSMP took place during the City Council's regular meeting. Written comments were received from the Oregon Health Division and verbal comments were taken from Jim Hurst, Hydrologist for the Confederated Tribes of the Umatilla Indian Reservation. Mr. Hurst was directed by the mayor to submit his comments in writing for discussion at the special work session to be held on August 8, 1995. No further comments were submitted.

August 8, 1995

A special meeting was held as a City Council work session to review the draft of the WSMP. Stan Wallulis, engineering consultant for the WSMP reviewed the plan and answered questions from the City Council and Staff concerning its components. The WSMP was adopted with an addendum updating the plan by including:

1) The 1995 water legislation;
2) An addendum expressing the City's intention to investigate the possibility of surface storage as described in the CTUIR comments;
3) A correction of the factual and grammatical information; and
4) All comments submitted for the record.

A copy of the draft and its addendum is to be forwarded to the Water Resources Department for approval as the City's Water Management Plan.

Also, the City is to commence:

1) Moving its points of diversion for water rights on the Umatilla River and its tributaries;
2) Beginning measurements of the flows on the North Fork of the Umatilla River in a manner acceptable to WRD and the CTUIR;
3) Seeking permits for testing a slow sand filtration plant;
4) Seeking permits for testing aquifer storage and recovery;
5) Expressing interest to the CTUIR in a joint venture for surface storage; and
6) Retaining legal counsel specialized in water law to advise and aid the City.

CITY COUNCIL MINUTES
CITY OF PENDLETON
AUGUST 1, 1995

A regular meeting of the Pendleton City Council was held in the Vert Little Theatre at 7:30 p.m., August 1, 1995, with Mayor Ramig presiding. Members in attendance were: Anderson, Brenne, Eardley, Ehmann, Houk, McNaught, and Taylor. Excused: Pinkerton. Staff members present were: Lehman, Wells, Odman, Hyde, Zoske, and L. Anderson. Representing the media were S. Brown, East Oregonian and C. McKee, KUMA.

Mayor Ramig called the meeting to order.

CONSENT AGENDA

Mr. McNaught moved the following consent agenda items be approved:

Minutes of the July 18, 1995, City Council meeting.

Executive Session pursuant to ORS 192.660(1)(e) real property; and ORS 192.660(1)(h) litigation.

Chamber of Commerce request for RV parking during the week of the 1995 Pendleton Round-Up.

Marina Swain request to use a P.A. system in Roy Raley Park Saturday, October 7, 1995 during a wedding reception.

The motion was seconded by Mr. Ehmann and carried unanimously.

PUBLIC HEARING - COMMENTS ON THE CITY'S DRAFT WATER MASTER PLAN

Mayor Ramig opened the hearing to receive public input of oral and written comments on the City's draft Water Master Plan.

Bob Patterson, 312 N.W. 4th Street, presented the written comments of Mr. Gary Burnett, Regional Engineer for the Oregon Health Division, who was unable to attend tonight's meeting. The comments will be entered into the record for the August 8, 1995 special work session.

Mr. Jim Hurst, 4023 NE Riverside, stated he was a hydrologist representing the Confederated Tribes. Mr. Hurst gave his comments on the draft water master plan stating the Tribes and the City have a common interest in maintaining a good water quality. He said the draft plan makes some good recommendations, but the Tribes have serious doubts about others and feel there are better solutions than those proposed. Mayor Ramig asked Mr. Hurst to place his comments in writing and turn them in to City Hall to be discussed at the special work session August 8th.

Mayor Ramig asked if anyone else wished to speak.

There being no further comments, Mayor Ramig closed the public hearing.

Mr. Ehmann moved that written comments sent to Mr. Stan Wallulis from Council Members and Mr. Wallulis' replies, as well as the comments presented at tonight's meeting, be made part of the public record. The motion was seconded by Mr. Houk and passed unanimously.

CITY COUNCIL MINUTES
CITY OF PENDLETON
AUGUST 1, 1995

A regular meeting of the Pendleton City Council was held in the Vert Little Theatre at 7:30 p.m., August 1, 1995, with Mayor Ramig presiding. Members in attendance were: Anderson, Brenne, Eardley, Ehmann, Houk, McNaught, and Taylor. Excused: Pinkerton. Staff members present were: Lehman, Wells, Odman, Hyde, Zoske, and L. Anderson. Representing the media were S. Brown, East Oregonian and C. McKee, KUMA.

Mayor Ramig called the meeting to order.

CONSENT AGENDA

Mr. McNaught moved the following consent agenda items be approved:

Minutes of the July 18, 1995, City Council meeting.

Executive Session pursuant to ORS 192.660(1)(e) real property; and ORS 192.660(1)(h) litigation.

Chamber of Commerce request for RV parking during the week of the 1995 Pendleton Round-Up.

Marina Swain request to use a P.A. system in Roy Raley Park Saturday, October 7, 1995 during a wedding reception.

The motion was seconded by Mr. Ehmann and carried unanimously.

PUBLIC HEARING - COMMENTS ON THE CITY'S DRAFT WATER MASTER PLAN

Mayor Ramig opened the hearing to receive public input of oral and written comments on the City's draft Water Master Plan.

Bob Patterson, 312 N.W. 4th Street, presented the written comments of Mr. Gary Burnett, Regional Engineer for the Oregon Health Division, who was unable to attend tonight's meeting. The comments will be entered into the record for the August 8, 1995 special work session.

Mr. Jim Hurst, 4023 NE Riverside, stated he was a hydrologist representing the Confederated Tribes. Mr. Hurst gave his comments on the draft water master plan stating the Tribes and the City have a common interest in maintaining a good water quality. He said the draft plan makes some good recommendations, but the Tribes have serious doubts about others and feel there are better solutions than those proposed. Mayor Ramig asked Mr. Hurst to place his comments in writing and turn them in to City Hall to be discussed at the special work session August 8th.

Mayor Ramig asked if anyone else wished to speak.

There being no further comments, Mayor Ramig closed the public hearing.

Mr. Ehmann moved that written comments sent to Mr. Stan Wallulis from Council Members and Mr. Wallulis' replies, as well as the comments presented at tonight's meeting, be made part of the public record. The motion was seconded by Mr. Houk and passed unanimously.

CITY COUNCIL MINUTES
CITY OF PENDLETON
August 8, 1995

A special meeting of the Pendleton City Council was held in the Vert Little Theatre at 7:30 p.m., August 8, 1995, with Mayor Bob Ramig presiding. Members in attendance were: Anderson, Brenne, Eardley, Ehmann, Houk, McNaught, Pinkerton, and Taylor. Staff members present were: Lehman, Odman, Wells, Patterson, and Zoske. S. Brown, East Oregonian, represented the media.

REVIEW OF THE DRAFT WATER MASTER PLAN FOR THE CITY OF PENDLETON

Mr. Odman introduced Stanley Wallulis, engineering consultant for the City's Water Master Plan.

Mr. Wallulis reviewed with the Council members and answered questions on the components of the draft plan. Included in his presentation were comments based upon the written and verbal comments received to date.

The City has provided for a written comment period and held a public hearing August 1, 1995 on the draft plan.

Mr. Ehmann moved to adopt and send the Water Master Plan as drafted to WRD with an addendum updating the plan by including the 1995 water legislation; an addendum expressing the City's intent to investigate the possibility of surface storage as described in the CTUIR comments; and with correction of the factual and grammatical errors as set forth in the discussion. The Water Master Plan will be accompanied by all of the comments submitted for the record, and the minutes of the public hearing and the work session. The motion, seconded by Mr. McNaught, passed unanimously.

Mr. Ehmann moved to commence the process of moving the City's points of diversion for water rights on the Umatilla River and its tributaries. Mr. McNaught seconded the motion. The motion passed unanimously.

Mr. Ehmann moved to begin the process of measuring the flows on the North Fork of the Umatilla in a manner acceptable to WRD and CTUIR; to seek permits for testing a slow sand filtration treatment process for Umatilla River water and the spring water; seek permits for testing of an ASR process; and to express interest to the CTUIR concerning their suggestion of a joint venture for surface water storage and to explore the possibility of surface water storage with CTUIR. Further, the City should pursue retaining legal counsel specialized in water law to advise and aid the City in accomplishing the foregoing motions. The motion was seconded by Mr. McNaught and carried unanimously.

There being no further business to come before the City Council, the meeting adjourned.

Submitted by: Judi A. Zoske
City Recorder

August 15, 1995
Date Accepted by Council

City of Pendleton
Draft Water System Master Plan Addendum
1995 Water Legislation

Significant changes in water law took place during the 1995 legislative session in Salem affecting the water law information presented in the City's *Draft of the Water System Master Plan*. Legislation passed during the 1995 session changed the process for moving the point of diversion for a surface water right and addressed the permitting process for aquifer storage and recovery. These changes in water law will reduce the restrictions placed on the City by previous water law in developing its water sources to augment flow demands in the water system and for providing an easier means of developing greater water storage capacity.

City of Pendleton
Draft Water System Master Plan Addendum
Surface Storage Option

The City Council, on August 8, 1995, expressed that City Staff is to pursue and investigate the possibility of surface storage as an additional alternative for our future water supply. The City Council also directed City Staff to express interest to the Confederated Tribes of the Umatilla Indian Reservation concerning their suggestion of a joint venture for surface water storage and to explore the possibility of surface water storage with the CTUIR.

City of Pendleton
Draft Water System Master Plan Addendum
Summary of Comments

The following abstracts have been compiled for attachment to the 1995 Draft of the Water System Master Plan adopted by the City Council on August 8, 1995. Copies of the original materials are included with this summary for additional information.

WaterWatch — Reed Benson, Reclamation Issues Director

August 8, 1995 - Expressed concerns about potential effects on Umatilla River instream flows and that the draft completely discounts conservation as a way to meet Pendleton's future needs. Also provided comments concerning aquifer recharge & recovery efforts by the City under this plan. Offered additional options for the City to consider:

1) Buy irrigation rights and transfer them to mucipal use.
2) Fund agricultural conservation measures in lower basin; thereby, reverting 25% of conserved water to the public (City).
3) Acquiring stored water from McKay Reservoir.

CTUIR — Jim Hurst, CTUIR Hydrologist

August 1, 1995 - Explains that the draft plan does not adequately describe the amount and timing of the City's water supply needs. Comments also focused on artificial recharge as being expensive to implement and maintain. Also commented on potential risk of contamination to the groundwater. Discussed the Tribes strong interest in the City's plans for the water system.

Oregon Health Division — Gary Burnett, Regional Engineer

July 31, 1995 - Expressed that the OHD has not made the determination that the City's "springs" are surface water influenced yet because of the issue of "natural filtration." Also commented that the use of the springs due to turbidity is not regulated presently. Expressed that the slow sand pilot study to be conducted by the City must use the actual water supply that is intended for use with the full scale plant. Also mentioned that the OHD regulations require that an adequate chlorine residual be maintained throughout the distribution system when multiple sources are being used; therefore, the WSMP should address disinfection of the wells.

0.887 million gallons per day during 6 months of the year. The City's basalt aquifer reliance would climb again to 611 million gallons per year. This is about 75% of the present amount being withdrawn for the basalt aquifer. Water conservation measures may reduce this withdrawal to 550 million gallons per year.

Conclusion:

If the City were only to use a hydraulically full gravity transmission line and the basalt aquifer for its water supply, it would not be able to meet the long-term demands of future population growth. The City must address the viability of aquifer recharge, increasing the size of the gravity transmission line, and/or the possibility of utilizing the Umatilla River in order to sustain its longevity.

Note:

Above ground impoundment of water to meet future growth is another alternative that should be addressed.

City of Pendleton
Wallulis & Associates

Bob Ehmann, Council Member
Stan Wallulis, Consulting Engineer

June 21, 1995 - Mr. Wallulis provided response to Mr. Ehmann's questions pertaining to the WSMP.

Private Resident

Alan Schroeder, 2518 SW Marshall

June 20, 1995 - Comments were focused on Chapter 6, Water Conservation. Found this chapter to be a disappointment and believes that the current rate structure should be reviewed and a new rate structure should be established that makes people think about how much water they use. Also believes all freewater accounts should be eliminated. Would prefer to leave the river alone, even in the winter months, if we have an opportunity to conserve water.

City of Pendleton

Bob Patterson, Regulatory Specialist

May 25, 1995 - Comments pertain to development of the "springs" to their full capacity, and express concerns about recharge due to potential of air binding and particulates plugging the water bearing zone. Other comments relate to the material presented in the text of the plan.

WaterWatch

August 8, 1995

City of Pendleton Public Works
c/o Bob Patterson
fax no. (503)276-1815

VIA TELECOPIER

Re: Comments on the Draft Water System Master Plan

Dear Pendleton Public Works Department and City Council:

I am writing to provide general comments on behalf of WaterWatch of Oregon regarding Pendleton's draft water system master plan. WaterWatch is a nonprofit environmental group working to restore and protect instream flows throughout Oregon. We have been quite active in the Umatilla River Basin for several years.

We have reviewed the draft water system master plan (the draft) and have a number of concerns with it. We offer the following general comments on the draft.

First and foremost, we are concerned about potential effects on Umatilla River instream flows. Federal, tribal and state agencies are making major efforts to rebuild and protect populations of salmon, steelhead and trout in the Umatilla basin. These efforts were a major reason for the building of the Umatilla Basin Project, whereby U.S. taxpayers and Northwest ratepayers will spend $100 million to restore streamflows in the Umatilla River. While this money is being spent to put water back in the lower Umatilla, Pendleton may take substantially more water from the middle reach of the river. Thus, maximum development of the City's existing rights may undercut the concerted efforts of state, tribal and federal governments to bring water and fish back to the Umatilla. And besides, maximum development may be unnecessary to meet Pendleton's future demands based on any realistic projection of its growth (see p. IX-4).

The draft completely discounts conservation as a way to meet Pendleton's future needs. I interpret the table on page II-6 as showing that Pendleton's per capita water use from 1973-1992 was 307.5 gallons/day. This figure seems very high, and would indicate that Pendleton could save a lot of water through conservation. Pendleton has adopted a conservation ordinance, but *the report assumes that conservation will have no effect*; the projections of water demand on pp. IX-4 and X-6 appear to be based on 307 gallons per person-day. That shouldn't be. If Pendleton is serious about conserving water, then its conservation program should trim per capita water use substantially. Pendleton shouldn't need as much "new" water for future growth as the draft projects.

The draft seems to acknowledge that minimum flows in the Umatilla should be protected, particularly at times of low water. It mentions the possibility of some type of water right exchange to provide water instream in periods of low flow, while allowing greater diversions during times of higher flows. The plan does not indicate how such a project would work, however, either legally or practically. This idea may be worth considering, but more information is needed.

The draft relies on a program of groundwater artificial recharge and recovery (ARR) to meet Pendleton's needs. Even though the draft promotes ARR as the best option, the information contained in Chapter III indicates that ARR is unproven and somewhat risky. Hermiston's recent experience with

ARR is cause for concern, since the presence of toxics in the source water resulted in the project being scrapped. While ARR may show promise for the future, there currently seem to be more questions than answers regarding this technique.

The draft also failed to analyze several options which are potentially attractive, both from the standpoint of the city and the river. These options include:

> buying irrigation rights and transferring them to municipal use. This option would be attractive environmentally because it would not increase total demands on the Umatilla River. Moreover, by acquiring senior irrigation rights the city could enhance the reliability of its surface water supplies. I don't know whether Oregon muncipalities have done much of this, but several cities in Colorado (including my old municipal client) base their water supply on converted agricultural rights.

> funding conservation measures and acquiring conserved water. The Oregon Conserved Water Statute allows a water user to retain up to 75% of water saved through state-approved conservation measures. The remaining 25% of conserved water reverts to the public, generally for instream use. Pendleton could potentially acquire a substantial amount of water (under senior priorities) for municipal uses, and provide clear benefits for the Umatilla River, by funding agricultural water conservation projects in the lower basin.

> acquiring stored water from McKay Reservoir. It isn't clear that this option can work, because currently the reservoir is fully used for irrigation, fisheries enhancement and flood control. Neither McKay's project authorization nor its water rights allow muncipal use; thus, Pendleton couldn't use McMay water without changes to federal law and state water rights. Such changes probably couldn't happen without the agreement of the existing McKay users and certainly the Bureau of Reclamation. However, such an agreement might be possible, particularly if the city could acquire water from existing contractors or otherwise assure that its use of McKay water would not increase the total consumptive demand on the reservoir.

Thanks for the opportunity to comment. We hope to work cooperatively with Pendleton in evaluating options to meet its water supply needs.

Best regards,

Reed D. Benson
Reclamation Issues Director

c: Bob Ehmann

DEPARTMENT of
NATURAL RESOURCES

Environmental
Planning/
Rights Protection
Program

CONFEDERATED TRIBES
of the
Umatilla Indian Reservation
P.O. Box 638
PENDLETON, OREGON 97801
Area code 503 Phone 276-3449 FAX 276-0540

To: Pendleton City Council
From: Jim Hurst, CTUIR Hydrologist
Re: CTUIR comments on Draft Water System Master Plan
Date: August 1, 1995

My name is Jim Hurst. I am here as a hydrologist representing the Confederated Tribes. Thank you for this opportunity to comment on the draft Water System Master Plan.

As neighbors, the City of Pendleton and the Tribes are linked on many levels, and both have common interests in good water quality and a healthy Umatilla River. The Draft Plan makes some good recommendations. Pendleton needs a filtration plant and an aggressive water conservation plan. But the Draft Plan also recommends that the City proceed with an artificial recharge and recovery project. The Tribes have serious doubts that this will work. There are better solutions to Pendleton's water supply. I would like to summarize the Tribes' major concerns with the Draft Plan.

The Draft Plan does not do an adequate job of describing the amount and timing of Pendleton's water supply needs for average years, dry years, and for projected growth. The timing of the water supply is critical since increased demand on surface water could impact instream flows used by fish. A more extensive discussion of disinfectant options is also appropriate; it appears that chlorine is assumed to be the default disinfectant.

Another concern is that artificial recharge has never been used successfully for municipal supply in Oregon for any length of time. Artificial recharge will be expensive to implement, and it will be expensive to maintain. There will be a constant risk of contaminating groundwater.

Three cities on the Eastside have tried artificial recharge and failed. The Dalles contaminated their well, and dropped the project under threat of lawsuits. Walla Walla found that the amount of water they could pump from their well was reduced, not increased, after an artificial recharge project. Hermiston quit their artificial recharge project after they found that the shallow groundwater they were pumping underground was polluted.

The only limited success artificial recharge has had is in Salem. Salem ran this project for 3 months over 30 years ago, and then 6 months 18 years ago. The Salem wells injected water at 1 to 2 cubic feet per second. Now, we don't know exactly how much water Pendleton wants to get from artificial recharge, but if it's 2000 acre feet a year, and if the water is pumped in over 150 days, that's 6.5 cfs, or over 4 million gallons per day. That's over five times the injection rate Salem was successful with. Even if the investment is made to use two or three wells for recharge, there is good reason to think this just won't work.

Another danger is contaminating the groundwater. If sediment from the water pumped underground plugs the pores in the aquifer, it makes it hard to pump water into it. If toxic chemicals or metals get pumped underground, it makes an expensive mess, and probably ends the artificial recharge project.

Airlock is the problem that may be the showstopper. The surface water will be colder than the groundwater. When water warms up, it releases dissolved air. Releasing air underground is a bad thing, because it causes airlock, where the pump can no longer pull water through the gaps in the rock. Airlock reduces the yield on a well, so the existing wells will produce less water. That means that artificial recharge may make it harder to pump water out, not easier.

The Tribes also depend on groundwater. If an artifical recharge project polluted the groundwater or caused problems with plugging or airlock, the Tribes could be directly impacted.

In short, the artificial recharge approach in the Draft Plan is expensive, it's never been done, and there are obvious technical problems. This is a risky plan.

While the Draft Plan contains much good information, the Tribes have serious concerns about an ARR project. Other options to meet the City's needs are viable and available and should be investigated further. The Tribes are also committed to protecting the region's groundwater and developing long term solutions to water needs. The City's future water plans will affect the Tribe directly and indirectly. The Tribes will continue to have a strong interest in your plans.

Thanks for your consideration.

(503) 276-8006

Oregon

July 31, 1995

DEPARTMENT OF
HUMAN
RESOURCES

HEALTH DIVISION
Drinking Water Section
Eastern Region

Mr. Jerry Odman, Public Works Director
City of Pendleton
P.O. Box 190
Pendleton, OR 97801

Subject: City of Pendleton, Water System Master Plan (Draft May 1995)

The following comments are based on my review of the "draft" Water System Master Plan, prepared by Stan Wallulis, dated May, 1995:

CITY'S SPRING WATER QUALITY ISSUES (page IV-26)

Under criteria established by the Surface Water Treatment Rule (SWTR), the City spring supply has been classified as groundwater for the last few years. However, the Health Division must make a determination if this supply source is under the direct influence of surface water and therefore subject to filtration as prescribed by the (SWTR). The City has collected much water quality data as required by the Division, including microscopic particulate analyses, and this data indicates that the source water is influenced by surface water, and will not continue to be classified as groundwater. However, due to data which indicates a significant level of "natural filtration", the treatment required for this source has not been finally determined.

Also, the City's control of the watershed is questionable, since some activities on private property adjacent to the water supply collectors may influence water quality.

The limitation on the amount of use of the spring supply because of turbidity is not mandated by regulations at this time. Rather, it is a practical matter pertaining to customer dissatisfaction if turbidity levels are too high, and the water becomes discolored.

Regardless of the regulatory issues, filtration of the spring supply is the best way to maximize the use of this source.

John A. Kitzhaber
Governor

700 SE Emigrant
Pendleton, OR 97801

PILOT STUDIES FOR SLOW SAND FILTRATION TREATMENT (page XI-8)

It is essential that slow sand filtration pilot studies use the actual water supply that is intended to be filtered with the full scale plant. If the goal is treat spring water mixed with river water, that's what should be pilot tested. A pilot study protocol is to be submitted to the Division for review, and the details can be determined at that time.

DISINFECTION TREATMENT OF GROUNDWATER WELLS

I did not find this issue addressed in the Master Plan, and Health Division regulations require that an adequate chlorine residual be maintained in the system if any sources are disinfected. The water quality of the deep wells is not a concern, but it is difficult to maintain an adequate chlorine residual throughout the distribution system when multiple sources are spread throughout town. There have been recent violations of the coliform bacteria standard, and an inadequate chlorine residual may be a contributing factor. As the City considers improvements to the water system for the long term this issue should be addressed.

Overall, the Master Plan is a comprehensive document which addresses the many complicated water supply issues. It is a fact of life that basalt aquifers are a diminishing resource, so it makes good sense to develop a water supply system that can maximize the use of the spring sources and/or the Umatilla River. The Master Plan will provide a good basis for the City Council to make the many difficult decisions which lie ahead.

Please call me if you have any questions.

Sincerely,

Gary

Gary F. Burnett, P.E.
Regional Engineer

c. Bob Patterson, City of Pendleton
Chris Hughes, Health Division, Portland

Oregon

DEPARTMENT OF
FISH AND
WILDLIFE

Pendleton District Office

July 17, 1995

City of Pendleton
Public Works Department
c/o Bob Patterson
P.O. Box 190
Pendleton, OR 97801

RE: Draft Water System Master plan

Dear Mr. Patterson:

I have reviewed your Draft Water System Master Plan (the plan) and have the following comments.

The cities proposed water withdrawals from the Umatilla River have the potential to significantly impact fish resources in the Umatilla basin. The magnitude of these impacts will be determined by the way in which the water developments are implemented. Because of the potential impact to fish resources, we are keenly interested in the need for the water developments in relation to predicted population growth. While I have not had the opportunity to read the plan cover to cover, I am not aware of this analysis. It seems as though this would be critical in developing a water supply plan.

The proposed water withdrawal developments that can potentially impact fish resources include the Umatilla River springs, Umatilla River water rights in Pendleton, and the North Fork Umatilla River water rights. The ODFW holds two instream water rights for the Umatilla River. The upper water right from Meacham Creek to McKay Creek with a priority date of November 3, 1983 and the following flows:

Period	Flows (cfs)
Oct 1 - Jan 1	200
Feb 1 - May 1	240
Jun 1 - Jun 30	200
Jul 1 - Jul 31	100
Aug 1 - Sep 30	60

Route 1, Box 18
Mission Road
Pendleton, OR 97801
(503) 276-2344
FAX (503) 276-4414

The lower water right from McKay Creek to the mouth of the Umatilla with a priority date of November 3, 1983 and the following flows:

Period	Flows (cfs)
Oct 1 - Nov 15	300
Nov 16 - Nov 30	250
Dec 1 - Jun 30	250
Jul 1 - Jul 31	120
Aug 1 - Sep 15	85
Sep 16 - Sep 30	250

The 80 percent exceedence flows for the reach from Meacham Creek to Mckay Creek (from U.S. Geological Survey - Statistical Summaries of Streamflow Data in Oregon) as measured at the gage in Pendleton are less than the instream water right for the period June 1 to January 31. Additional withdrawals from the Umatilla between McKay and Meacham creeks during this time period will further impact the instream water right.

Historically, flows have not met the instream water right below Pendleton for a large part of the year due to irrigation withdrawals and watershed impacts. However, flows from McKay Creek to the mouth will be supplemented for fish needs through the Umatilla Basin Project. As broad in scope as the Umatilla Basin Project is, we anticipate that during dry years it will not provide for enough flow to meet the instream water right at critical times. To insure that the Umatilla Basin Project is successful in meeting fisheries restoration goals, it is imperative that all users fully understand how the project will operate, and the critical time periods of need for fish. The plan should address potential impacts to the Umatilla Basin Project.

Since the instream water right quantities are based on biological needs of fish resources, we must look critically at any withdrawal that may impact instream flows during the months that flows do not meet or exceed the instream water right. We are also concerned about future withdrawals that will cause flows that currently exceed the instream water right to diminish to levels less than the instream water right.

Bull trout (dolly varden) are endemic to the Umatilla basin and are currently found in the upper mainstem Umatilla, North Fork Umatilla, South Fork Umatilla and North Fork of Meacham Creek. The U. S. Fish and Wildlife Service (USFWS) has been petitioned to list bull trout as a threatened or endangered species. The USFWS has designated the bull trout listing status as warranted but precluded . This means that they have found the bull trout as warranted for listing, but they have higher priorities to address at this time. However, a listing decision will likely be made within a year. This will, in effect, give agencies and land managers an opportunity to begin to address habitat problems without oversight of the federal government. The plan should take into account bull trout needs as related to the development of the cities water rights. We are very willing to share with the city our knowledge of the status of bull trout in the Umatilla, their habitat needs, and the potential impacts of the cities proposed water withdrawals from the Umatilla River.

Summer steelhead are endemic to the Umatilla basin and are found throughout the basin including the mainstem and North Fork above Pendleton. The National Marine Fisheries Service (NMFS) has been petitioned to list steelhead as a threatened or endangered species. The NMFS is now in the process of making a determination on the listing status of steelhead. While this process is underway, the city should consider potential impacts to summer steelhead and the options available

to minimize impact. We are very willing to share with the City our knowledge of the status of summer steelhead in the Umatilla, their habitat needs, and the potential impacts of the cities proposed water withdrawals from the Umatilla River.

In conclusion, while the plan identifies the City of Pendleton's Water Rights and their priority for development, issues such as the planned timing of development, season of intended use for the various water rights, and the actual quantities of water to be withdrawn (the north fork water right) are not specified. These issues are very pertinent to the level of impact that will be sustained by fisheries resources. Because of the importance of these issues for the City of Pendleton and fisheries resources in the Umatilla basin, I suggest that the we consult at your convenience to discuss the draft Water System Master Plan.

Sincerely,

Timothy D. Bailey
Umatilla District Fish Biologist

c: Bruce Eddy, ODFW

MEMORANDUM

CITY OF PENDLETON

July 17, 1995

TO: Jerry Odman, Bob Patterson

FROM: Pete Wells, City Attorney

RE: Draft of the Water System Master Plan for the City of Pendleton, Oregon

Page	Comment
II-34	First line of text. I don't understand "annual per capita average daily use." Annual and daily seem to conflict. Is 307.7 gal/day ~~average~~ annual or daily?
III-24	E.5, third paragraph, second line. "(at levels to low to be quantified)". Should first "to" be "too"?
IV-10	D.5. The 1995 legislation passed before this section was published, but, I assume, after it was written. The master plan should be revised to reflect significant changes regarding points of diversion passed by the 1995 legislature. If you don't have copies of the legislation I can get them for you.
IV-17	Last paragraph that begins on this page, first line. "There was times during the first" should be "There were . . . ".
IV-19	First paragraph of item F. The third word should be "made".
IV-26	I.4. "Miltonberger" should be spelled "Miltenberger".
IV-27	J., next to the last line, last sentence. "selectively turns out and/or water from" appears to have one or more words missing.
VI-7	Last paragraph, first three words. Should it read "climate as a variable"?

Oregon

WATER
RESOURCES
DEPARTMENT

Watermaster

July 14, 1995

Pendleton Public Works
c/o Bob Patterson
PO Box 190
Pendleton, Or. 97801

RE: Comments on Draft Water System Master Plan.

Dear Bob:

I have done a quick review of the Draft Master Plan. I have not reviewed the water right data for completeness or accuracy. The following comments should not be considered as a complete and thorough review of the document by OWRD. I generally echo the comments of Mr. Wallulis in suggesting further dialogue with the Watermaster's Office is in order.

(Page IV-21,F-5) For Clarification: The OWRD is currently and has for several years regulated the Umatilla River below the City of Pendleton in accordance with the prior appropriation doctrine. In the future there is intent to regulate the upper river, as identified in the Umatilla River Water Management Plan. To date, the springs have not been regulated because the jurisdictional issue between OWRD and CTUIR, with respect to who would do the regulation, has not been decided. The OWRD at this time does not believe the CTUIR has any additional reserved claims, other than what is already identified in the Umatilla River Decree, to surface water that would affect these rights.

(Page IV-23,H3) The Matlock right is for irrigation, domestic and stock. I do not believe it has ever been a part of or connected to the municipal system. It was a right belonging to an individual who sold his land and his water right to the City of Pendleton. It is still a water right for irrigation, stock and domestic. It therefore, does not enjoy the same privileges accorded to municipal rights, such as abandonment. The right may have been forfeited due to non-use. Additional research should be done.

(Page VII-50,J.1) The OWRD has recently advanced an opinion from the Oregon Attorney General's Office (enclosed) which in essence claims the CTUIR has no additional valid claims to surface water from the Umatilla River. Their tribal reserved rights were adjudicated in the Umatilla River Decree and they cannot make additional claims now.

(Page VII-50,J.2) Using the cities old water right for an exchange in the fashion suggested is not likely to be a workable alternative, unless new legislation is advanced. The concept suggested is confusing, and is not how the Umatilla Basin Project's water rights are administered.

278-5456
PH. 503-276-7111
3920 Westgate
Pendleton, OR 97801

Thank you for the opportunity to comment. If you have any questions about our comments, please give me a call. We look forward to working with you as you proceed forward with your master plan.

Sincerely,

Michael F. Ladd
North Central Regional Manager, OWRD

cc: Tom Paul
Reed Marbut
Tony Justus

GENERAL COUNCIL
and
BOARD OF TRUSTEES

Water Committee

CONFEDERATED TRIBES
of the
Umatilla Indian Reservation
P.O. Box 638
PENDLETON, OREGON 97801
Area code 503 Phone 276–3165 FAX 276-3095

July 13, 1995

Honorable Bob Ramig
Mayor, City of Pendleton
34 S.E. Dorion
Pendleton, Oregon 97801

Dear Mayor Ramig:

The Confederated Tribes of the Umatilla Indian Reservation appreciate the opportunity to comment on the Draft Water System Master Plan for the City of Pendleton. The City and the CTUIR are linked on many levels, and the CTUIR believe that our prosperity is tied to that of the City. For these reasons, we wish to share several concerns with the proposed Draft Plan. It is the hope of the CTUIR that the City will not accept this Plan without substantial alteration. Significant issues have been omitted or downplayed. There are better options than those presented in this Plan, and the Tribe is interested in working with the City to pursue them.

GENERAL COMMENTS

The primary focus of the plan as presented is on improving the water supply to meet current and projected City water needs by implementing an Artificial Recharge and Recovery (ARR) project. The proposed ARR project is both costly and risky. The potential for failure, based on the experience of others, is high. Biological, chemical, and physical differences between the native basalt groundwater and the surface water used for recharge have been proven to negatively affect aquifer yield and groundwater quality.

Over the last few months, City officials have approached the Tribe to explore the possibilities of working jointly to improve the municipal water supplies to both entities. The Tribes appreciate the City's overtures, and we believe there is great potential for mutual economic, social, and environmental benefits to both governments and to the citizens of the Reservation and the City by our coordinated and cooperative efforts. The Tribe is concerned that the City ensures a safe and adequate municipal water supply for those who live and work on the Reservation.

The Plan's proposed ARR project, however, would not provide any benefit to the Tribe. On the contrary, it would remove water from the river that could potentially conflict with Tribal instream water rights to flows for fish. The purpose of the project is to store water in the aquifer under the City for later withdrawal for use within the City. The location of the project would make it difficult for the Tribe to derive any benefit in increased municipal water supply. Given that the basalt aquifer proposed for recharge under the City may be connected to the aquifer under portions of the Reservation, there is a distinct probability that the recharge project will affect the groundwater resources of the Reservation. Any project which plugs or contaminates the aquifer under the Reservation would not be acceptable to the Tribe. Other types of storage do not pose the same degree of risk, and should be explored to determine their feasibility in meeting the water needs of both the City and the Tribe.

The declining water table in the basalt aquifer under the City is of concern to the Tribe. The Tribe strongly urges the City to reduce its annual groundwater pumpage to sustainable levels in order to maintain the long-term viability of this vital resource. Very likely, the influence of over-pumping of the aquifer under the City is extending onto the Reservation, causing a falling water level in the basalts in the river valley near the west boundary of the Reservation. The Tribe's own water management policies require the protection and conservation of groundwater, which we view as a critical long-term resource. As a major user of the basalt groundwater resource in the area, the City must be sensitive and responsive to the long-term protection of the resource for multiple beneficial uses now and in the future.

Water storage projects such as watershed improvement projects and impoundments in the upper Umatilla Basin are probably needed to meet the growing needs for water supplies by the City and the Tribe. We believe, however, that the ARR will likely fail in providing the necessary water for the City or any other water user, and should be viewed as an option of last resort. Other means should be studied and implemented to meet the short-term and long-term needs of the City and the Tribe.

There is a great deal of information presented in the plan. It would improve the report and be helpful to readers to have a summary which includes a display of critical information such as the quantities of water currently utilized by the City from various sources, current water quality problems, projected water needs, the size and timing of the existing deficiency, the estimated potential for conservation, and similar information.

There are several issues which the report does not adequately discuss. We urge the City to give these issues due consideration. A brief summary of key concerns at this point in our discussions with the City follows.

Potential problems with ARR are downplayed. Contamination of an aquifer is a very serious problem, easily accomplished, and both expensive and difficult to remedy.

Contamination in the case of an ARR project could occur through the failure of the filtration system, failure of monitoring of treated water, or the introduction of contamination between the treatment facility and the injection well. The maintenance burden of continuous monitoring will be substantial, with the cost of failure high. An ARR project would likely be shut down by ODEQ after a single incident of groundwater contamination. The viability of an ARR project could be seriously compromised by such an incident. If the ARR were to contaminate the groundwater supply, there would be more pressure placed on the surface water sources to meet the City's needs. This in turn would impact stream flows in the mainstem Umatilla River, with negative consequences on the Tribal fishery. Further, a failed ARR project in the City could reduce the quantity and/or quality of water derived from some wells on the Reservation, causing a major negative impact on Tribal groundwater resources.

The public perception of the risks entailed in an ARR is important. Citizens require an adequate water supply to protect their investments in property. The City would stand to lose a substantial investment if a system were installed and later became unusable. Have City officials discussed with the City of The Dalles their experience with ARR?

Air lock is likely under the conditions here and could drastically reduce the benefits of ARR. The temperature difference between the surface waters to be injected and the native groundwater would range from ten to twenty degrees Fahrenheit. This can lead to problems with increased viscosity reducing well yields and to problems with the release of dissolved gas from the injected water into the basalt medium. Release of substantial amounts of dissolved air could lead to problems ranging from increased pump maintenance to dramatically reduced aquifer yield. In short, there is good reason to believe that an ARR project will decrease yields, even if it does put more water in storage. Stored water is not useful if it cannot be retrieved.

The Draft Plan does not address the severity of the problem the City faces with water supply in terms of schedule. It does not explain clearly what the City's needs are. How much additional water does the City need now and in the future to meet its needs? What is the anticipated yearly timing of the need for increased water? How soon is the additional water supply needed? Identification of the City's needs are a high priority as would be an estimated range of a sustainable pumping rate from the City wells.

The report does not adequately discuss the issue of turbidity of surface water, and how often and to what degree this might pose a problem if surface water is to be treated at a filtration plant. What options are available at times of high turbidity? What expense is entailed in designing the system to handle water with higher turbidity? If surface water is being seriously considered, this issue needs a more detailed consideration.

We support the City's commitment to develop and implement a conservation plan. We regard water as a precious resource, and a source of healing and life, so it should

not be wasted. To be successful, a conservation program needs to be tailored to the City's patterns of use. Therefore, the development of a monitoring system to determine the amount of use in different classes and sub-classes is essential. We recommend in addition that the results of the monitoring need to be fed back into the conservation program, so that the categories of highest use get the support and attention they need to assure efficient water use. Because economic incentives are simple and effective ways of changing water consumption, the City should consider an ascending scale of water pricing, so that the marginal rate increases at higher levels of consumption. In short, if those who use large amounts of water pay more, water consumption will be reduced by those best positioned to conserve.

The consultant's recommendation to consider asking for state declaration of a Critical Groundwater Area should be considered carefully before action is taken. The consultant seems to make the implicit assumption that the groundwater depletion is at least in part the result of groundwater pumping in the area by interests besides the City. Given the information that is available it is likely that most of the groundwater depletion experienced in the aquifer under the City is the result of pumping from the City's wells. The Tribe is concerned with ending overdrafting of groundwater in the region, but prefers to try cooperation among local entities before initiating this type of a state process.

SPECIFIC COMMENTS ON THE DRAFT MASTER PLAN

Chapter III

Page III-3.B ¶2

The report notes that differing opinions exist as to the nature of the geology of the Columbia River Basalts. It is also noted that the differing opinions are not addressed nor are the accepted sources cited. Many references are made to "professionals" "other sources" and "some certified engineering geologists", and other statements are made without identifying who these "professionals" etc are. Here and throughout the document, sources of opinions and technical information should be clearly documented.

Page III-4.¶2

There is reference to a "Haskie well." This well is located on the Reservation and it is 120 feet deep (not 1208 feet deep) and is used for domestic purposes.

Page III-4.¶4

The statement is made in bold type that "It is entirely possible that if the City of Pendleton ceased use of all it's deep wells, that the water table in the deep wells would continue to drop." While this may be a true statement, it may also be true that the City of Pendleton is the sole major pumper of that water source and if the City ceased its pumping, the aquifer would cease declining and may begin recovery. There may even be a sustainable pumping rate that would allow for recharge. The definitive evidence is not presented and probably is not available at this time but should be investigated

because the City may continue using some groundwater to meet municipal needs in the future.

Page III-4. B1 Columbia River Basaltic Lava Flows
This section draws conclusions on the nature of the subsurface without any supporting evidence or documentation of source, especially note page III-4 B.1 ¶4 and page III-6 ¶1 and 2. Does this imply that the statements are merely the opinion of the author?

Page III-27 ¶4
"The water in the deep basalt has been age tested and found to be 1000's of years old. This attests to the safety of storing massive quantities of water in the deep basalt aquifers." This statement has been made in spite of the difficulties noted in the methodology of the samples. (See page IV-34,35. L2 Age Dating of the Water in the City's Deep Wells) Ranges in the age of the water indicate that there may be an influence of younger water in the well. This suggests that the deeper aquifers are susceptible to contamination from a surface or near-surface source.

General comments to Chapter III.
The data provided appears to be interpreted to promote the ARR project rather than analyzing the data. In fact three of the four ARR projects are failures. The three that failed occurred in an environment similar to that of Pendleton east of the Cascades. The one which showed modest success occurred in the Willamette Valley under different environmental conditions. The viability and availability of other alternatives to address the City's water needs were not addressed.

Chapter IV
Page IV-7
The report incorrectly summarizes the history of the springs and the agreements surrounding the development of the system. The amount of water to be provided to the Tribes for the Indian schoolhouse and farm was never quantified. The 100,000 cubic feet per month of water provided from the City of Pendleton was from a billing agreement negotiated through the BIA in the early 1980's.

Page IV-8 D.1
The conclusion in this section is speculative and without a factual basis. It appears to contradict the subsection cited from the OAR's.

Page IV-15 E. ¶4
A conclusion is made about the existence of a relationship between the City's Gate House and Weir and the Tribe's Observation well (CTUIR Obs Well 3s) without explaining what the relationship is. The implication is that the static water level in the observation well is related to the quantity of water passed through the transmission line. Is the implication that leakage is responsible for this relationship?

Page IV-23,24
Multi-use reservoirs are dismissed as not being economically viable without any supporting data. Multi-use impoundments may be more cost effective as the varied interests involved bring a wider range of resources for development. This option should be investigated further, especially given the questions about the viability of ARR.

Page IV-26 J. ¶2
This appears to contradict the current trend in water quality standards. Treatment of all surface water prior to introduction into a municipal water system will soon be mandatory.

Page IV-33,34 L1
What is the static water level in each of the City's wells? This section on the interrelationship of the City's wells implies a direct hydraulic connection (Statement in ¶3, page IV-33 L1. "..immediate response was noted in the float recorder..." and ¶2 page IV-34 "Well No. 6, which is presently...,also immediately responds to pumping...". In view of these statements how does this hold true with the statement on page IV-36 ¶1, where in explaining the data on the City's wells (table IV-7) "In reviewing the above table it is important to recognize that wells can be relatively close together, be poorly hydraulically interconnected, and have substantial difference in static water levels." This is inconsistent with the previous statements.

Page IV-37,38
Even with the discrepancies in the data for well #1, there is 479 to 640 feet of borehole that is not being accessed by the City.

General comment to Chapter IV-
The nature of the City's wells appears to be poorly understood. The data presented has raised more questions than answers given. A more thorough analysis of the data would be desirable to characterize the nature of each of the City's wells. This would be useful for determining the severity of the City's water supply situation and to assess the short term as well as the long term needs of Pendleton.

Chapter V
Page V-2
Although the correct terminology is used, the example shown is the Yakima Basin Sub-group and does not show all the members relevant to the Umatilla basin. (It includes many members not present in the Umatilla Basin.)

Page V-4 B.3
Who are "Most investigators" in ¶1? In ¶4&5, what is the source of this discussion on the compressional forces? This is the basis of the interpretation of the nature of the

aquifers in the basalt underlying the Pendleton area and as was noted in Chapter III "...there are several differing opinions in this particular professional field."

Pages V-7 to 10.
What is the purpose of this information on base mapping and geological cross section? The mapping is highly hypothetical and implies that more is known about the stratigraphy in the basalts than is actually known.

Page V-10.
The Vantage Interbed may very well be present and outcrop in the basalt bluffs located near exit 209 on I-84.

Page V-10.
What is the purpose of the section on N.F. McKay Creek hydrograph?

Page V-14
Example shown lists log recording (soft brown cinders at: 300 to 310').
Does this log indicate that the strata is water-bearing or was this an assumption?

General comments to Chapter V
We agree with the summary of Chapter V, but question the method that was used to arrive at the conclusion. The data provided in chapter 5 is not necessarily supportive of the conclusion.

Chapter VI
Page VI-10.
Why is it necessary to have water overflowing from the South Hill Reservoir into the river (section D.2b.)? Is water unnecessarily being diverted from wells or the springs and discharged into the river within the City boundaries? How much water is returned to the river as overflow every year?

Page VI-15.
An aggressive leak detection and repair program should be implemented by the City. The leak detection program should not be limited to the in-city water system, but should be extended to the water transmission line from the springs to the City. The transmission line has the potential for high leakage rates and should be investigated. Leakage is also a potential source of contamination to the line. Is the transmission line leaking? If so, how much? What are the repair plans, if any?

Chapter VII
Page VII-1.
The first bullet on this page implies that the City has suffered a loss of 941.7 mg/yr due to the problems with well #1. This is incorrect (or very misleading) information because we are not aware of any basalt well in the area that can produce this quantity of water

on a sustainable basis. The plan indicates that the average annual total pumpage from all of the basalt wells in the City between 1982 and 1992 (pages II-10 to II-32) is about 970 mg/yr.

Page VII-1.
The last bullet on the page suggests that 3000 gpm wells are needed. Again, it is unrealistic to expect to develop basalt wells in this area with sustainable pumping levels of this magnitude.

Page VII-2.
The projected future demand for water by the City does not include any allowance for conservation. Implementation of the water conservation ordinance should (or could) produce substantial water savings. These savings should be made part of the formulas for projecting future needs.

Page VII-45.
Prior to making improvements to the City's deep wells, the City needs a better understanding of the availability of water in the aquifer. The City should conduct a study to determine the sustainable annual pumpage from the basalt aquifer in the vicinity of its wells. The City could then reduce its annual pumpage to the sustainable volumes.

Chapter X
Page X-3.
The Tribe is concerned about the City potentially seeking a "Critical Groundwater Area" declaration for the Pendleton area. In general, the creation of a Critical Groundwater Area under State of Oregon procedures is an after-the-fact reaction to poor water resources management practices. It is far better to be proactive and recognize early on the limitations of the groundwater supply and manage the resource within those limitations.

Chapter XI
Page XI-1.
Slow sand filtration as described and recommended in the plan seems to be a promising method of improving water quality to meet drinking water standards for a municipality.

Page XI-12.
We agree that an emergency action plan (water quality concerns) for the spring sources should be developed and implemented. Perhaps the Tribe could assist the City in this effort.

Page XI-12.
The Tribe agrees with the writer's conclusion that water resources are neither "inexhaustible" nor inexpensive to develop and use for municipal or other purposes. These principles, and others, should form the basis of your approach to improve the water supply for the City of Pendleton.

CONCLUSION

The Draft Plan contains much good information. We have serious concerns about its recommendations for an ARR project. We believe that other options to meet the City's needs are both viable and available and should be investigated further.

We, too, are committed both to protecting the groundwater resources of this region and to developing long term solutions to our water needs. The City's future water plans will affect the Tribe both directly and indirectly, and we will continue to have a strong interest in your plans.

Sincerely,

Antone Minthorn
Chairman, Tribal Water Committee

cc: Board of Trustees
CTUIR Staff

United States Department of Agriculture | Forest Service | Umatilla National Forest | 2517 S.W. Hailey Avenue Pendleton, OR 97801

Reply To: 2540

Date: July 13, 1995

Pendleton Public Works
ATTN: Bob Patterson
P.O. Box 190
Pendleton, OR 97801

Dear Mr. Patterson:

Thank-you for the opportunity to review the City of Pendleton's draft of the Water System Master Plan. I have the following comments to offer for your consideration. First, I recognize the challenge of managing a water supply for a growing population, as well as the limitations of existing groundwater sources that the city relies on for a part of that supply. However, I am concerned about the recommendation to evaluate development of surface water sources on the Umatilla National Forest which is managed for multiple uses, now and into the future. All too frequently the development of municipal supplies precludes the public from using the National Forest because of concerns regarding the Safe Drinking Water Act and other requirements. Current land allocations in the upper Umatilla watershed emphasize wilderness and recreation.

There is also question as to the validity of the City's water rights, which is a matter of discussion for the legal experts, since neither the 1910 water right nor the 1941 withdrawal has ever been put to use. Furthermore, the location of the point of diversion is now within a wilderness area. Rights to the natural flow of the river were implied at the time of the designation. It is also unlikely an impoundment or diversion would be permitted within a wilderness area. Lastly, options to move the point of diversion downstream are also of concern because of likely impacts to migrating fish that spawn and rear on the National Forest.

I offer these comments not to present obstacles to the City, but rather to alert you to some of my concerns. I urge emphasis be placed on water conservation within the city and in the watershed, rather than pursuit of development of instream water resources on the National Forest.

Thank you for the opportunity to comment.

Sincerely,

John P. Kline

JOHN P. KLINE
Acting Forest Supervisor

cc M. Lohrey, RO
T. Reilly
E. Rother

Supplement to the Draft of the Water System Master Plan for the City of Pendleton

July 5, 1995

The purpose of this summary report is to provide additional information to augment the Draft of the Water System Master Plan for the City of Pendleton. Staff from both the City and the Confederated Tribes of the Umatilla Indian Reservation met on June 19,1995 to discuss the draft water system master plan. During the discussion, two topics of interest needed further exploring:

1) What effects would water conservation have on the annual usage (million gallons/year) of water from Pendleton's basalt aquifer? Would this significantly slow down the decline in the aquifer?
2) What would the drawdown of the basalt aquifer be if the gravity transmission line was utilized at its hydraulic capacity of 5.25 mgd? Would the decline of the aquifer continue? At what point would the aquifer begin to naturally recharge?

Information pertaining to Pendleton's actual water consumption during the last 25 months of record was used to model several different scenarios. They are the following:

A) Effects of water conservation pertaining to the basalt aquifer based on the present total consumption.
B) Effects on the basalt aquifer with an additional source augmenting the present flow in the gravity transmission line.
C) Effects on the basalt aquifer utilizing the hydraulic capacity of the gravity transmission line (5.25 million gallons per day).
D) Effects of future population growth relating to the basalt aquifer.

Note: None of these scenarios take into account the 100,000 cubic feet per month (nearly 25,000 gallons per day) of water historically available to the CTUIR from the gravity transmission line.

Scenario A: Water Conservation

Assumptions:

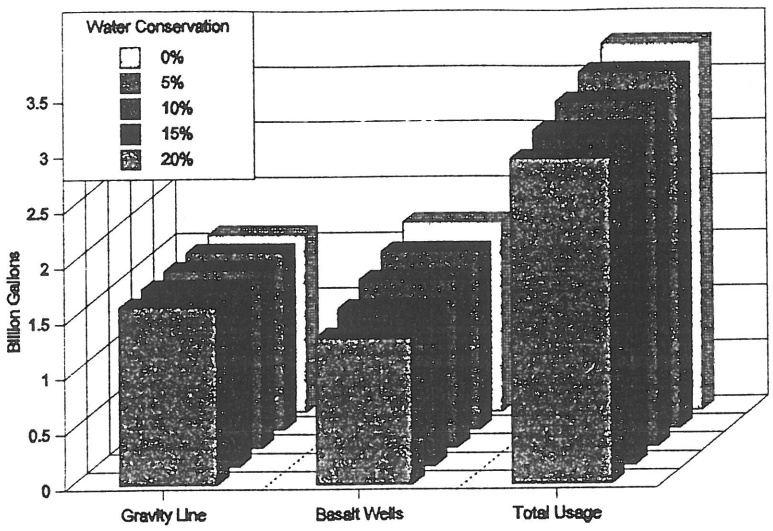
1) The last 25 months of record provide reasonable data.
2) Water conservation measures will be utilized during the highest demand months of May, June, July, August, & September.
3) Water use during the remaining 7 months will not be significantly affected by a water conservation program.

Table 1 represents the actual water usage for the City of Pendleton during the period of April 1995 to April 1993. Tables 1A, 1B, 1C, & 1D were developed using 5%, 10%, 15%, & 20% water conservation figures for the high demand months of May, June, July, August, & September.

Figure 1 shows that utilizing water conservation measures to help reduce the drawdown in the basalt aquifer will not have a significant impact in reducing the decline in the basalt aquifer's water level. The City, through its water conservation program, should be able to achieve a 10% reduction in the use of water during the high demand months. If 10% was achieved, the total

Figure 1 - Pendleton Water Consumption

April 1995 - April 1993



savings in water withdrawn from the basalt aquifer would have been about 192 million gallons, or 92 million gallons per year. This would be an 11% reduction in the amount of water withdrawn from the basalt aquifer. If water conservation reached an optimistic 20% reduction during the high demand months, the total savings in water would have been about 384 million gallons, or 184 million gallons per year. This would have equated to a 22% reduction in the withdrawal of water from the basalt aquifer for this 25 month period.

Note: The average annual reduction seen by most communities utilizing water conservation measures is around 3%. The maximum annual reduction is generally 5%.

During the five high demand months, a 5% reduction in water use for Pendleton would be equivalent to a 3% annual reduction. Also, a 10% reduction in water use would be equivalent to a 5.8% annual reduction. Therefore, a 10% reduction in the use of water during May, June, July, August, & September is probably an optimistically high figure to use when addressing water conservation.

Water conservation measures utilized in the near future will help slow down the decline of water in the basalt aquifer, but they will not provide enough water savings to alleviate the decline of the water level in the basalt aquifer. Therefore, the City still would need to seek out additional alternatives for sources of water to meet it present and future needs. Additional water from another source(s), coupled with water conservation, will be necessary for the City to meet its present and future growth demands for water.

Scenario B: Additional Source Augmenting Present Flow in Gravity Transmission Line

Assumptions:

1) Another source(s) of water has been developed along the gravity transmission line to

augment the actual flow from the springs.

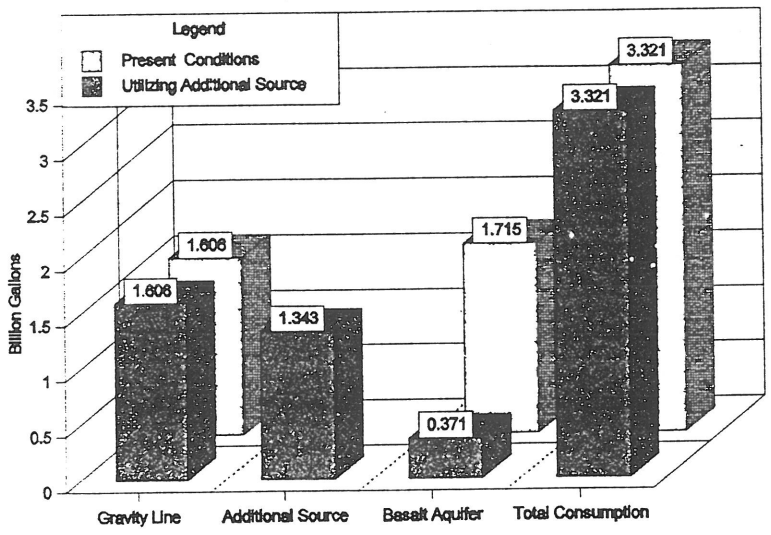
2) The capacity of the new source(s) is only enough to meet the present consumption requirements for the City.
3) Water in the gravity transmission line remains unfiltered.
4) Additional savings from water conservation were not taken into account.
5) The City's basalt aquifer is presently used year-round.

Table 2 represents what the City's reliance on the basalt aquifer would have been during April 1995 to April 1993 under Scenario B.

Figure 2 shows that another source delivering water into the gravity line to meet the consumptive needs of the City during the 25 month period would reduce the City's reliance on the basalt aquifer by about 78%. Water conservation efforts would further reduce the City's reliance on the basalt aquifer.

Figure 2 - Dev't of Additional Source

April 1995 - April 1993



The source(s) of additional water would have to be capable of 2500 gpm to meet the maximum high demand month requirement (08/94). During this same month, the City would be withdrawing water from the basalt aquifer. The average flow required from an additional source(s) for the 25 month period would be approximately 1250 gpm.

Another source of water delivered into the gravity transmission line would reduce the City's reliance on the basalt aquifer and might also allow it to naturally recharge.

Scenario C: Utilize the 5.25 MGD Hydraulic Capacity of the Gravity Transmission Line

Assumptions:

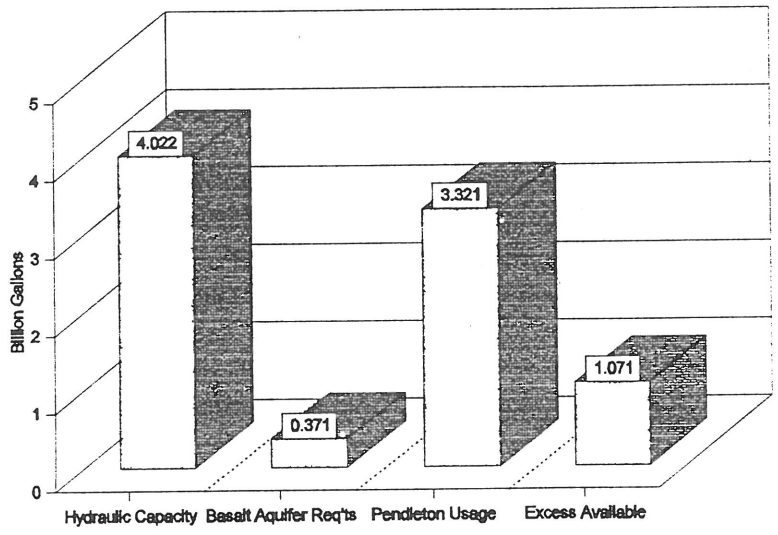
1) Another source(s) of water has been developed to provide the hydraulic capacity of the gravity transmission line on a year-round basis.
2) The maximum capacity of the new source(s) would have to be the same as described in Scenario B to maintain the hydraulic capacity.

3) The amount of water turned out due to high turbidity was not taken into account.
4) Slow sand filtration is used to treat all the water before distribution.
5) Additional savings from water conservation were not taken into account.

Table 3 represents what the City's basalt aquifer requirements would have been from April 1995 to April 1993 if the gravity line was utilized to its hydraulic capacity (5.25 mgd) and slow sand filtration was used for treatment. Also, this table shows the amount of excess water that would have been available during this period.

Figure 3 illustrates the amount of excess water that would have been available during the 25 month period if the gravity line was utilized to its full capacity. The amount of excess water available would be 1,071 million gallons, or 514 million gallons per year. This would be an average of approximately 2.1 mgd of excess water available during 8 months out of the year.

Figure 3 - Excess Water Available
April 1995 - April 1993



Also, under this scenario, the City would be able to reduce its present reliance on the basalt aquifer by 78% (the same amount as described in Scenario B).

April 1995 - April 1993 data concerning the amount of water that was turned-out from the springs to the river, due to high turbidity, was not readily accessible from the SCADA monitoring system. Since slow sand filtration would be used to treat all the water in the gravity line, water that was historically turned-out would now be treated. This should further reduce the amount of water needed from an additional source(s) to maintain the hydraulic capacity of the gravity line.

The maximum amount of required from an additional source(s) to maintain the hydraulic capacity of the gravity transmission line would be 3.6 mgd or 2500 gpm (the same amount as described in Scenario B). This amount is based on information provided in Table 2 and that turned-out water during the winter/spring months is now utilized because of filtration.

Scenario D: Effects of Future Population Growth

Assumptions:

1) Year 2020 high projection population of 22,960 from page II-1 of the Draft of the Water System Master Plan was used for future growth calculations.
2) Consumption figures were developed using a multiplier of 1.49 for the present population (15,395) demands.
3) Residential versus commercial usage, water conservation measures, or the use of the river in addition to a hydraulically full gravity transmission line were not taken into account.
4) All assumption from Scenario C were used.

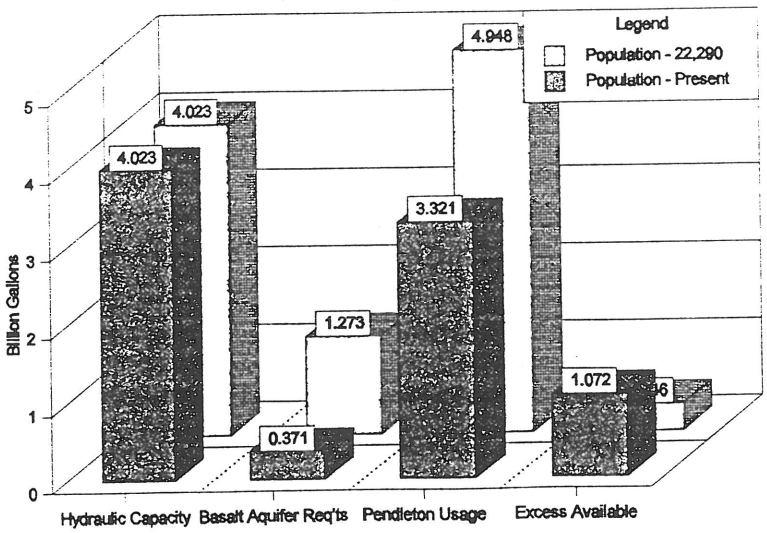
Table 4 addresses the same information used in the development of Table 3, except that a future population for Pendleton of 22,960 was taken into account. This population is the high projection from the draft water system master plan (page II-1) for the year 2020.

Figure 4 illustrates the amount of excess water, based on the present population and the future projection, that would have been available for the 25 month period. Also, the future basalt aquifer requirements for the City are illustrated.

For the population projection of 22,960, the amount of excess water available in a hydraulically full gravity transmission line would have diminished 70% from the present population being served. The amount of excess water available in the year 2020 would be an average of approximately 0.887 mgd during 6 months out of the year.

Figure 4 - Excess Water Available

April 1995 - April 1993



The significant figure developed from Table 4 is the City's potential future reliance on the basalt aquifer. The City presently uses about 823 million gallons per year from the basalt aquifer. Based on the information developed in Table 4, the City's basalt aquifer reliance would be almost 611 million gallons per year. This would be almost 75% of the present amount of water being pumped from the City's basalt aquifer.

If the City were able to actively reach a water conservation goal of 10% during the high demand months, the reliance on the basalt aquifer would drop to 550 million gallons per year. This would be almost 67% of the present amount of water being withdrawn. Future population growth would still require the City to explore the potential of artificial recharge of the basalt aquifer or use the Umatilla River to augment the hydraulic capacity of the gravity transmission line in order to meet future consumptive demands.

Summary

Water conservation will have an impact on the annual usage for the City's basalt aquifer, although it would not be enough to significantly slow down the decline of the City's basalt aquifer. Also, an active water conservation program will help make the public more aware of the significance of water related issues and help allow additional time for the development of alternatives for additional water.

Based on the City's present water demand; utilizing only a hydraulically full gravity transmission line and the basalt aquifer; and providing slow sand filtration:

> The development of an additional source(s) of water to sustain the 5.25 mgd hydraulic capacity of the gravity transmission line would provide enough water to slow the present decline of the basalt aquifer. Not enough historical information was available to determine the amount of withdrawal from the basalt aquifer that would equal the amount of natural recharge. Utilizing the hydraulic capacity of the gravity transmission line would provide an average of 2.1 mgd of excess water that would not be needed to meet the City's demands during 8 months out of the year.
>
> If the excess water was utilized for artificial recharge of the basalt aquifer, the City would be injecting 514 million gallons per year, while withdrawing 178 million gallons per year. This would provide an artificial recharge of 336 million gallons per year into the basalt aquifer.
>
> Also, achieving an additional water conservation goal of 10% during the high demand months (5.8% annual reduction), would decrease the withdrawal from the basalt aquifer to 160 million gallons per year. This would provide an artificial recharge of 354 million gallons per year.

Addressing future population growth of 22,960; still utilizing only a hydraulically full gravity transmission line and the basalt aquifer; and providing slow sand filtration:

> The withdrawal of water from the basalt aquifer will again become an issue. Basic

calculations used to generate Table 4 demonstrate that the City will need to continue to rely on the basalt aquifer for the high demand months. Water conservation measures will allow for less water to be used, but the City still will need to develop (or continue use of) a recharge project and/or use the river to help meet summer demands without causing the basalt aquifer to continue to decline. Utilizing the hydraulic capacity of the gravity transmission line would provide an average of 0.887 mgd of excess water that would not be needed to meet the City's demands during 6 months out of the year.

If the excess water was utilized for artificial recharge of the basalt aquifer, the City would be injecting 166 million gallons per year, while withdrawing 611 million gallons per year. This would effectively mean that 445 million gallons per year would be withdrawn from the basalt aquifer. This is 46% less water than would be withdrawn compared to the current 826 million gallons per year. Also, further achievement of a water conservation goal of 10% during the high demand months would decrease the withdrawal from the basalt aquifer to 550 million gallons per year.

Under these conditions, the basalt aquifer would probably begin to decline again and the use of the Umatilla River or increase the size of the gravity transmission line to provide more water for artificial recharge during the winter would need to be addressed.

Conclusion:

If the City were only to use a hydraulically full gravity transmission line and the basalt aquifer for its water supply, it would not be able to meet the long-term demands of future population growth. The City must address the viability of aquifer recharge, increasing the size of the gravity transmission line, and/or the possibility of utilizing the Umatilla River in order to sustain its longevity.

Table 1
Pendleton Water Consumption
April 1995 - April 1993
(Gallons)

	Gravity Transmission Line			Basalt Wells	Consumption
Month/Year	Springs	Well #7	Total	1/2/3/4/5/8	Total
04/95	46,000,000	14,000,000	60000000	39,515,000	99515000
03/95	24,122,000	14,827,000	38949000	47,352,000	86301000
02/95	38,799,000	15,868,000	54667000	62,483,000	117150000
01/95	41,937,000	16,273,000	58210000	42,425,000	100635000
12/94	88,860,000		88860000	5,679,000	94539000
11/94	83,107,000		83107000	12,608,000	95715000
10/94	47,408,000		47408000	53,307,000	100715000
09/94	46,267,000		46267000	79,929,000	126196000
08/94	38,692,000	12,595,000	51287000	203,113,000	254400000
07/94	60,035,000	6,457,000	66492000	187,089,000	253581000
06/94	86,964,000		86964000	100,039,000	187003000
05/94	119,108,000	2,112,000	121220000	47,554,000	168774000
04/94	35,091,000	17,610,000	52701000	55,634,000	108335000
03/94		18,717,000	18717000	71,633,000	90350000
02/94	24,531,000	14,949,000	39480000	42,934,000	82414000
01/94	9,832,000	16,551,000	26383000	59,948,000	86331000
12/93	78,000,000		78000000	13,174,000	91174000
11/93	52,100,000		52100000	4,271,000	56371000
10/93	56,800,000		56800000	50,907,000	107707000
09/93	58,900,000		58900000	127,618,000	186518000
08/93	64,900,000		64900000	185,394,000	250294000
07/93	73,058,000		73058000	122,025,000	195083000
06/93	105,900,000		105900000	55,811,000	161711000
05/93	98,627,000		98627000	39,565,000	138192000
04/93	60,916,000	15,984,000	76900000	5,088,000	81988000
TOTALS	1439954000	165943000	1605897000	1715095000	3320992000

Table 1A
- 5% Water Conservation -
Pendleton Water Consumption
April 1995 - April 1993
(Gallons)

	Gravity Transmission Line			Basalt Wells	Consumption
Month/Year	Springs	Well #7	Total	1/2/3/4/5/8	Total
04/95	46,000,000	14,000,000	60000000	39,515,000	99515000
03/95	24,122,000	14,827,000	38949000	47,352,000	86301000
02/95	38,799,000	15,868,000	54667000	62,483,000	117150000
01/95	41,937,000	16,273,000	58210000	42,425,000	100635000
12/94	88,860,000		88860000	5,679,000	94539000
11/94	83,107,000		83107000	12,608,000	95715000
10/94	47,408,000		47408000	53,307,000	100715000
09/94	46,267,000		46267000	73619200	119886200
08/94	38,692,000	12,595,000	51287000	190393000	241680000
07/94	60,035,000	6,457,000	66492000	174409950	240901950
06/94	86,964,000		86964000	90688850	177652850
05/94	119,108,000	2,112,000	121220000	39115300	160335300
04/94	35,091,000	17,610,000	52701000	55,634,000	108335000
03/94		18,717,000	18717000	71,633,000	90350000
02/94	24,531,000	14,949,000	39480000	42,934,000	82414000
01/94	9,832,000	16,551,000	26383000	59,948,000	86331000
12/93	78,000,000		78000000	13,174,000	91174000
11/93	52,100,000		52100000	4,271,000	56371000
10/93	56,800,000		56800000	50,907,000	107707000
09/93	58,900,000		58900000	118292100	177192100
08/93	64,900,000		64900000	172879300	237779300
07/93	73,058,000		73058000	112270850	185328850
06/93	105,900,000		105900000	47725450	153625450
05/93	98,627,000		98627000	32655400	131282400
04/93	60,916,000	15,984,000	76900000	5,088,000	81988000
TOTALS	1439954000	165943000	1605897000	1619007400	3224904400

Table 1B
- 10% Water Conservation -
Pendleton Water Consumption
April 1995 - April 1993
(Gallons)

	Gravity Transmission Line			Basalt Wells	Consumption
Month/Year	Springs	Well #7	Total	1/2/3/4/5/8	Total
04/95	46,000,000	14,000,000	60000000	39,515,000	99515000
03/95	24,122,000	14,827,000	38949000	47,352,000	86301000
02/95	38,799,000	15,868,000	54667000	62,483,000	117150000
01/95	41,937,000	16,273,000	58210000	42,425,000	100635000
12/94	88,860,000		88860000	5,679,000	94539000
11/94	83,107,000		83107000	12,608,000	95715000
10/94	47,408,000		47408000	53,307,000	100715000
09/94	46,267,000		46267000	67309400	113576400
08/94	38,692,000	12,595,000	51287000	177673000	228960000
07/94	60,035,000	6,457,000	66492000	161730900	228222900
06/94	86,964,000		86964000	81338700	168302700
05/94	119,108,000	2,112,000	121220000	30676600	151896600
04/94	35,091,000	17,610,000	52701000	55,634,000	108335000
03/94		18,717,000	18717000	71,633,000	90350000
02/94	24,531,000	14,949,000	39480000	42,934,000	82414000
01/94	9,832,000	16,551,000	26383000	59,948,000	86331000
12/93	78,000,000		78000000	13,174,000	91174000
11/93	52,100,000		52100000	4,271,000	56371000
10/93	56,800,000		56800000	50,907,000	107707000
09/93	58,900,000		58900000	108966200	167866200
08/93	64,900,000		64900000	160364600	225264600
07/93	73,058,000		73058000	102516700	175574700
06/93	105,900,000		105900000	39639900	145539900
05/93	98,627,000		98627000	25745800	124372800
04/93	60,916,000	15,984,000	76900000	5,088,000	81988000
TOTALS	1439954000	165943000	1605897000	1522919800	3128816800

Table 1C
- 15% Water Conservation -
Pendleton Water Consumption
April 1995 - April 1993
(Gallons)

	Gravity Transmission Line			Basalt Wells	Consumption
Month/Year	Springs	Well #7	Total	1/2/3/4/5/8	Total
04/95	46,000,000	14,000,000	60000000	39,515,000	99515000
03/95	24,122,000	14,827,000	38949000	47,352,000	86301000
02/95	38,799,000	15,868,000	54667000	62,483,000	117150000
01/95	41,937,000	16,273,000	58210000	42,425,000	100635000
12/94	88,860,000		88860000	5,679,000	94539000
11/94	83,107,000		83107000	12,608,000	95715000
10/94	47,408,000		47408000	53,307,000	100715000
09/94	46,267,000		46267000	60999600	107266600
08/94	38,692,000	12,595,000	51287000	164953000	216240000
07/94	60,035,000	6,457,000	66492000	149051850	215543850
06/94	86,964,000		86964000	71988550	158952550
05/94	119,108,000	2,112,000	121220000	22237900	143457900
04/94	35,091,000	17,610,000	52701000	55,634,000	108335000
03/94		18,717,000	18717000	71,633,000	90350000
02/94	24,531,000	14,949,000	39480000	42,934,000	82414000
01/94	9,832,000	16,551,000	26383000	59,948,000	86331000
12/93	78,000,000		78000000	13,174,000	91174000
11/93	52,100,000		52100000	4,271,000	56371000
10/93	56,800,000		56800000	50,907,000	107707000
09/93	58,900,000		58900000	99640300	158540300
08/93	64,900,000		64900000	147849900	212749900
07/93	73,058,000		73058000	92762550	165820550
06/93	105,900,000		105900000	31554350	137454350
05/93	98,627,000		98627000	18836200	117463200
04/93	60,916,000	15,984,000	76900000	5,088,000	81988000
TOTALS	1439954000	165943000	1605897000	1426832200	3032729200

Table 1D
- 20% Water Conservation -
Pendleton Water Consumption
April 1995 - April 1993
(Gallons)

	Gravity Transmission Line			Basalt Wells	Consumption
Month/Year	Springs	Well #7	Total	1/2/3/4/5/8	Total
04/95	46,000,000	14,000,000	60000000	39,515,000	99515000
03/95	24,122,000	14,827,000	38949000	47,352,000	86301000
02/95	38,799,000	15,868,000	54667000	62,483,000	117150000
01/95	41,937,000	16,273,000	58210000	42,425,000	100635000
12/94	88,860,000		88860000	5,679,000	94539000
11/94	83,107,000		83107000	12,608,000	95715000
10/94	47,408,000		47408000	53,307,000	100715000
09/94	46,267,000		46267000	54689800	100956800
08/94	38,692,000	12,595,000	51287000	152233000	203520000
07/94	60,035,000	6,457,000	66492000	136372800	202864800
06/94	86,964,000		86964000	62638400	149602400
05/94	119,108,000	2,112,000	121220000	13799200	135019200
04/94	35,091,000	17,610,000	52701000	55,634,000	108335000
03/94		18,717,000	18717000	71,633,000	90350000
02/94	24,531,000	14,949,000	39480000	42,934,000	82414000
01/94	9,832,000	16,551,000	26383000	59,948,000	86331000
12/93	78,000,000		78000000	13,174,000	91174000
11/93	52,100,000		52100000	4,271,000	56371000
10/93	56,800,000		56800000	50,907,000	107707000
09/93	58,900,000		58900000	90314400	149214400
08/93	64,900,000		64900000	135355200	200255200
07/93	73,058,000		73058000	83008400	156066400
06/93	105,900,000		105900000	23468800	129368800
05/93	98,627,000		98627000	11926600	110553600
04/93	60,916,000	15,984,000	76900000	5,088,000	81988000
TOTALS	1439954000	165943000	1605897000	1330764600	2936661600

Table 2
Pendleton Water Consumption for April 1995 - April 1993
if Utilizing Additional Source with Gravity Transmission Line and No Filtration
(Gallons)

	Gravity Transmission Line			Consumption	Basalt Aquifer
Month/Year	Actual Amount Utilized	Hydraulic Capacity	Amount Req'd from Add'l Source	Total Amount Used by Pendleton	Req'd Amount for Consumption
04/95	60,000,000	157,500,000	39,515,000	99,515,000	
03/95	38,949,000	162,750,000	47,352,000	86,301,000	
02/95	54,667,000	147,000,000	62,483,000	117,150,000	
01/95	58,210,000	162,750,000	42,425,000	100,635,000	
12/94	88,860,000	162,750,000	5,679,000	94,539,000	
11/94	83,107,000	157,500,000	12,608,000	95,715,000	
10/94	47,408,000	162,750,000	53,307,000	100,715,000	
09/94	46,267,000	157,500,000	79,929,000	126,196,000	
08/94 *	51,287,000	162,750,000	111,463,000	254,400,000	91,650,000
07/94	66,492,000	162,750,000	96,258,000	253,581,000	90,831,000
06/94	86,964,000	157,500,000	70,536,000	187,003,000	29,503,000
05/94	121,220,000	162,750,000	41,530,000	168,774,000	5,994,000
04/94	52,701,000	157,500,000	55,634,000	108,335,000	
03/94	18,717,000	162,750,000	71,633,000	90,350,000	
02/94	39,480,000	147,000,000	42,934,000	82,414,000	
01/94	26,383,000	162,750,000	59,948,000	86,331,000	
12/93	78,000,000	162,750,000	13,174,000	91,174,000	
11/93	52,100,000	157,500,000	4,271,000	56,371,000	
10/93	56,800,000	162,750,000	50,907,000	107,707,000	
09/93	58,900,000	157,500,000	98,600,000	186,518,000	29,018,000
08/93	64,900,000	162,750,000	97,850,000	250,294,000	87,544,000
07/93	73,058,000	162,750,000	89,692,000	195,083,000	32,333,000
06/93	105,900,000	157,500,000	51,600,000	161,711,000	4,211,000
05/93	98,627,000	162,750,000	39,565,000	138,192,000	
04/93	76,900,000	157,500,000	5,088,000	81,988,000	
TOTALS	1605897000	3990000000	1343981000	3320992000	371084000

* 08/94 was the maximum monthly requirement for an additional source of water to augment the flow in the gravity transmission line. The additional flow required equates to 2500 gpm.

Table 3

Pendleton Basalt Aquifer Requirements and Available Excess Water if Utilizing Hydraulically Full Gravity Transmission Line and Slow Sand Filtration April 1995 - April 1993 (Gallons)

Month/Year	Transmission Line Hydraulic Capacity	Pendleton Consumption	Available Excess Water	Pendleton Basalt Aquifer Req'ts
04/95	157,500,000	99,515,000	57985000	
03/95	162,750,000	86,301,000	76449000	
02/95	162,750,000	117,150,000	45600000	
01/95	162,750,000	100,635,000	62115000	
12/94	162,750,000	94,539,000	68211000	
11/94	157,500,000	95,715,000	61785000	
10/94	162,750,000	100,715,000	62035000	
09/94	157,500,000	126,196,000	31304000	
08/94	162,750,000	254,400,000		91650000
07/94	162,750,000	253,581,000		90831000
06/94	157,500,000	187,003,000		29503000
05/94	162,750,000	168,774,000		6024000
04/94	157,500,000	108,335,000	49165000	
03/94	162,750,000	90,350,000	72400000	
02/94	162,750,000	82,414,000	80336000	
01/94	162,750,000	86,331,000	76419000	
12/93	162,750,000	91,174,000	71576000	
11/93	157,500,000	56,371,000	101129000	
10/93	162,750,000	107,707,000	55043000	
09/93	157,500,000	186,518,000		29018000
08/93	162,750,000	250,294,000		87544000
07/93	162,750,000	195,083,000		32333000
06/93	157,500,000	161,711,000		4211000
05/93	162,750,000	138,192,000	24558000	
04/93	157,500,000	81,988,000	75512000	
TOTALS	4021500000	3320992000	1071622000	371114000

Table 4

Pendleton Basalt Aquifer Requirements and Available Excess Water if Utilizing Hydraulically Full Gravity Transmission Line and Slow Sand Filtration Based on Year 2020 Population of 22,960 April 1995 - April 1993 (Gallons)

Month/Year	Transmission Line Hydraulic Capacity	Pendleton Consumption Pop of 15,395	Pendleton Consumption Pop of 22,960	Available Excess Water	Pendleton Basalt Aquifer Req'ts
04/95	157,500,000	99,515,000	148277350	9222650	
03/95	162,750,000	86,301,000	128588490	34161510	
02/95	162,750,000	117,150,000	174553500		11803500
01/95	162,750,000	100,635,000	149946150	12803850	
12/94	162,750,000	94,539,000	140863110	21886890	
11/94	157,500,000	95,715,000	142615350	14884650	
10/94	162,750,000	100,715,000	150065350	12684650	
09/94	157,500,000	126,196,000	188032040		30532040
08/94	162,750,000	254,400,000	379056000		216306000
07/94	162,750,000	253,581,000	377835690		215085690
06/94	157,500,000	187,003,000	278634470		121134470
05/94	162,750,000	168,774,000	251473260		88723260
04/94	157,500,000	108,335,000	161419150		3919150
03/94	162,750,000	90,350,000	134621500	28128500	
02/94	162,750,000	82,414,000	122796860	39953140	
01/94	162,750,000	86,331,000	128633190	34116810	
12/93	162,750,000	91,174,000	135849260	26900740	
11/93	157,500,000	56,371,000	83992790	73507210	
10/93	162,750,000	107,707,000	160483430	2266570	
09/93	157,500,000	186,518,000	277911820		120411820
08/93	162,750,000	250,294,000	372938060		210188060
07/93	162,750,000	195,083,000	290673670		127923670
06/93	157,500,000	161,711,000	240949390		83449390
05/93	162,750,000	138,192,000	205906080		43156080
04/93	157,500,000	81,988,000	122162120	35337880	
TOTALS	4021500000	3320992000	4948278080	345855050	1272633130

June 20, 1995

Bob Patterson, P.E.
Pendleton Public Works
P.O. Box 190
Pendleton, Oregon 97801

Re: Draft Water System Master Plan
City of Pendleton

Dear Bob:

I had a chance to skim the draft Master Plan, and would like to throw in my personal two cents. I focused my attention on Chapter 6, Water Conservation. I firmly believe that water conservation will be increasingly important in the near future, and that we do not give it adequate attention now. Chapter 6 is a disappointment. So what if OWRD rules and guidance are not well established? If the City wants to reduce water usage, then let us find a way to do it, with no excuses.

The first section of the water conservation chapter is titled "Conservation Plan, a Statutory Requirement." Who can get interested and excited about saving water when water conservation is introduced as bureaucratic manifestation, or regulatory burden? I'm not one to advocate the "Rah, Rah" approach, but the only way Pendleton residents will get interested in saving water is if City staff get interested. If I was a City Public Works employee reading this chapter, I would be defensive or asleep by the time I finished the first paragraph. We need motivated employees to convey the message.

Ordinance 3514 is a bit better than the rest of the chapter, but still does not generate faith that water conservation will be a serious effort. I strongly believe that the current rate structure should be reviewed (section 7.B) and a new rate structure should be established that makes people think about how much water they use. As a Pendleton resident, I am willing to pay more for water. And, the more water that I use, the more I should pay per unit (the days of volume discounts should be over). We all think nothing of spending a dollar for a Big Gulp, but we get upset if we pay less than a dollar a day for all the water we use. Something is wrong.

I also believe the City should eliminate all free water accounts (Section 7.C). It would be a horrible shame if the City were to utilize a stream water right if we have not curtailed usage to efficient levels. The Umatilla River and its tributaries, and groundwater sources, are stressed enough. I would prefer to leave them alone, even in winter months, if we have an opportunity to conserve water.

Right now most City residents have no idea that Pendleton could face a water crisis in the future. It is time to educate, and not just through brochures and mailers. How about water usage summaries in the newspaper, with goals established? How about the City supplying some water saving fixtures to random houses? We have a shutoff valve on our bathroom faucet that I use without thinking while I shave or wash up. It was a free gift from PP&L I think, and a great idea. How about prizes or discounts to efficient water users?

The Master Plan should treat water conservation for what it is - a source of water that can be tapped, just like a well or river. In the short term conservation may be more costly, but since our water resources are fixed conservation will be required in the future anyway. Why not start now.

Thanks for considering my comments. I hope the City will allow you to direct some of your enthusiasm into making water conservation a reality.

Sincerely,

ALAN

Alan Schroeder
2518 SW Marshall Avenue

P.S. - TONE NOT DIRECTED AT YOU!

Pendleton Public Works - Memo

To: Jerry Odman, PWD
From: Bob Patterson
Date: May 25, 1995
Subject: Review of Draft Water System Master Plan

I have finally finished my review of the draft between other job tasks. Most of the following comments are insignificant to the overall scope and recommendations of the study. I agree with Stan that we need to pursue the development of our "springs" to their full capacity of 7.56 mgd. When it comes to using the basalt aquifer for artificial storage of treated water, I have many concerns, those being air binding and particulates plugging the fractured water bearing zones. The concept is wonderful, but making it a reality will be really interesting.

The following are my comments pertaining to the report:

Page I-8 "Post Disinfection Byproducts (PDBs)." This is the first time I have come across this terminology. Disinfection Byproducts (DBPs) is the general acronym used for the formation of compounds from disinfection treatment.

Page II-5 ".... Federal EPA mandated lower amount of turbidity (1 NTU)." The MCL for turbidity only applies to systems that are surface water or under the influence of surface water. Since the City's springs are designated by OHD as groundwater and they have not yet declared the springs as under the direct influence, then the City has not had to forego a substantial amount of water from the springs due to turbidity & EPA requirements. The 1NTU requirement is for slow sand filtration. For conventional treatment, the requirement is 0.5 NTU.

Page III-1 ".... Artificial Recharge & Recovery." This is the first time I have seen this terminology used relating to the artificial storage of water utilizing an aquifer. The common terminology used in the industry is Aquifer Storage and Recovery (ASR). I find this terminology more appealing because aquifers store water through natural means and can also be used to store water through artificial means. The term "recharge" is more indicative of restoring the aquifer to its natural hydraulic state through artificial means.

Page III-24 ".... required the aeration of Well #5 at a cost of +/- $100,000." Should be "$100,000 +/-."

Page IV-17 ".... the State Health Division has ruled that the City's springs are influenced by the Umatilla River." The OHD has not and probably will not "rule" on this issue until the are forced to by EPA. All conductivity measurements and even the MPA results are indicative that the Umatilla River and springs are hydraulically connected; therefore, the river does have "some" influence on the springs. We met with Leland & Burnett almost a year ago to discuss their upcoming determination of surface water influence. They backed off, due in part to the MPA results being generated by full-scale treatment facilities and also because EPA Region 10 has not

been willing to verify that the MPA are a definative method for making these determinations.

Page IV-32 ".... existing transmission line.... is in excellent condition." Our SCADA system has been providing information that we are incurring leakage between the South Hill Reservoir and Well #7. The trends can be graphed for your review. I agree with Stan that we need to TV our transmission line and prove to ourselves, without doubt, that the transmission line is in excellent repair. Reference is again made on Page VII-47.

Page VII-15 "Table VII-4." The unit for turbidity provided in this table is "ppm." I believe Stan would like to have "NTU" in place of "ppm." Stan must have had an off-day when he created this table.

Page VII-23 ".... achieve at least 99 percent (2 log)...." I strongly believe the ESWTR is going to stipulate at least 99.9 percent (3 log) removal of *Crypto* between the source and first customer. It might even possibly require 4 log removal for *Crypto*.

Also, I observed many typos throughout the report, but in no way did I want to burden you or myself with them.

I am looking forward to hearing what the council has to say about the study.