Water System Plan

Jonathan M. Wainwright Memorial VA Medical Center

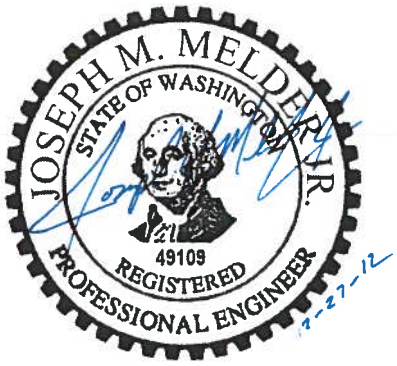
Engineering
Surveying
Natural Resources

anderson perry & associates, inc.
Walla Walla, WA La Grande, OR

JONATHAN M. WAINWRIGHT MEMORIAL VA MEDICAL CENTER

WATER SYSTEM PLAN

NOVEMBER 2012



ANDERSON PERRY & ASSOCIATES, INC.

Civil Engineers

Walla Walla, Washington
La Grande, Oregon

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Chapter 1 - Description of Water System

Ownership and Management

The Jonathan M. Wainwright Memorial VA Medical Center (VAMC) is owned by the United States Department of Veterans Affairs (VA). The VA owns and operates a non-transient non-community water system identified by the Washington State Department of Health (DOH) identification number 90542. The federal government manages this existing system.

System History and Background

The Walla Walla VAMC was established in 1921 on an 88-acre campus located in Walla Walla, Washington. The VAMC was constructed on the historic cavalry fort, Fort Walla Walla. The address for the campus is 77 Wainwright Drive, Walla Walla, Washington 99362. The campus is bordered by the City of Walla Walla and Fort Walla Walla on all sides.

The original water distribution system was constructed in 1921, with water supplied by the City of Walla Walla with a 6-inch intertie at Chestnut Street. See Figure 1-1 for a vicinity map of the surrounding area. In 1926, the VA drilled a well on site and in 1928 completed construction of a 100,000-gallon water tower. At this time, Well No. 1 became the primary source of water on site. An additional well was constructed in 1933 as another source for obtaining water. These wells are discussed further below. In 1939, several mains were replaced and extended. In 1956, an 8-inch connection was added to the City of Walla Walla's water distribution system at Willow Street. Currently the original 6-inch intertie has been removed and an additional intertie was constructed at the Avery/Poplar Street intersection. There have been no major changes to the network with the exception of routine maintenance and an additional City connection serving as a dedicated fire main for the Residential Rehab Unit (RRU) and Outpatient Clinic (OPC). Locations of these buildings are shown on the VAMC Campus Map in Figure 1-2.

Currently, there are three interties to the City of Walla Walla's water distribution system. These connections consist of one 6-inch intertie constructed as part of the suggested improvements after the previous water system study (Intertie No. 1), one 8-inch intertie constructed in 1956 (Intertie No. 2), and one 10-inch intertie constructed in 2011 (Intertie No. 3). These three connections provide emergency fire protection service to the VAMC. Locations of the services are shown on the Water Distribution Map in Figure 1-3.

Well No. 1

In 1926, the VAMC drilled Well No. 1 near Wainwright Drive. Two years later, the VAMC installed an elevated 100,000-gallon water tower and connected it to Well No. 1. Both facilities are still in use today; however, the well has been upgraded over the years. Well No. 1's pump was last replaced in 1977. The new pump was a 50-horsepower (Hp) turbine pump capable of pumping 550 gallons per minute (gpm) at 220 total dynamic head (TDH). This flow rate and pump data was provided in a previous Water System Study prepared by Sorenson and Company, dated April 1987 (Appendix C). Actual flow rates were not verified and may vary from the published values.

Well No. 1 was redrilled in 1980. According to the well log, the approximate elevation of the well is 870 feet above mean sea level (MSL) with a static water level (SWL) elevation of approximately 846 feet. The casing was installed to 103 feet below grade with perforations on the last 20 feet. The well was then

grouted with bentonite to 20 feet deep for a surface seal. See Appendix A for a copy of DOH's Water Well Report. Once the well drilling was complete, the existing pump was repositioned over the new well and the wellhouse, Building 99, was modified to accommodate the new layout.

Water pumped into the system is disinfected with a hypochlorite solution generated from a Clor-Tech On-Site Sodium Hypochlorite Generation System at the source.

Well No. 2

Well No. 2 was originally drilled in 1933 on the southeast corner of campus. At this time, the well was 550 feet deep and consisted of a 16-inch casing which reduced to an 8-inch casing at the bottom of the well. The well was outfitted with a pump set at 145 feet below grade. This pump is reported to be capable of pumping 350 gpm at 270 feet TDH with a 40-Hp motor.

Well No. 2 was redrilled in 1982. According to the well log, the approximate elevation of this well is 870 feet above MSL with an SWL of approximately 602 feet. A 12-inch, non-perforated casing was installed to a depth of 551.5 feet below grade. The well was then sealed with 30 feet of cement grout. See Appendix A for a copy of DOH's Water Well Report. Upon completion, a new pump was installed in the newly drilled well. The new pump was a 100-Hp submersible pump capable of pumping 534 gpm at 497 TDH. This flow rate and pump data was provided in the previous Water System Study by Sorenson and Company, April 1987 (Appendix C). Actual flow rates were not verified and may vary from the published values. The current well and pump station have a brick wellhouse, Building 101, enclosing the wellhead and equipment.

Water pumped from this well is also disinfected with a hypochlorite solution generated from a Clor-Tech On-Site Sodium Hypochlorite Generation System at the source.

Geography

The VAMC is located adjacent to the City of Walla Walla and College Place situated in the Walla Walla Valley.

Neighboring/Adjacent Purveyors

The City of Walla Walla (Group A System with approximately 14,788 connections) is the closest purveyor of water adjacent to the VAMC. As of November 2012, there are three interties to the City's water distribution system. Interties No. 1 and 2 contain meters and gate valves that are closed and only provide emergency fire protection service. Intertie No. 3 is a dedicated fire line with no service connections. This intertie is not metered and valves are open. The VAMC pays the City of Walla Walla a monthly connection fee for these connections. There are no additional planned interties.

Ordinances/Bylaws

Design of new water facilities must be in accordance with the Federal Clean Water Act, VA design criteria, and applicable DOH requirements. New construction and re-development projects within the VAMC must provide infrastructure capable of meeting fire flow, domestic, and/or industrial water demand as required and approved by the VAMC.

Inventory of Existing Facilities

The VAMC derives its potable water supply from groundwater sources. The current water system consists of two wells, an aboveground reservoir (100,000 gallons), and approximately 12,000 linear feet of water mains.

The VAMC obtains fire flow by utilizing three existing interties connected to the City of Walla Walla's water distribution system.

Sources

There are three water sources for the VAMC, see Figure 1-3 for the locations of these sources.

- **Source No. 1** – A gravel aquifer accessed by Well No. 1. The well is 103 feet deep. Well No. 1 was redrilled in 1980 and has a 50-Hp turbine pump capable of pumping 550 gpm at 220 TDH. This aquifer extends under the City of Walla Walla and the surrounding region. Figure 1-4 outlines the Critical Aquifer Recharge Area for this aquifer.

- **Source No. 2** – A deeper basalt aquifer accessed by Well No. 2. This aquifer also extends under the City of Walla Walla and the surrounding region. Well No. 2 is approximately 550 feet deep and has a 100-Hp submersible pump capable of pumping 534 gpm at 497 TDH.

- **Source No. 3** – The interties to the City of Walla Walla's water distribution system. This source would only be used in an emergency or when fire flow is required on the campus. Interties No. 1 and 2 are also capable of providing potable water in the event the wells are offline. Based on observed fire flow rates (Anderson Perry & Associates, Inc., 2012) these connections are necessary to provide fire flow on site due to insufficient capacity in the VAMC's water distribution system.

Water Rights

The VAMC has a federal reserved water right. This water right allows the facility to use any quantity of water required to meet the federal mission of the campus.

Storage

The VAMC currently owns an elevated 100,000-gallon water tower on site. This water tower was constructed in 1928 and the interior of the tower was recoated in 2009. The tower is currently located within the footprint of a future Washington State Department of Veterans Affairs Skilled Nursing Facility and will be removed to accommodate the planned building. A new water tower, sized to provide adequate storage as required by the VA Site Utility Design Requirements and Physical Security Design Manual for VA Facilities, will be constructed on site to provide potable water to the campus.

Telemetry (Control System)

The control for the VAMC's water system is located in the Boiler Plant, Building 76. The telemetry system enunciates alarms, and controls the tower's water level and the current pump(s) in operation.

Transmission and Distribution System

As of November 2012, there are 31 allowed connections to the VAMC's water system according to the DOH Water Facilities Inventory (WFI) form. A copy of the WFI form is included in Appendix A. According to the VAMC, there are currently 25 active connections to the water system.

A map of the existing water distribution system is presented in Figure 1-3. The VAMC's system consists of interconnected 4- to 8-inch ductile iron water mains. There is also a 10-inch ductile iron water main connected to the City's system to provide fire flow to the new OPC and RRU, but this main is not connected to the VAMC's potable water distribution system.

Water Disinfection

The two existing on-site wells both have Clor-Tec On-Site Sodium Hypochlorite systems that disinfect well water. Chlorine residual is maintained between 3.0 and 4.0 parts per million. This concentration is tested daily at the Boiler Plant.

Water Facilities Inventory (WFI)

A copy of the VAMC's WFI is included in Appendix A.

Related Plans and Documents

The following documents were consulted in preparation of this plan:

- DOH Water System Design Manual, December 2009
- Physical Security Design Manual for VA Facilities, July 2007
- VA Site Utility Design Manual, July 2010
- Executive Order 13423, issued January 24, 2007
- Executive Order 13514, issued October 5, 2009
- Walla Walla/College Place Coordinated Water System Plan Update, March 1994
- Water System Study, Sorenson and Company, April 1987 (Appendix C)
- VAMC Construction Documents and Site Maps
- Washington State Department of Ecology (DOE) Criteria for Sewage Works Design, August 2008

Service Area Characteristics

The existing service area is based around the 88-acre VAMC campus. Uses consist of health care facilities, irrigation, and supplying VAMC-owned buildings with potable water.

Existing Service Area

The service area for the VAMC's water distribution system is limited to the current 88-acre campus. Existing facilities constructed within the campus obtain water from the VAMC distribution system as long as the VA retains ownership of the land.

Zoning and Land Use

The property is owned and maintained by the federal government and is exempt from zoning and land use classifications.

Future Service Area

The future service area will be limited to the existing 88-acre facility that remains under ownership of the VAMC. The VAMC has agreed to donate approximately 10 acres of the campus to the Washington State Department of Veterans Affairs for construction of a Skilled Nursing Facility. This facility will not obtain water from the VAMC.

Service Area Agreements

There is currently no service agreement with the City of Walla Walla to provide emergency potable water and fire flow to the VAMC, but the VAMC does pay a monthly connection fee for the existing interties.

Service Area Requirements and Conditions of Service

The VAMC has no service policy related to building connections. All buildings located on campus are owned and operated by the federal government and connections are made as needed to the new buildings.

Duty to Serve

According to the Municipal Water Law as codified in Revised Code of Washington (RCW) 43.20.260, a municipal supplier has a duty to serve new water service (including individual connections) to the identified retail service area if the utility:

- Can provide water service in a timely and reasonable manner
- Has sufficient water rights or uses water from a source that has a water right
- Has sufficient capacity to serve the water in a safe and reliable manner as determined by DOH
- The service is consistent with the requirements of any comprehensive plans or development regulations adopted under Chapter 36.70A RCW or any other applicable adopted comprehensive plans, land use plans, or development regulations

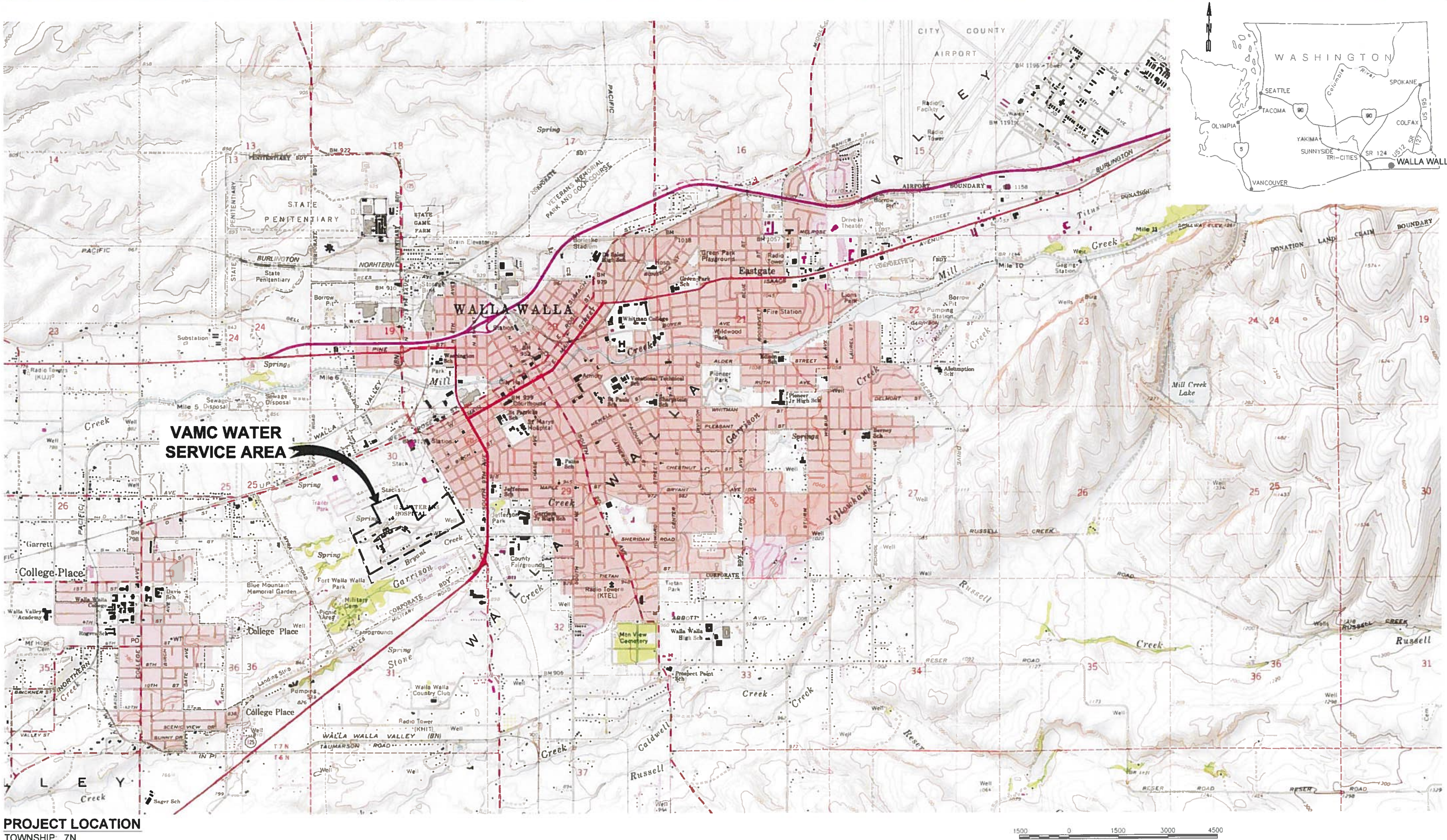
Local Government Consistency

In addition to the duty-to-serve requirement, the Municipal Water Law also requires the Water System Plan (WSP) be consistent with local adopted plans, regulations, and policies (including coordinated WSPs).

The VAMC WSP was identified in the Walla Walla/College Place Coordinated WSP Update, March 1994. This plan lists the VAMC as a small water system. For the VAMC WSP, the City of Walla Walla and Walla Walla County were contacted. The City and County were requested to review the relevant water system planning information and provide a signed consistency statement to the VAMC for submittal to DOH. Signed copies of the consistency statements have not been obtained at this time but will be included in Appendix A upon receipt.

Satellite Management Agencies

The VAMC has no plans for becoming a Satellite Management Agency.



PROJECT LOCATION

TOWNSHIP: 7N
RANGE: 36E
SECTION: 30

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VICINITY/SERVICE AREA MAP

NOVEMBER 27 2012

FIGURE
1-1

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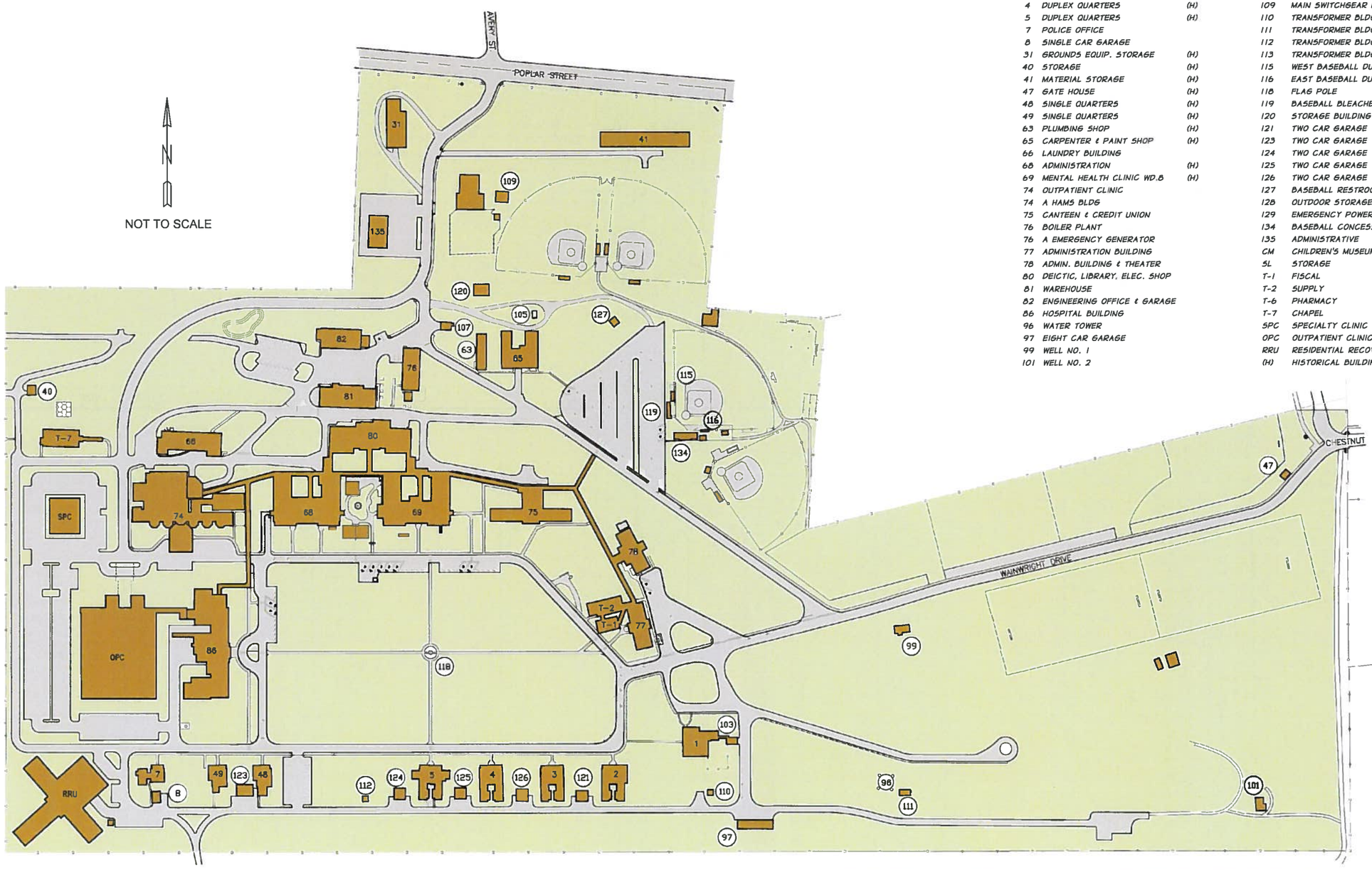
BUILDING SCHEDULE

1	SINGLE QUARTERS	(H)	103	SINGLE CAR GARAGE	
2	DUPLEX QUARTERS	(H)	105	WASTE STORAGE BUILDING	
3	DUPLEX QUARTERS	(H)	107	STORAGE BUILDING	
4	DUPLEX QUARTERS	(H)	109	MAIN SWITCHGEAR BLDG	
5	DUPLEX QUARTERS	(H)	110	TRANSFORMER BLDG	
7	POLICE OFFICE		111	TRANSFORMER BLDG & EMERGENCY GENERATOR	
8	SINGLE CAR GARAGE		112	TRANSFORMER BLDG	
31	GROUNDS EQUIP. STORAGE	(H)	113	TRANSFORMER BLDG	
40	STORAGE	(H)	115	WEST BASEBALL DUGOUT	
41	MATERIAL STORAGE	(H)	116	EAST BASEBALL DUGOUT	
47	GATE HOUSE	(H)	118	FLAG POLE	
48	SINGLE QUARTERS	(H)	119	BASEBALL BLEACHERS	
49	SINGLE QUARTERS	(H)	120	STORAGE BUILDING	
63	PLUMBING SHOP	(H)	121	TWO CAR GARAGE	
65	CARPENTER & PAINT SHOP	(H)	123	TWO CAR GARAGE	
66	LAUNDRY BUILDING		124	TWO CAR GARAGE	
68	ADMINISTRATION	(H)	125	TWO CAR GARAGE	
69	MENTAL HEALTH CLINIC WD.B	(H)	126	TWO CAR GARAGE	
74	OUTPATIENT CLINIC		127	BASEBALL RESTROOMS	
74	A HAMS BLDG		128	OUTDOOR STORAGE	
75	CANTEEN & CREDIT UNION		129	EMERGENCY POWER GENERATOR	
76	BOILER PLANT		134	BASEBALL CONCESSION BLDG	
76	A EMERGENCY GENERATOR		135	ADMINISTRATIVE	
77	ADMINISTRATION BUILDING		CM	CHILDREN'S MUSEUM	
78	ADMIN. BUILDING & THEATER		SL	STORAGE	
80	DEICTIC, LIBRARY, ELEC. SHOP		T-1	FISCAL	
81	WAREHOUSE		T-2	SUPPLY	
82	ENGINEERING OFFICE & GARAGE		T-6	PHARMACY	
86	HOSPITAL BUILDING		T-7	CHAPEL	
96	WATER TOWER		SPC	SPECIALTY CLINIC	
97	EIGHT CAR GARAGE		OPC	OUTPATIENT CLINIC	
99	WELL NO. 1		RRU	RESIDENTIAL RECOVERY UNIT	
101	WELL NO. 2		(H)	HISTORICAL BUILDING	



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EXISTING CAMPUS MAP

DECEMBER 19 2012

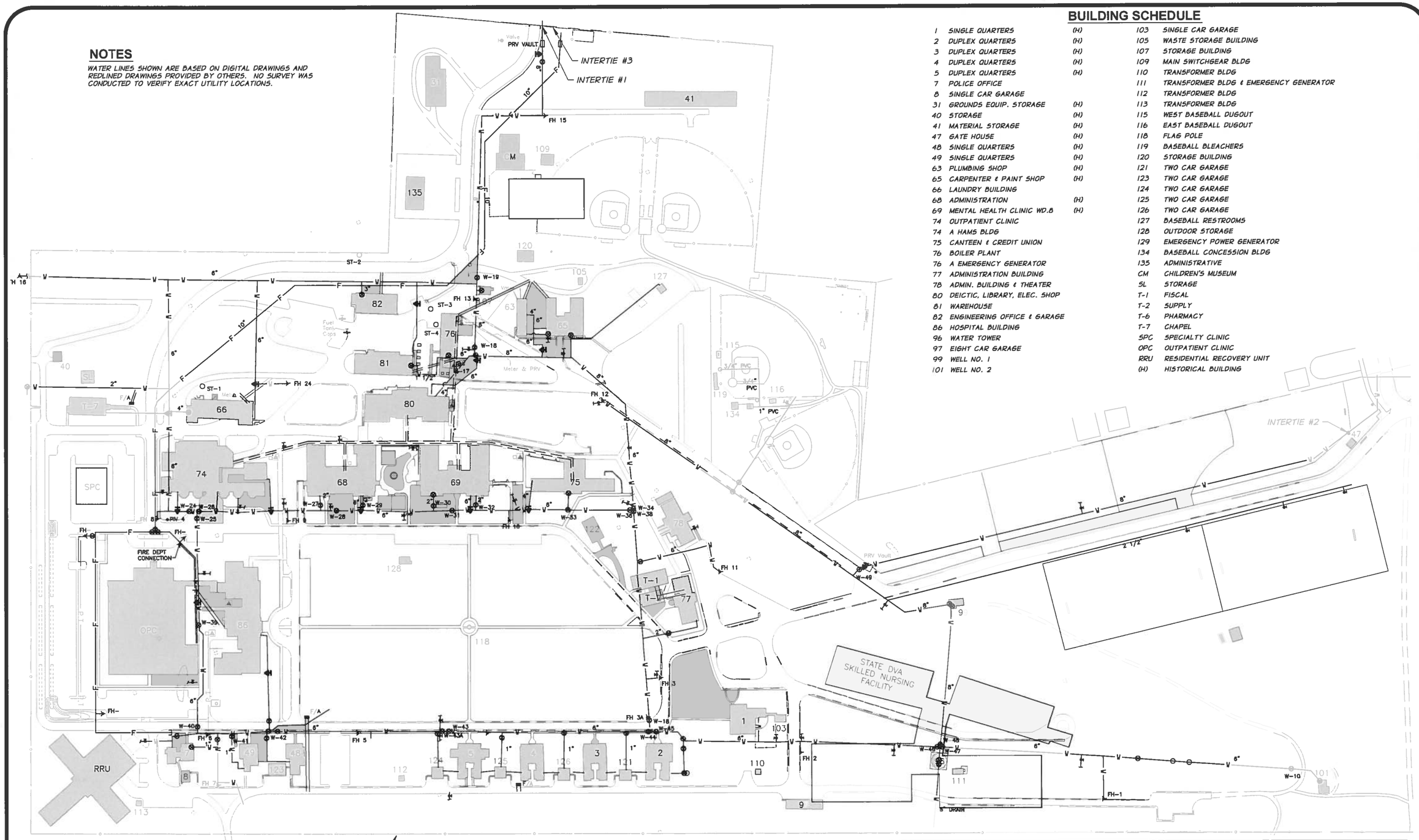
FIGURE

1-2

R:\Clients\Architects West\6006-42 VAMC - Water Study\DWG\Water System Plan\Figures\Figure 1-2 Campus Map.dwg, 12/19/2012 2:14:46 PM

NOTES

WATER LINES SHOWN ARE BASED ON DIGITAL DRAWINGS AND REDLINED DRAWINGS PROVIDED BY OTHERS. NO SURVEY WAS CONDUCTED TO VERIFY EXACT UTILITY LOCATIONS.



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99	WELL NO. 1		RRU	RESIDENTIAL RECOVERY UNIT
101	WELL NO. 2		(H)	HISTORICAL BUILDING

100 0 100 200 300
SCALE IN FEET

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EXISTING WATER DISTRIBUTION MAP

DECEMBER 19 2012

FIGURE
1-3

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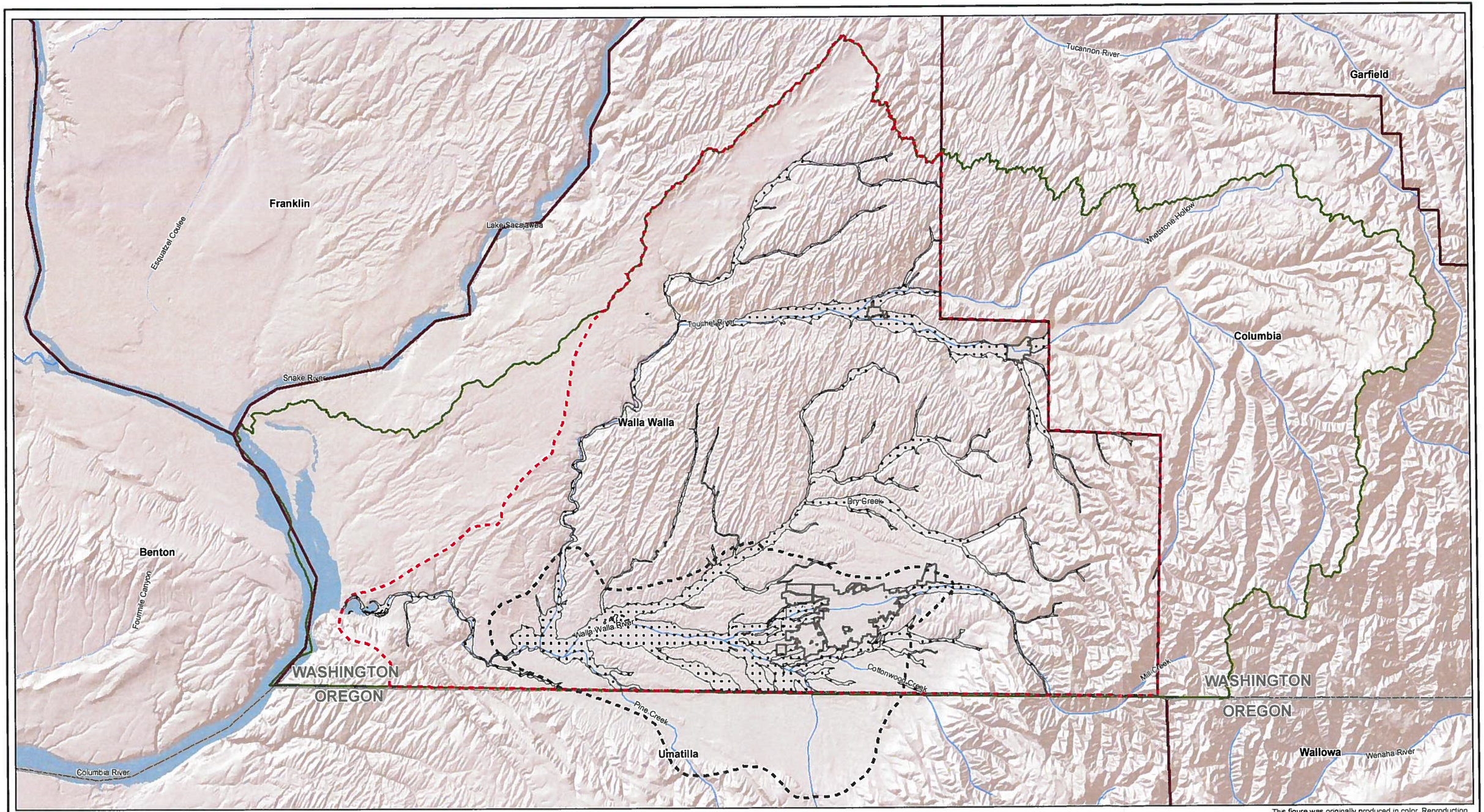


This figure was originally produced in color. Reproduction in black and white may result in a loss of information.

LEGEND

- Critical Aquifer Recharge Area
- Walla Walla River Catchment
- City Limits
- WRIA 32
- Shallow Gravel Aquifer Area Delineated by County
- States
- Counties

0 5
Scale in Miles

Map Projection:
Washington State Plane South
NAD 1983 Feet
Source:
Walla Walla County,
Golder Associates Inc.

N

FIGURE 1-4

WALLA WALLA RIVER SHALLOW GRAVEL AQUIFER CRITICAL AQUIFER RECHARGE AREA MAP (DECEMBER 2011)

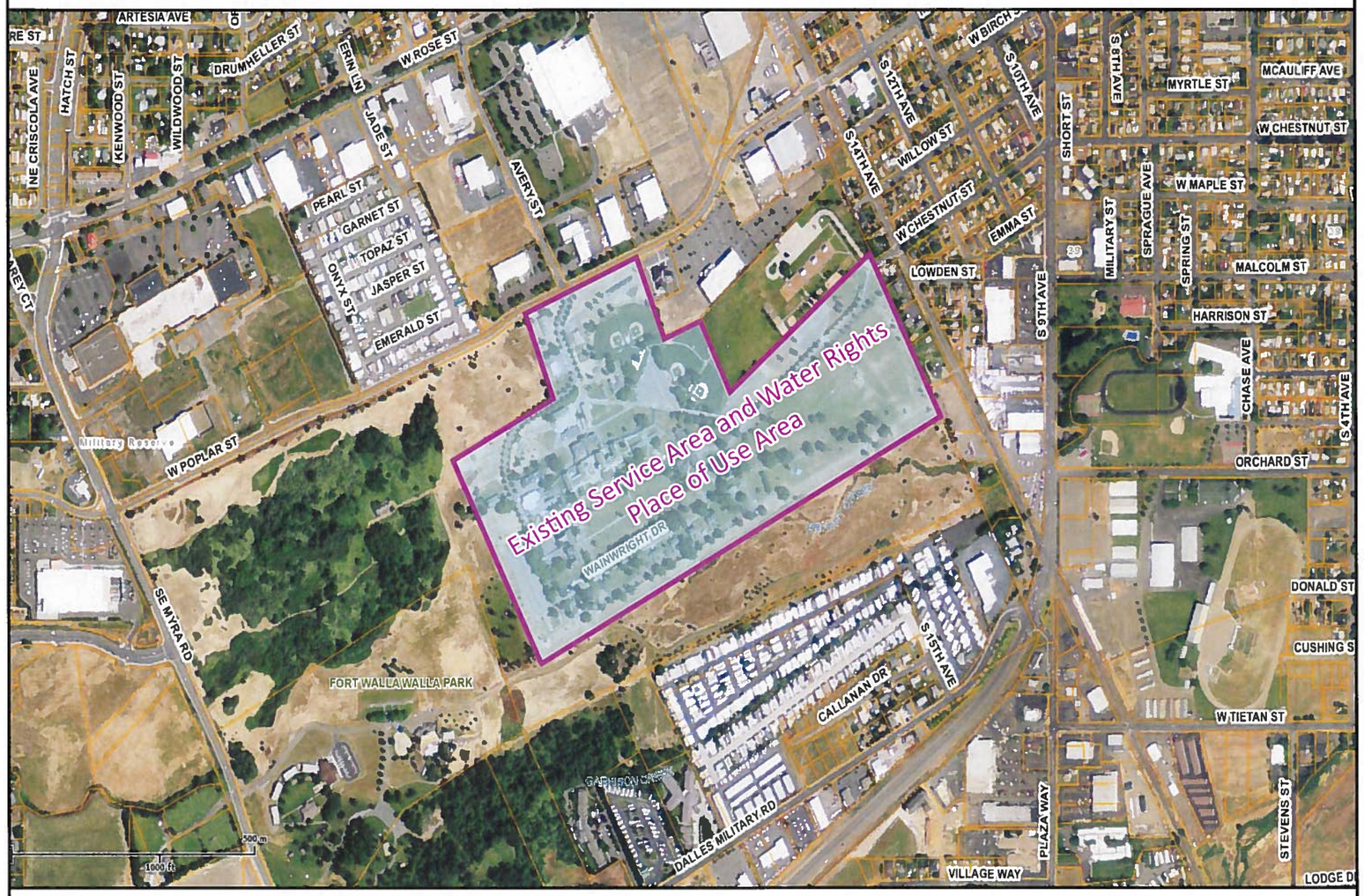
WALLA WALLA COUNTY CARA REVIEW/WA

11393087F12_CriticalAquiferMap_WWV.mxd | 12/22/2011 | THAMMOND

Golder Associates

Figure 1-5

Existing VAMC Water Service Area



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GIS
Walla Walla County

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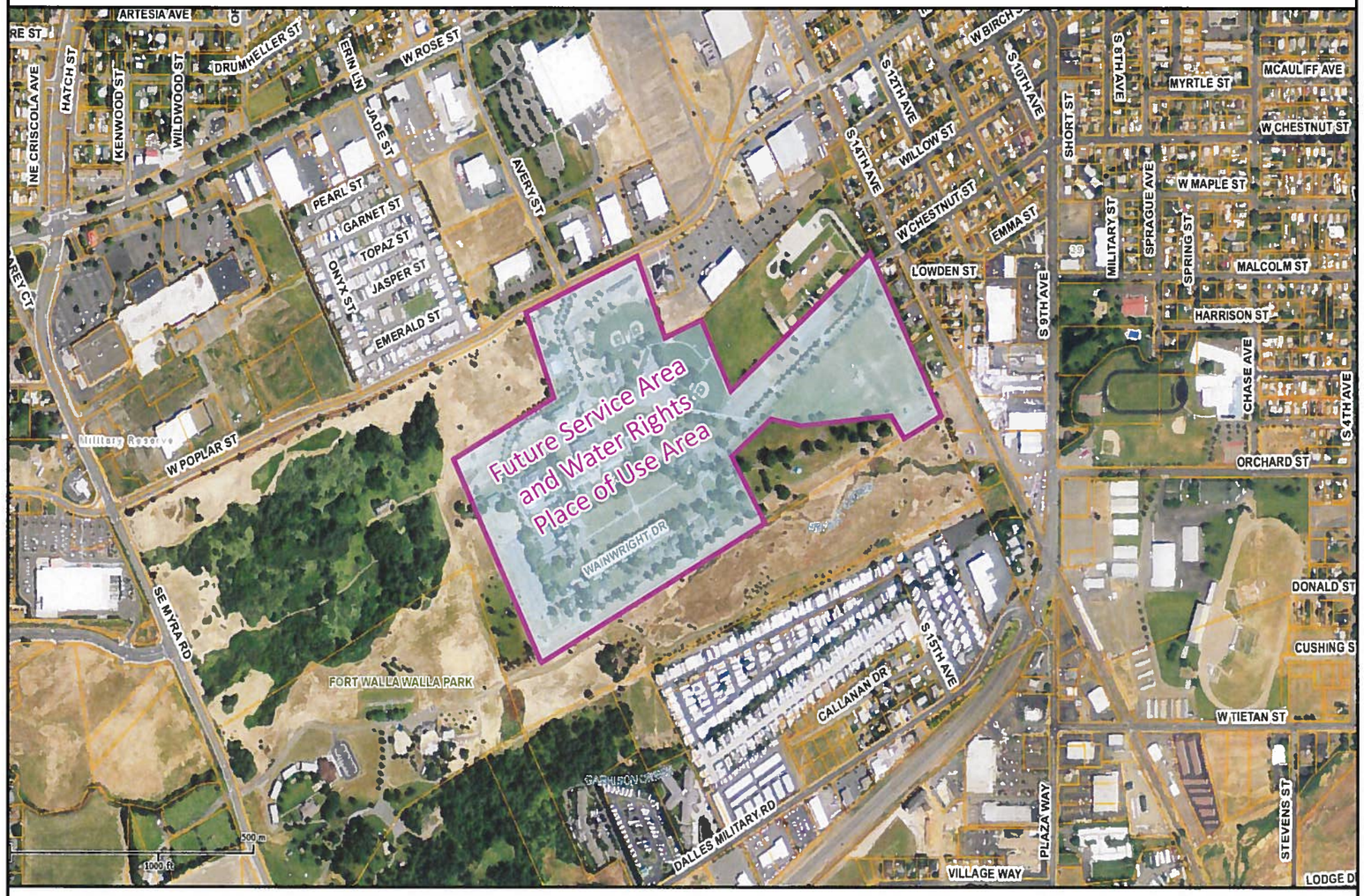
Legend

N
W E
S

- AIRFIELDS
- BRIDGE - NON-RESTRICTED
- BRIDGE - RESTRICTED
- CEMETERIES
- DAMS
- FIRE STATIONS
- GOLF COURSES
- GOVERNMENT FACILITIES
- HOSPITALS
- LIBRARIES
- MEDICAL CLINICS
- POLICE STATIONS
- POST OFFICES
- RAILROAD STATIONS
- SCHOOLS
- WINERY - TASTING ROOMS
- RAILROADS
- STATE HIGHWAYS
- PUBLIC ROADS
- PRIVATE ROADS
- STREAMS
- RIVERS
- PARKS
- SECTION BOUNDARIES
- CITY OF COLLEGE PLACE
- CITY OF PRESCOTT
- CITY OF WAITSBURG
- CITY OF WALLA WALLA
- COLLEGE PLACE UGA
- PRESCOTT UGA
- PROVISIONAL BURBANK UGA
- WAITSBURG UGA
- WALLA WALLA UGA

Figure 1-6

Future VAMC Water Service Area



T.7.N., R.36.E, Section 30

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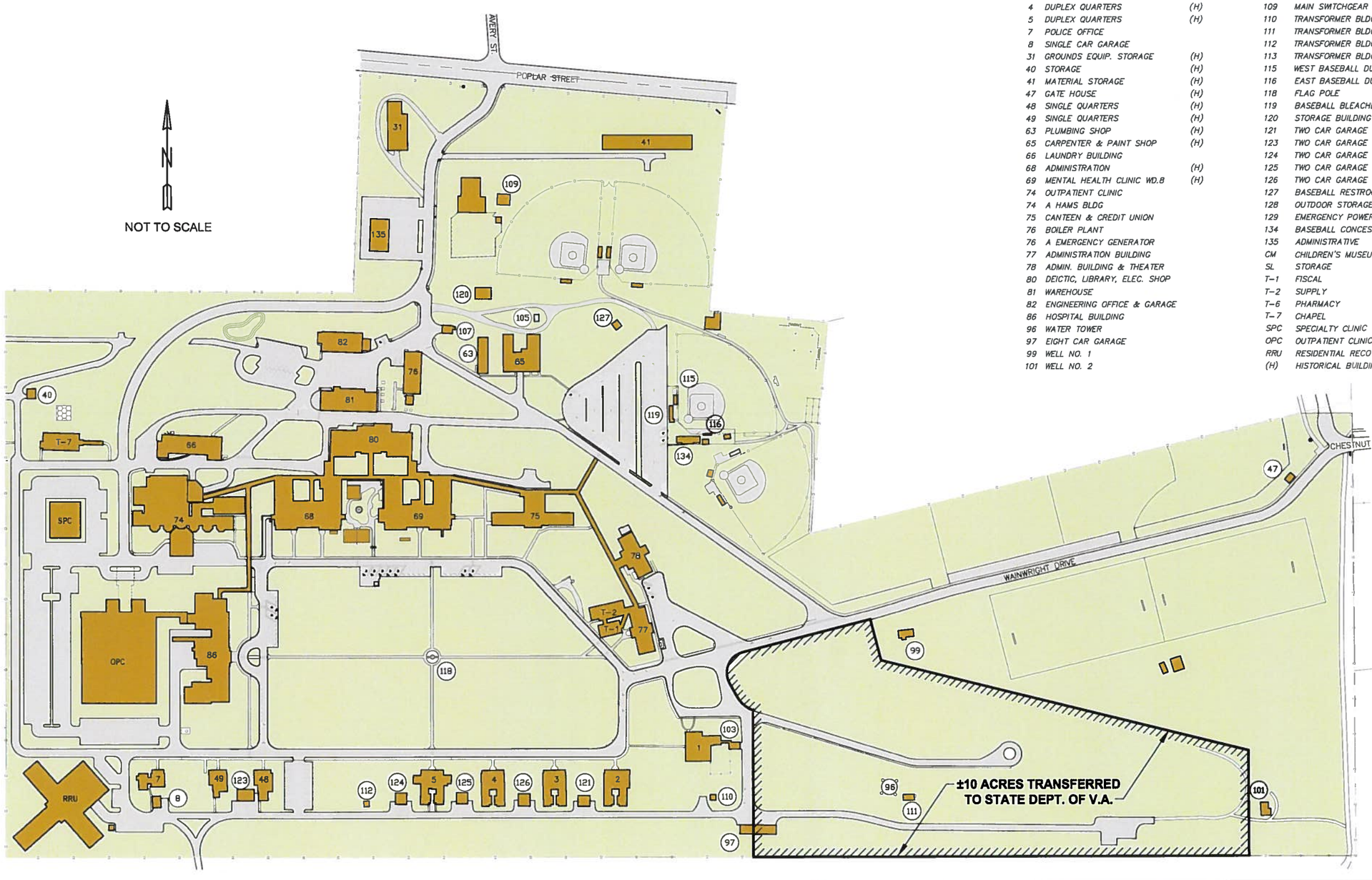
- AIRFIELDS
- BRIDGE - NON-RESTRICTED
- BRIDGE - RESTRICTED
- CEMETERIES
- DAMS
- FIRE STATIONS
- GOLF COURSES
- GOVERNMENT FACILITIES
- HOSPITALS
- LIBRARIES
- MEDICAL CLINICS
- POLICE STATIONS
- POST OFFICES
- RAILROAD STATIONS
- SCHOOLS
- WINERY - TASTING ROOMS
- RAILROADS
- STATE HIGHWAYS
- PUBLIC ROADS
- PRIVATE ROADS
- STREAMS
- RIVERS
- PARKS
- SECTION BOUNDARIES
- CITY OF COLLEGE PLACE
- CITY OF PRESCOTT
- CITY OF WAITSBURG
- CITY OF WALLA WALLA
- COLLEGE PLACE UGA
- PRESCOTT UGA
- PROVISIONAL BURBANK UGA
- WAITSBURG UGA
- WALLA WALLA UGA

BUILDING SCHEDULE

1	SINGLE QUARTERS	(H)	103	SINGLE CAR GARAGE
2	DUPLEX QUARTERS	(H)	105	WASTE STORAGE BUILDING
3	DUPLEX QUARTERS	(H)	107	STORAGE BUILDING
4	DUPLEX QUARTERS	(H)	109	MAIN SWITCHGEAR BLDG
5	DUPLEX QUARTERS	(H)	110	TRANSFORMER BLDG
7	POLICE OFFICE		111	TRANSFORMER BLDG & EMERGENCY GENERATOR
8	SINGLE CAR GARAGE		112	TRANSFORMER BLDG
31	GROUNDS EQUIP. STORAGE	(H)	113	TRANSFORMER BLDG
40	STORAGE	(H)	115	WEST BASEBALL DUGOUT
41	MATERIAL STORAGE	(H)	116	EAST BASEBALL DUGOUT
47	GATE HOUSE	(H)	118	FLAG POLE
48	SINGLE QUARTERS	(H)	119	BASEBALL BLEACHERS
49	SINGLE QUARTERS	(H)	120	STORAGE BUILDING
63	PLUMBING SHOP	(H)	121	TWO CAR GARAGE
65	CARPENTER & PAINT SHOP	(H)	123	TWO CAR GARAGE
66	LAUNDRY BUILDING		124	TWO CAR GARAGE
68	ADMINISTRATION	(H)	125	TWO CAR GARAGE
69	MENTAL HEALTH CLINIC WD.8	(H)	126	TWO CAR GARAGE
74	OUTPATIENT CLINIC		127	BASEBALL RESTROOMS
74	A HAMS BLDG		128	OUTDOOR STORAGE
75	CANTEEN & CREDIT UNION		129	EMERGENCY POWER GENERATOR
76	BOILER PLANT		134	BASEBALL CONCESSION BLDG
76	A EMERGENCY GENERATOR		135	ADMINISTRATIVE
77	ADMINISTRATION BUILDING		CM	CHILDREN'S MUSEUM
78	ADMIN. BUILDING & THEATER		SL	STORAGE
80	DEICTIC, LIBRARY, ELEC. SHOP		T-1	FISCAL
81	WAREHOUSE		T-2	SUPPLY
82	ENGINEERING OFFICE & GARAGE		T-6	PHARMACY
86	HOSPITAL BUILDING		T-7	CHAPEL
96	WATER TOWER		SPC	SPECIALTY CLINIC
97	EIGHT CAR GARAGE		OPC	OUTPATIENT CLINIC
99	WELL NO. 1		RRU	RESIDENTIAL RECOVERY UNIT
101	WELL NO. 2		(H)	HISTORICAL BUILDING



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VA MEDICAL CENTER

FUTURE CAMPUS MAP

DECEMBER 24 2012

FIGURE

1-7

Chapter 2 - Basic Planning Data and Water Demand Forecasting

Basic planning data essential for the assessment of the VAMC's water demands is presented in this chapter. This planning information is used to evaluate the existing system and determine future needs based on projected trends for 2018 and 2032. These years correspond to the 6-year and 20-year plans, respectively. Information to be used in the water system analysis for the VAMC includes historical water system demand from 2011. The historical water system demand will be used to project the system's future demand.

Current and Historical Water System Data

The current and historical water system data is described in this section including population and service connections, source water production, and service water use. Source water production and water use data was collected and compiled using VAMC records. Within the body of this plan, water data is reported with respect to gallons.

In this plan, the water demand terms defined by DOH and the VA are used. A brief description of these water demand terms is provided below.

Average Annual Demand (AAD) – The total volume of water delivered to the campus in a full year, expressed in gallons.

Average Annual Domestic Demand (AADD) – The total volume of domestic water delivered to the campus in a full year, expressed in gallons.

Average Annual Irrigation Demand (AAID) – The total volume of irrigation water delivered to the campus in a full year, expressed in gallons.

Average Daily Demand (ADD) – The total volume of water delivered to the campus over a year divided by 365 days, expressed in gallons per day (gpd).

Average Daily Domestic Demand (ADDD) – The daily volume of water used for domestic water (non-irrigated) services on site, expressed in gpd. To obtain this volume, the pump meter readings were reviewed when there was no irrigation taking place (November through April).

Average Daily Domestic Flow Rate (ADDF) – Defined by the VA as 80 percent of the ADDD (gpd) used in 16 hours, or the ADDD divided by 1,200, expressed in gpm.

Average Daily Irrigation Demand (ADID) – Volume synonymous with the Maximum Month's Average Daily Demand (MMAD). To define the volume used for irrigation, the ADDD was subtracted from the MMAD, yielding the ADID in gpd.

Average Daily Irrigation Flow Rate (ADIF) – Defined by the VA as 90 percent of the ADID (gpd) from the peak month used in 10 hours. The timeframe was extended to 14 hours after evaluation of the irrigation clocks and observed irrigation throughout the campus showed landscaped areas being irrigated throughout the afternoon and into the morning hours, making the ADIF equal to the ADID divided by 933, expressed in gpm.

Fire Flow Demand – Defined by the International Fire Code (IFC) as the flow rate of a water supply that is available for firefighting, measured at 20 pounds per square inch (psi) residual pressure. For planning purposes, a flow rate of 4,000 gpm must be available for four hours. The 4,000 gpm is based on the worst case scenario, 8,000 gpm, for a fully sprinklered building being reduced by 50 percent as allowed by the IFC.

Maximum Month's Average Daily Demand (MMAD) – The ADD from the largest volume of water delivered to the system in a given month over the annual period. The MMAD is used to define the Maximum Daily Demand (MDD) when daily readings are not available for a yearly cycle.

Maximum Daily Demand (MDD) – The largest volume of water delivered to the campus in a single day, expressed in gpd. The MDD is commonly used to size facilities to provide capacity for periods of high demand. The MDD usually occurs during the warmest part of the year when irrigation and uses of potable water are at their greatest. In Eastern Washington, DOH utilizes a factor of 1.3 multiplied by the MMAD to define the MDD. This method was used since daily metering was unavailable.

Peak Hourly Demand (PHD) – The maximum volume of water delivered to the campus in a single hour, expressed in gpm. PHD is a combination of Peak Hourly Domestic Flow Rate (PHDF) and Peak Hourly Irrigation Flow Rate (PHIF). To be conservative, an assumption was made that both peaks occurred simultaneously. PHD is defined as the summation of the PHDF and PHIF. Distribution systems should be designed to adequately handle the PHD. During this peak usage, storage reservoirs supply the demand in excess of the supply output. PHD is commonly experienced during the early morning hours when many water users are bathing, cooking, and engaging in other activities requiring widespread water use.

Peak Hourly Domestic Flow Rate (PHDF) – The maximum volume of domestic water delivered to the campus in a single hour, including water serving energy centers, expressed in gpm. The VA defines the PHDF as the ADDF multiplied by three.

Peak Hourly Irrigation Flow Rate (PHIF) – The maximum volume of irrigation water delivered to the campus in a single hour. The VA defines the PHIF as the ADIF multiplied by two.

In addition to water demand parameters, various terms are used and values calculated that are related to water conservation. These water conservation terms are described below.

Non-Revenue Water (NRW) – Water that does not produce any revenues for the system and is equal to the difference between System Input Volume and Bill Authorized Consumption. NRW is further subdivided into unbilled authorized consumption, apparent losses, and real losses.

- **Unbilled Authorized Consumption** – Sum of unbilled meter consumption and unbilled unmetered consumption.
- **Apparent Losses** – Sum of unauthorized consumption, customer metering inaccuracies, and data handling errors.
- **Real Losses** – Sum of leakage on transmission and distribution mains, leakage and overflows at utility's storage tanks, and leakage on service connections up to the point of customer metering.

Population and Service Connections

The current population at the VAMC can be divided into three categories: full-time employees, daily visitors, and temporary residents. The current workforce on the VAMC campus is approximately 400 full-time employees who operate and maintain the campus. Daily visitors are veterans who visit the campus each day. Whenever a visitor checks into a clinic, office, or medical facility, one trip is generated. Each visitor generates a trip every time he or she checks in at a different location. In 2012, the VAMC recorded 113,020 trips. The VAMC is projecting a 20 percent increase in annual trips by 2020. Temporary residents are patients who are temporarily housed on the campus to recover from substance abuse or illness. There are currently 28 temporary residential recovery beds and no permanent residences on the campus.

As of September 2012, the VAMC has a total of 25 connections to its water system. Of the 25 connections, 24 currently serve VA buildings. The remaining connection provides water service to a recreational outbuilding that serves athletic fields located on campus. These athletic fields and outbuilding are leased by the local recreation department for youth sporting events.

Source Water Production

Several years of source water production data (1984 through 1985, 1995, and 1997 through 2011), historically collected by VAMC staff on a monthly basis, was compiled and analyzed. A compilation of the data provided for analysis is attached as Appendix A. Historical evidence shows peaks in water usage in 2001 and 2006. Since the peak in 2006, water consumption has decreased approximately nine percent per year to the current consumption volume of approximately 53.9 million gallons (MG) per year, which is comparable to the 1984 consumption volume of 54.7 MG per year. This decrease is partially due to Executive Order 13423, which required all federal facilities to reduce water consumption by two percent per year until Year 2015, using 2007 as a baseline. Executive Order 13514 extended these consumption requirements through Year 2020 and further required federal facilities to reduce industrial, landscaping, and agricultural (non-potable) water consumption by two percent per year through Year 2020, using 2010 as a baseline. Historical annual water production volumes are provided in Appendix A.

Over the last ten years, the range of water usage has varied from 91.6 MG per year (2001) to 53.9 MG per year (2011). Because of the historic reduction requirements and overall decreasing trend in usage since 2006, only the last year of data (2011) was analyzed (see Table 2-1). This water demand data will serve as the basis for planning in this WSP. Calculations for the source water production were calculated using the VA Site Utility Design Manual, Section 3.2. Due to lack of individual service meters on site, assumptions were made to separate domestic and irrigation flow rates. To define domestic volumes and flow rates, well production records were reviewed when no irrigation was occurring on campus. This time period corresponds to the months of November through April.

TABLE 2-1
Summary of Source Water Production (2011)

Measurement	Demand[1]
AAD, gpy	63,910,000
AADD, gpy	21,790,000
AAID, gpy	32,120,000
ADD, gpd	148,000
ADDD, gpd	60,000
ADID, gpd	347,000
Fire Flow, gpm	4,000
MMAD, gpd	407,000
MDD, gpd	528,000
PHD, gpm	892
PHDF, gpm	149
PHIF, gpm	743

[1] – Rounded, actual values are included in Appendix D

The above values represent a summary of the annual production as it relates to campus-wide usage. The majority of the annual consumption is used by the campus' irrigation system (see Figure 2-2). Due to the lack of water meters throughout the campus, irrigation and domestic demands also include unbilled authorized consumption, apparent losses, and real losses. Consequently, the amount of water demand attributed to irrigation may be less than the amounts calculated and shown in Table 2-1 and Figure 2-2. Once more meters are installed throughout the campus in future projects, the actual volumes will be more definable.

Water Consumption

There are minimal records for service water usage due to the lack of individual meters at each service connection. The VAMC recognizes the need to monitor water usage for individual buildings and plans to implement a service metering plan as part of a future project. There are currently two metered connections on campus that are monitored on a monthly basis.

Water Losses

NRW is defined as the difference between the water supplied by the sources and the water metered and billed for authorized use. NRW includes the following categories:

- **Unbilled Authorized Consumption** – Unbilled metered (multiple sources on campus) and unmetered consumption. The campus has approximately 24 active connections that are currently not metered.
- **Apparent Losses** – Unauthorized consumption (e.g. fire hydrants), customer metering inaccuracies (i.e. old meters), and data handling errors.
- **Real Losses** – Leakage and flushing/testing of water facilities.

Due to the lack of metered service connections on site, current and historical water losses cannot currently be accurately defined.

Equivalent Residential Units (ERU)

Due to the lack of home residential units typical of a municipal water system on site, ERUs were not included in this water study. Instead, water quantities were computed in gallons and are presented in gallons throughout this report.

Projected Water System Data

Water demands are projected into the future using the past records of water produced and water sold along with projected land use, population estimates, and anticipated additional water demand.

The goal of projecting future water demand is not to build larger facilities to accommodate excessive water consumption, but rather to evaluate the capability of existing components and to size new facilities for reasonable demand rates. Large amounts of leakage and excessive water consumption should not be projected into future estimates. Efforts should instead be made to reduce leakage and lost water to a reasonable level and utilize lower, more acceptable demand rates for planning efforts. Water demand projections should be based on acceptable water loss quantities, reasonable conservation measures, and the campus' expected water use characteristics.

There is a degree of uncertainty associated with future water demand projections for any water system. Uncertainties in projections exist because of the estimates used to define the system's current water use and the built-in assumptions made with respect to anticipated growth. The impact of water conservation measures on the campus' future water consumption is also difficult to predict. The VAMC is mandated by Executive Order 13423 to reduce water consumption at all federal facilities by two percent per year through 2015, using 2007 as a baseline. Executive Order 13514 extended these reduction requirements through Year 2020 and further required federal facilities to reduce industrial, landscaping, and agricultural (non-potable) water consumption by two percent per year through Year 2020, using 2010 as a baseline. Projected water usage is discussed later in this chapter.

Figure 2-3 shows the annual water production and estimated irrigation and industrial water usage for all connections to the water system. Industrial water usage is based on using 5,000 gallons of makeup water per day in the Boiler Plant. Irrigation water is approximated by subtracting the ADDD from the water produced during the months of May through October when irrigation is occurring on campus. Projected irrigation flow rates are discussed later in this chapter.

As shown in Figure 2-3, the VAMC is currently meeting the reduction requirements required by Executive Orders 13423 and 13514. Upon completion of the efficiency apartments, the projected water production will increase slightly. The VAMC is therefore anticipating still meeting the consumption reductions mandated by the executive orders.

The following discussion will address projected land use and population within the campus along with projected non-residential and NRW usage in the water system. This information will be utilized to forecast the future water demand for the next six and 20 years.

Projected Land Use

Projected land uses, unless otherwise specifically mentioned, will remain federal property. The VAMC is in the planning phase to transfer approximately 10 acres to the Washington State Department of Veterans Affairs for the construction of an 80-bed Skilled Nursing Facility to serve veterans. This facility

will be state-run with anticipated construction in the next six years. The facility will obtain potable water and fire flow from the City of Walla Walla. The irrigation to the athletic fields will continue. In Year 2015, the VAMC anticipates construction of six multi-tenant apartment buildings for homeless veterans. There will be a total of 40 units which will provide 50 bedrooms. For demand purposes, all bedrooms are assumed to be occupied. Pursuant to DOE Criteria for Sewage Works Design, dwellings use 100 gallons of water per day per person. Based on these values, the total daily usage is anticipated to be 5,000 gallons. These apartments will be leased and operated by Catholic Housing Services of Eastern Washington; the VAMC will retain ownership of the property.

Projected Population

The VAMC is projecting an increase in permanent population upon completion of the efficiency apartments. The population increase will result in approximately 50 new, full-time residents.

Additionally, the VAMC is projecting an increase in the amount of visitors to the campus by Year 2018. The VAMC is not projecting an employee growth rate in the next six years; however, a three percent growth rate by Year 2032 was assumed.

Overall population projections are included in Table 2-2.

TABLE 2-2
Current and Future Populations

Type of Capita	Year		
	2012	2018	2032
VAMC Full-Time Employees[1]	400	400	412
Temporary VAMC Residents	28	36	36
Tenants (Apartment)	0	50	50
Total	428	486	498

[1] – Employee projection is estimated to increase by three percent in 20 years

Projected Water Needs

Future water usage will increase with the addition of significant non-residential users and generally increase with a growing population to support the needs and desires of the general population.

6-Year Plan

Within six years, the campus is anticipating construction of the efficiency apartments. This use will be classified as a residential water need. There are no projected additional non-residential needs at this time. A side effect of dedicating approximately ten acres to the Washington State Department of Veterans Affairs and constructing the efficiency apartments will be a net decrease in the irrigated area on the VAMC campus. Approximately 16 percent of the currently irrigated area will no longer be irrigated, thus reducing the annual amount of irrigation water consumed. A breakdown of the current and future irrigation usage is shown in Table 2-3.

TABLE 2-3
Campus Irrigation Demands

Campus Irrigation	Flow	
	Present (2011)	6-Year Plan (2018)
AAID, gpy	32,120,000	26,960,000
ADD – Based on 184 Days, gpd	175,000	147,000
Peak Month ADID, gpd	347,000	324,000
Peak Month ADIF, gpm	372	347
Peak Month PHIF, gpm	743	694

In addition to the irrigation water savings, a current project is underway to replace existing steam heating lines throughout the campus. Once these lines are replaced, an additional savings of 2,500 gpd of water is anticipated.

Upon completion of the efficiency apartments, and once the projected populations are established on site, there will be an increase in domestic water demands. The efficiency apartments are anticipated to use approximately 100 gallons of water per bedroom per day (5,000 gpd). These values are typical of flow rates provided by DOE's Criteria for Sewage Works Design, August 2008. A breakdown of the anticipated water system demands is shown in Table 2-4.

TABLE 2-4
VAMC Water System Demands

VAMC Water System	Flow	
	Present (2011)	6-Year Plan (2018)
AAD, gpy	53,910,000	49,660,000
ADD, gpd	148,000	136,000[(1)]
ADDD, gpd	60,000	62,000[(2)]
ADDF, gpm	50	52
Average Hourly Demand (AHD), gpm[(3)]	421	399
PHD, gpm[(4)]	892	849

(1) – 136,000 = AAD / 365
(2) – 62,000 = $ADDD_{present}$ + 5,000 – 2,500
(3) – AHD = ADDF + ADIF
(4) – PHD = 3(ADDF) + 2(ADIF)

20-Year Plan

The campus will have available floor space from existing buildings for expansion as new construction occurs on site. This floor space is intended to be for limited use or even mothballed and not used. Since final occupancy and use is not easily defined, a growth factor of 20 percent was added to the 2012 ADDD. This growth rate is in addition to the ADDD that will be factored in for the efficiency apartments.

Future xeriscaping in various landscaped areas on site will reduce the irrigation needs by planting native vegetation that requires minimal or no supplemental irrigation. The VAMC is

anticipating a 20 percent decrease in irrigation demand in the 20-year plan. Projected irrigation flow rates for the 20-year plan are shown in Table 2-5.

TABLE 2-5
Campus Irrigation Demands

Campus Irrigation	Flow	
	Present (2011)	20-Year Plan (2032)
AAID, gpy	32,120,000	21,570,000
ADD – Based on 184 Days, gpd	175,000	117,000
Peak Month ADID, gpd	347,000	259,000
Peak Month ADIF, gpm	372	277
Peak Month PHIF, gpm	743	554

Projected water usage was calculated based on existing water system demands, projected irrigation conservation measures, and campus growth rates. The projected water system demands shown in Table 2-6 include anticipated construction of the efficiency apartments and a 20 percent increase in domestic usage.

TABLE 2-6
VAMC Water System Demands

VAMC Water System	Flow	
	Present (2011)	20-Year Plan (2032)
AAD, gpy	53,910,000	48,630,000
ADD, gpd	148,000	133,000(1)
ADDD, gpd	60,000	74,000(2)
ADDF, gpm	50	62
AHD, gpm(3)	421	339
PHD, gpm(4)	892	740

(1) – 133,000 = AAD / 365
(2) – 74,000 = $ADDD_{present}$ X 1.2 + 5,000 – 2,500
(3) – AHD = ADDF + ADIF
(4) – PHD = 3(ADDF) + 2(ADIF)

Projected Water Loss

The campus does not currently charge any federal facilities on site for water usage and has no plans to charge federal users in the future. Additionally, there are very few service meters on site and examining the existing monthly reports from well production records is necessary to define the volume of water consumed. As part of future projects, the VAMC plans to install water meters on individual service connections throughout the campus to more easily monitor water usages and losses.

Water Demand Forecasting

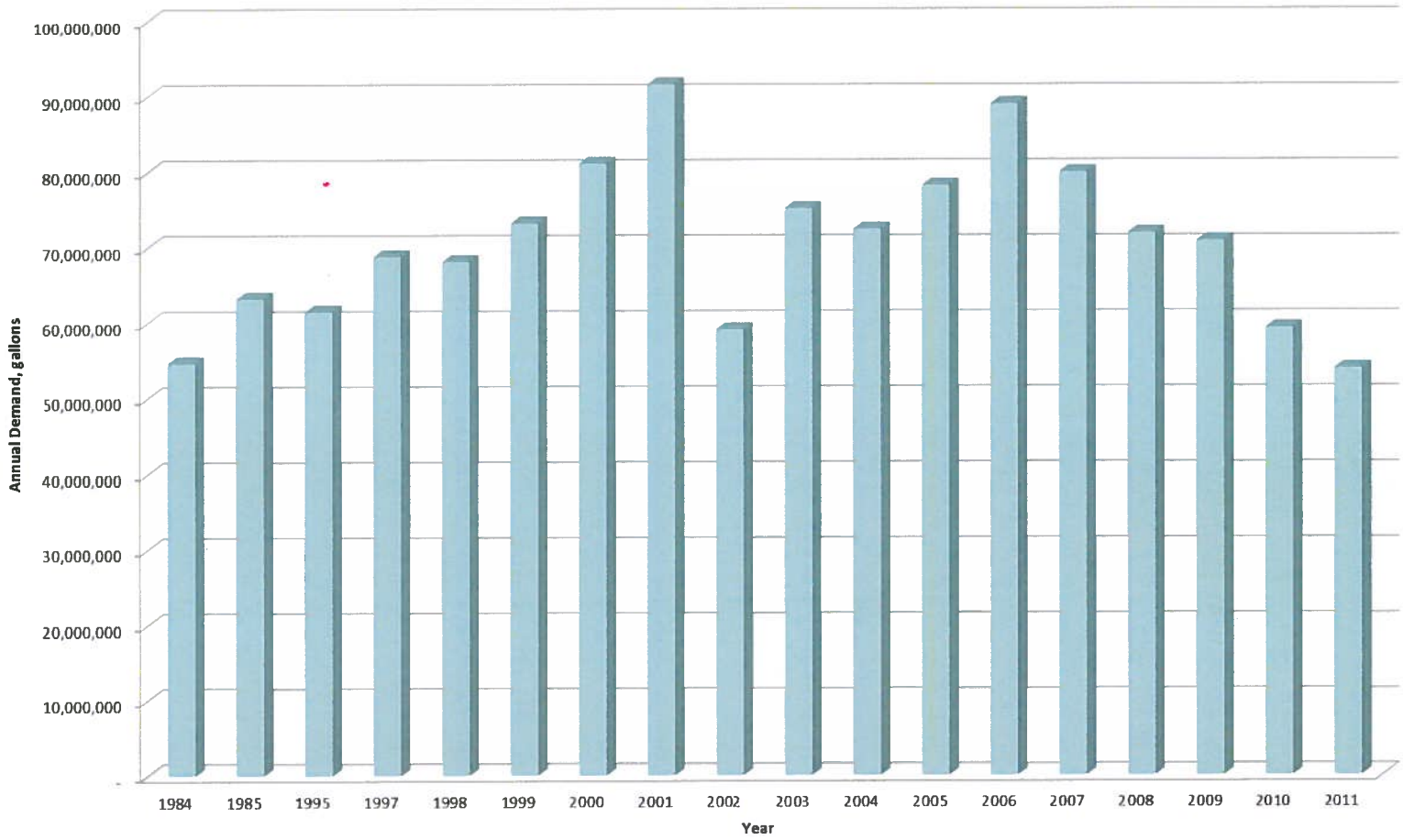
The water system forecasts include projections of future water demand for 6-year (2018) and 20-year (2032) plans, for both PHD and total AAD. These forecasts were compiled to include anticipated campus growth and implementation of irrigation conservation savings. The basis for the water demand forecasts includes the following:

- Projected population growth of three percent and a 20 percent increase in domestic water use by Year 2032. This projected growth and increase in water use are inclusive of all facilities served by the VAMC water system.
- Non-residential water use is not anticipated to increase as there are no planned improvements to the campus.
- The campus is currently implementing measures to conserve water as mandated by Executive Order 13423. Current and planned projects include replacing the steam lines on the campus and incorporating xeriscaping on portions of the campus.

Summaries of the water demand forecasts with anticipated growth and irrigation conservation are presented in Table 2-7.

TABLE 2-7
Water Demand Forecasts

Parameter / Year	2011	2018	2032
Service Population	400	486	498
Water Demand			
AAD, gpy	63,910,000	49,660,000	48,630,000
AADD, gpy	21,179,000	22,700,000	27,060,000
AAID, gpy	32,120,000	26,960,000	21,570,000
ADD, gpd	148,000	136,000	133,000
ADDD, gpd	60,000	62,000	74,000
ADID, gpd	347,000	324,000	259,000
MMAD, gpd	407,000	403,000	347,000
MDD, gpd	528,000	524,000	452,000
ADDF, gpm	50	52	62
ADIF, gpm	372	347	277
AHD, gpm	421	399	339
PHDF, gpm	149	155	185
PHIF, gpm	742	694	555
PHD, gpm	892	849	740



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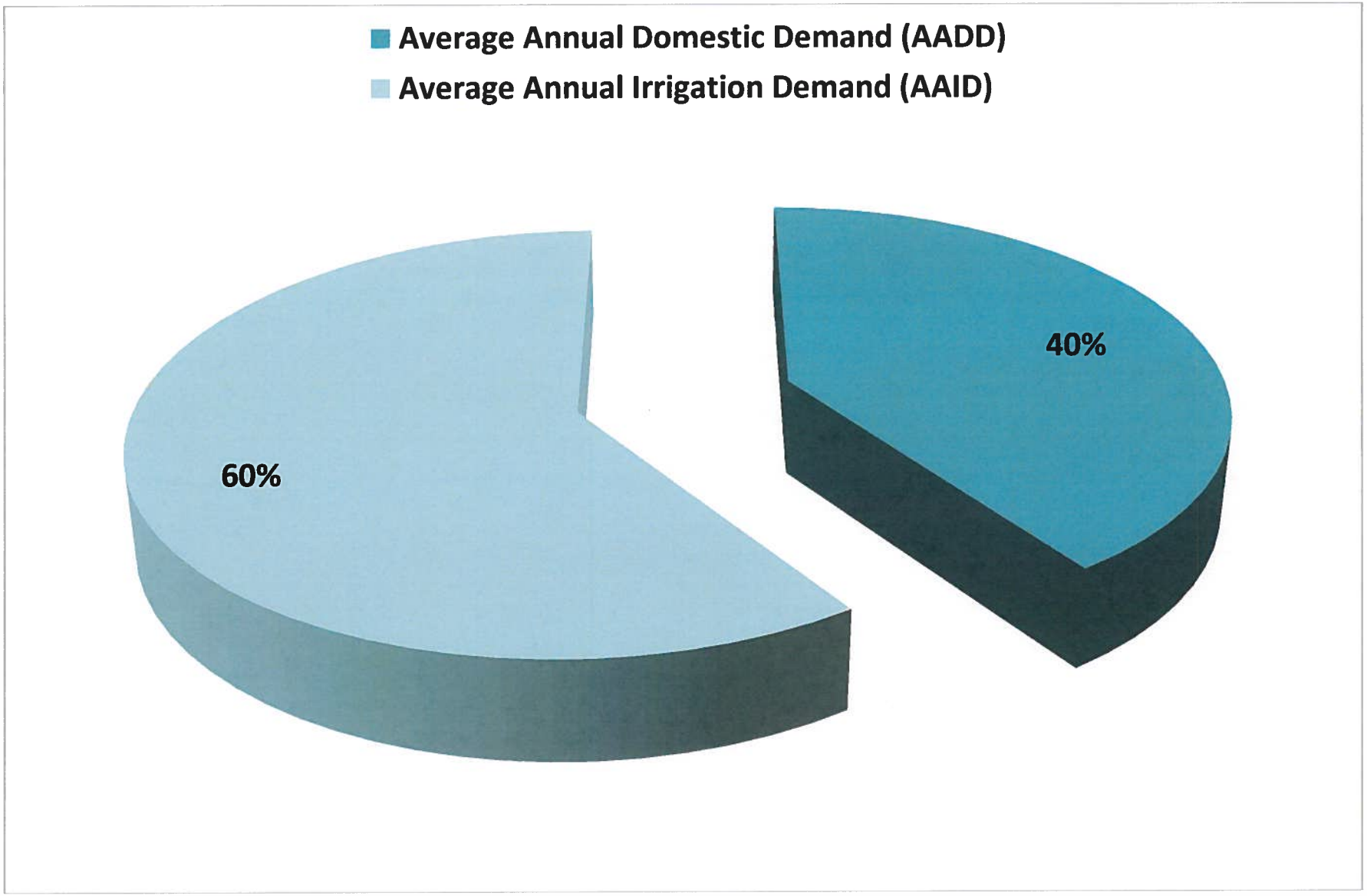
ANNUAL WATER CONSUMPTION

FIGURE
2-1



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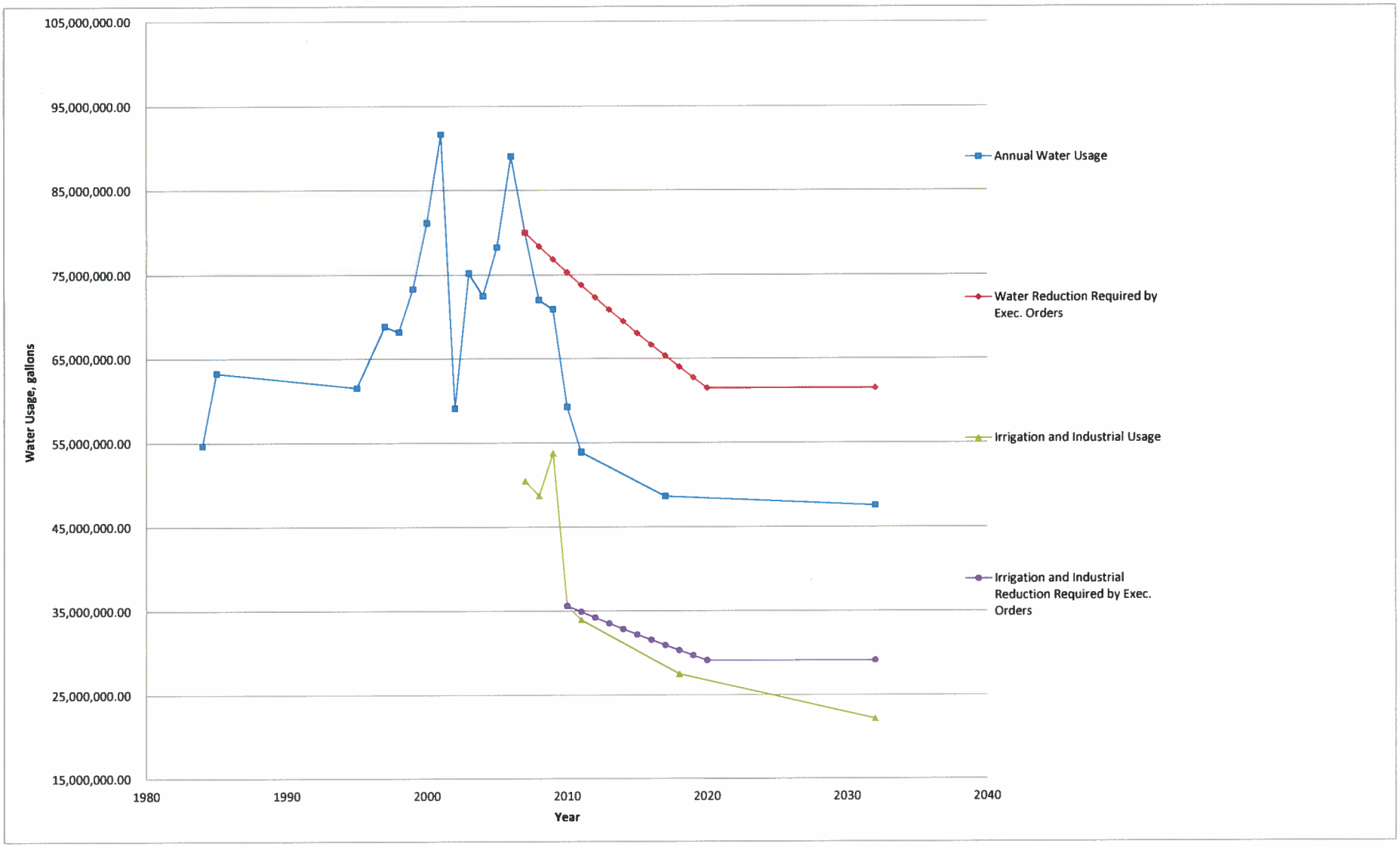
ANNUAL PERCENTAGE OF DOMESTIC AND IRRIGATION DEMAND

FIGURE
2-2



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CURRENT AND PROJECTED WATER PRODUCTION VS. REDUCTION REQUIREMENTS

FIGURE
2-3

Chapter 3 - System Analysis

The campus' water system is described and evaluated on the basis of criteria established by the campus, the State of Washington, the Federal Government, and the drinking water industry. This evaluation is performed to determine whether the existing system facilities are capable of supplying sufficient water quantity and quality to satisfy current and projected water demand given in Chapter 2.

System Design Standards

A summary of the campus' system design standards is given in Table 3-1.

TABLE 3-1
VAMC Water System Design Standards

Parameter	Campus Standard
Water Quality Parameters	As a minimum, water quality is monitored to meet the requirements of Washington Administrative Code (WAC) 246-290-300 and the Federal Clean Water Drinking Standards.
ADD and MDD	ADD and MDD were calculated from monthly well production records provided by the VAMC.
ADDD and Maximum Domestic Daily Demand (MDDD)	ADD and MDDD were calculated from monthly well production records provided by the VAMC using the months November through April during which the campus was not irrigating.
ADDF and PHDF	VA Site Utility Design Manual; Section 3.2.2 – ADDF is determined by assuming 80 percent of the ADDD that occurs in 16 hours (divide ADDD, in gallons, by 1,200). Peak Daily Domestic Flow Rate is three times the average.
ADIF and PHD	VA Site Utility Design Manual; Section 3.2.2 – ADIF is determined based on the ADD during the peak month, assuming 90 percent of the demand occurs over a period of 10 hours. PDIF is two times the average. Based on a review of the campus irrigation patterns, 90 percent of irrigation water was assumed to be used over a 14 hour period.
Storage Requirements	VA Physical Security and Utility Design Manual – Required standby storage (SB) and fire flow demand storage on site. SB shall provide four days of storage for mission critical facilities and seven days of storage for energy center usage.
Fire Flow Rate and Duration	IFC 2009 – 4,000 gpm at 20 psi for four hours.
Minimum System Pressure	VA Site Utility Design Manual; Section 3.3.1 – On-site water system shall provide for the Peak Daily Demand and Peak Hourly Flow Rate at a minimum residual pressure of 50 psi.
Minimum Pipe Size	VA Site Utility Design Manual; Section 3.4.1 – No water main shall be smaller than eight inches. WAC 246-290-230 – Minimum 8-inch diameter for distribution and fire flow unless justified by hydraulic analysis.

TABLE 3-1 (cont.)
VAMC Water System Design Standards

Telemetry Systems	VA Site Utility Design Manual; Section 3.5.3 – All pumping facilities shall be provided with a control system to control the pump operation based on the water distribution system pressure. The location of the pressure transmitters shall be remote from the pumping station to adequately monitor the system pressure and provide redundancy should a transmitter fail. The logic of the control system shall provide for the selection of the most efficient pump operation based on the trending of system demands. The system shall facilitate remote monitoring of the system operation and alarm conditions. The system shall be compatible with the facility's Energy Management and Control System. The system shall provide for manual overrides on the control system for the operation of all pumps.
Backup Power Requirements	VA Site Utility Design Manual; Section 3.5.4 – All water pumps and associated control systems shall be on emergency power.
Valve Spacing	VA Site Utility Design Manual; Section 3.4.2 – Place isolation valves to provide control over a reasonably sized area. In general, a segment of the water distribution system can be isolated without impacting more than one service line and one fire hydrant. Install valves on all fire hydrant branches and at all building service lines. Locate service line valves as close as possible to their connections to the distribution mains. Valves with post indicators shall be set in non-traffic areas. Post-indicator valves that could potentially be damaged by vehicular traffic shall be protected by post bollards.
Hydrant Spacing	VA Site Utility Design Manual; Section 3.4.3 – Place hydrants at a nominal 300 feet spacing and within 150 feet of all fire department connections. The locations shall be along approved fire access lanes or adequate roadways. The location of the hydrants shall comply with National Fire Protection Association (NFPA) 1, Uniform Fire Code, Appendix 1. Appendix C, Fire Hydrant Locations and Distribution, IFC 2003.
Other System Policies	See VA Site Utility Design Manual and Physical Security Manual for VA Facilities.

Water Quality Analysis

The VAMC complies with the provisions of the Safe Drinking Water Act and WAC 246-290. The comprehensive monitoring program is discussed further in Chapter 6.

Source Water

Water from the VAMC's wells is treated with a sodium hypochlorite solution for disinfection purposes prior to entering the distribution system. The sodium hypochlorite is infused into the system via a Clor-Tec On-Site Sodium Hypochlorite Generation System.

Samples from the VAMC's water system have been collected since 1979. The analytical results from the sampling of the VAMC's water system are given on DOH's website. This data was reviewed and evaluated primarily with respect to the following:

- Constituents observed to have concentrations above the State's reporting limits
- Concentrations above the drinking water maximum contaminant limits (MCL)
- Trends of nitrate concentrations over time

There are two sources of water the VAMC uses for the daily domestic needs of the campus, Wells No. 1 and 2. Each source is monitored and the results are submitted to DOH. Water from Wells No. 1 and 2 has historically had concentrations of manganese, sodium, hardness, fluoride, turbidity, and total dissolved solids exceeding the State's Reporting Limits but rarely exceeding MCLs. There was one reported case in 1990 where test results from Well No. 2 measured iron and manganese above MCLs. Follow-up test results since 1990 show the concentrations of both iron and manganese to be under MCLs. Both minerals, however, still remain above the State Reporting Limits.

Nitrate concentrations in Well No. 1 have varied between less than 0.5 milligrams per liter (mg/L (2007) and 3.3 mg/L (2004). Nitrate concentrations in Well No. 2 have varied between less than 0.5 mg/L (2008) and 2.0 mg/L (2003). Annual concentrations reported to DOH are shown in Figure 3-1.

All of the nitrate concentrations observed in the VAMC's wells have been below the State and Federal MCLs for nitrate (10 mg/L). Based on historical nitrate concentrations, there does not appear to be a significant increasing trend of nitrates in either of the wells, as the concentrations are not consistent over the years from one water sample to another. However, it should be noted that the nitrate concentrations in Well No. 2 are a great deal lower than the concentrations in Well No. 1. This is potentially due to Well No. 1's location in an unconfined gravel aquifer that is approximately 100 feet below ground surface. Well No. 2 is much deeper, 550 feet below ground surface, and is located in basalt which confines the aquifer and protects it from pollutant intrusion.

Distribution System

The VAMC water distribution system is tested for coliform monthly. Monthly samples are taken from various locations across campus and submitted to DOH for testing. Test results are presented in an Absence/Presence format. DOH's exceedances reports show one positive test for coliform in 2000. The VAMC reviewed this test and determined the sample was not obtained in accordance with industry standard testing procedures and was contaminated by the person collecting the sample. There have been no additional positive tests for coliform since this instance. A copy of the VAMC's Coliform Monitoring Plan is included in Appendix A.

Corrosion

The majority of the VAMC Water System was installed between 1921 and 1956. Pipe materials for this era were ductile or cast iron. There have been several documented water main breaks within the last few years that have been caused by corroded pipes. In many cases, the existing pipes are so brittle that they break on contact or when the surrounding soils are disturbed.

On several occasions, VAMC staff has observed rust colored water and rust nodules being discharged from the piping. This rust is attributed to various ferrous piping (ductile iron, cast iron, etc.) within the VAMC's system. When hydrant flushing occurs on site, maintenance staff must be on standby to clean clogged water filters that supply water to the VAMC's sensitive medical equipment and laboratories.

Evaluation of Water Quality Related Complaint Records

All water quality complaints are reviewed and investigated by VAMC staff. The investigation of the complaints is documented in an annual report prepared for the VA's Environment of Care Committee

(EOCC). A copy of this report is available at the Office of Facilities Management. VAMC staff indicates the majority of the water quality complaints are related to the rust color of the water.

System Description Analysis

The following sections describe the major components of the VAMC's water system including sources, treatment, storage reservoirs, and distribution system. Each section includes a discussion of the general description and condition of the water system component and a capacity analysis of the VAMC's facilities. System deficiencies are also noted and discussed in each section along with an analysis and discussion of potential improvements to help resolve or eliminate any existing and/or anticipated deficiencies. The identified deficiencies and proposed improvements are provided under the "System Deficiencies" and "Proposed Projects" sections.

Sources

The VAMC relies on two groundwater wells to supply potable and irrigation water to its users: Wells No. 1 and 2. Well No. 1 is located adjacent to Wainwright Drive in Building 99 and Well No. 2 is located in the southeast corner of campus in Building 101. These wells are shown on the VAMC Campus Map on Figure 1-3. The characteristics of the VAMC's wells are summarized in Table 3.2.

TABLE 3-2
VAMC Well Pump Characteristics

Characteristic	Well No. 1	Well No. 2
Status	Primary	Primary
Date Drilled or Redrilled	1980	1982
Approximate Wellhead Elevation from Well Log, feet	870	870
Wellhead Elevation from Campus Map Provided by VAMC	893	900
Well Depth, feet	103	551.5
Rated Capacity, gpm	800[1]	500
SWL from Well Log, feet	844	602
Well Diameter, inches	12 Inside Diameter	12 Inside Diameter
Surface Seal Description	Bentonite	Cement Grout
Pump Type[2]	Submersible	Turbine
TDH[2]	550 gpm at 220 feet	534 gpm at 497 feet
Motor Characteristics[2]	50 Hp	100 Hp

[1] – Estimated based on air test.

[2] – Pump Types, TDH, and Motor Characteristics were taken from the Water System Study prepared by Sorenson and Company, dated April 1987 (Appendix C). No complete records on pump data could be obtained from VAMC records.

Flow rates for each well pump were obtained from Sorenson and Company's 1987 Water System Study. Actual flow rates may vary from the published values. No documentation could be obtained on the existing well pumps other than that published in the previously mentioned report. Evaluation of the wells/pump capacity presented throughout this report assumes the previously published data is accurate. The well pumps appear to be in good hydraulic and operational condition, but the pumps

themselves have not been inspected since their installation. There are visible signs of corrosion inside Building 99 on the aboveground pipes, pump casings, and Clor-Tec system. Building 101 has visible signs of corrosion around the Clor-Tec system. In the summer, both building are noticeably hotter than the outside environment due to poor ventilation and the presence of operating mechanical equipment.

Well No. 1 contains a Sensus W-2000 Magnetic Drive water meter and Well No. 2 contains a McCrometer Propeller Meter. Each meter is read on a bi-weekly basis and the data is collected in a logbook by VAMC staff. In addition to the meters that are manually read, each well also has a SeaMetrics Insertion Paddlewheel Flow Sensor that relays flow rates to the VA regional headquarters in Spokane, Washington. This data, however, has not been integrated into the VA's computer system and is not being monitored or stored. Integration of the wireless SeaMetric Flow Sensors into the VA's computer system is recommended so the sensor's future readings are monitored and compared with the manual readings.

Since the wells were originally constructed, the VAMC has enjoyed sufficient well capacity to serve the campus' needs. The wells typically operate in a lead, lag manner with Well No. 1 typically being the lead well. Based on conversation with VAMC staff, Well No. 1 is the lead because its pump uses less power and is cheaper to operate.

Source Capacity Assessment

In this section, the ability of the VAMC's existing sources to meet current and projected demands is evaluated. Evaluations of the VAMC's source capacity for current and projected water demand are shown in Tables 3-3 through 3-5. For this evaluation, maximum source production from the wells was assumed to be limited to 20 hours per day.

TABLE 3-3
Present Source Capacity Evaluation

Parameter/Year	Present		
	Well No. 1	Well No. 2	Total
Maximum Annual Source Production, gpy[1]	240,900,000	280,670,000	521,570,000
AAD, gpy	-	-	63,910,000
ADD, gpd	-	-	148,000
MDD, gpd	-	-	528,000
MDD, gpm	-	-	366
PHD, gpm	-	-	892
Source Capacity, gpm[2]	550	534	1,084
Capacity Surplus Over MDD, gpm	184	168	718
Daily Source Production – 20 Hours Per Day, gpd	660,000	641,000	1,301,000
Capacity Surplus Over MDD, gpd	132,000	113,000	773,000

[1] – Based on pump running 20 hours per day for the entire year

[2] – From Water System Study (Sorenson and Company, April 1987)

Based on the above parameters, either well is capable of supplying the present MDD demands. The combination of the lead and lag pump capacity exceeds PHD. PHD is based on irrigation and

domestic demand occurring simultaneously with the PHIF being approximately 743 gpm. If one source is offline, VAMC staff may need to shut off the irrigation system until the water tower can refill.

TABLE 3-4
2018 Source Capacity Evaluation

Parameter/Year	2018		
	Well No. 1	Well No. 2	Total
Maximum Annual Source Production, gpy[1]	240,900,000	280,670,000	521,570,000
AAD, gpy	-	-	49,660,000
ADD, gpd	-	-	136,000
MDD, gpm	-	-	364
MDD, gpd	-	-	524,000
PHD, gpm	-	-	849
Source Capacity, gpm[2]	550	534	1,084
Capacity Surplus Over MDD, gpm	186	170	330
Daily Source Production – 20 Hours Per Day, gpd	660,000	641,000	1,301,000
Capacity Surplus Over MDD, gpd	136,000	117,000	777,000

[1] – Based on pump running 20 hours per day for the entire year

[2] – From Water System Study (Sorenson and Company, April 1987)

Based on the above projected parameters for 2018, either well pump is capable of supplying the MDD flow rate. If both wells are in operation, the MDD can be obtained from the sources with no shortages. In the event the lead pump cannot satisfy the demand, the lag pump will turn on and refill the water tower. The combination of the lead and lag pump capacities exceed PHD. PHD is based on irrigation and domestic demand occurring simultaneously with the PHIF being approximately 694 gpm. If one source is offline, VAMC staff may need to shut off the irrigation system until the water tower can refill.

TABLE 3-5
2032 Source Capacity Evaluation

Parameter/Year	2032		
	Well No. 1	Well No. 2	Total
Maximum Annual Source Production, gpy[1]	240,900,000	280,670,000	521,570,000
AAD, gpy	-	-	48,630,000
ADD, gpd	-	-	133,000
MDD, gpm	-	-	313
MDD, gpd	-	-	451,000
PHD, gpm	-	-	740
Source Capacity, gpm[2]	550	534	1,084
Capacity Surplus Over MDD, gpm	237	221	771
Daily Source Production – 20 Hours Per Day, gpd	660,000	641,000	1,301,000
Capacity Surplus Over MDD, gpd	209,000	190,000	850,000

[1] – Based on pump running 20 hours per day for the entire year

[2] – From Water System Study (Sorenson and Company, April 1987)

Based on the above projected parameters, either well is capable of supplying the present MDD volumes and flow rates. The combination of the lead and lag pump capacities exceed PHD. PHD is based on irrigation and domestic demand occurring simultaneously with the PHIF being approximately 555 gpm. If one source is offline, VAMC staff may need to shut off the irrigation system until the water tower can refill.

Storage

The VAMC's water distribution system currently utilizes a 100,000-gallon elevated steel water tower. Due to future construction of the Washington State Department of Veterans Affairs Skilled Nursing Facility, this water tower is scheduled to be replaced on campus. A new 150,000-gallon capacity reservoir is being proposed on site that will provide sufficient SB and operating storage (OS) as required by the VA Site Utility Design Manual and Physical Security Design Manual for VA Facilities. The VAMC has requested on-site fire flow storage required by the VA Site Utility Design Manual and Physical Security Design Manual for VA Facilities be waived due to the available fire flow capacity from the City of Walla Walla. The results presented throughout this WSP assume this waiver will be approved. To obtain fire flow from the City, the existing interties will be modified and a service agreement will be completed between the VAMC and the City of Walla Walla.

Storage Capacity Analysis

The ability of the existing and proposed storage reservoir to meet current and projected water storage needs is evaluated in this section. A system's storage capacity analysis consists of five parts: 1) operational, 2) standby, 3) equalizing, 4) fire flow, and 5) dead storage, if any.

Existing Operational Storage (OS) – The volume of water corresponding to the band of storage between the supply pump on and off levels within the water tower. For the VAMC's existing water tower, this band is 5.3 feet. Due to the reservoir being a cylinder, the operating volume

can be calculated based on the area of the tank multiplied by the difference between the on/off elevations. The existing water tower diameter is 22 feet which provides approximately 380 cubic feet (2,843 gallons) of storage per vertical foot. Based on this volume and an operating height of 5.3 feet, there is approximately 2,014 cubic feet (approximately 15,000 gallons) of OS in the existing reservoir.

Proposed Operational Storage (OS) – For most water level sensors and reservoir tank configurations, a minimum of six inches to one foot of water level for OS is needed. Once the supply pumps are called into operation, the pumps should be operated at least 15 to 20 minutes to prevent excessive cycling. The existing supply pumps have a capacity of approximately 1,084 gpm. The OS for the VAMC's reservoir should be between 15,000 and 20,000 gallons. For planning purposes, a minimum OS volume of 15,000 gallons is utilized in this study. Due to standard reservoir sizes, this volume may be increased once a tank's type and size are determined.

Equalizing Storage (ES) – The water required when the source capacity cannot meet the PHD of the system. The projected PHD for the present, 6-year, and 20-year plans was calculated. An example calculation for the present ES is shown below. ES is calculated as follows but is in no case less than zero:

ES (gallons) = [PHD (gpm) – sum of normal source capacity (gpm)] X 150 minutes

= (888 gpm – 1,084 gpm) X 150 minutes

= -29,400 gallons

The ES capacity for the VAMC was calculated using the PHD of 888 gpm (present), 845 gpm (2018), and 735 gpm (2032). The ES component was calculated to be -29,400 gallons (present), -35,850 gallons (2018), and -52,350 gallons (2032). In all cases, the resulting ES value was negative, therefore, the proposed ES is zero.

Standby Storage (SB) – The amount of storage should sources fail or unusual conditions impose higher demand than anticipated. The SB recommended for water systems with one source differs from water systems with multiple sources. For planning purposes, this study evaluates the SB using both the DOH and the VA methods. Each method is presented below and the most conservative volume is used.

DOH Method – The following equation, with present day demands, is used as required by DOH when multiple sources provide water to the water system. Due to lack of an ERU defined by this report, the 200 gal/ERU alternative was not calculated.

SB (gallons) = (2 days X present ADD) – (1,440 minutes X (sum of all sources – largest capacity source))

= (2 days X 166,000 gpd) – (1,440 minutes X (1,084 gpm – 550 gpm)

= (332,000 gallons) – (1,440 minutes X 534 gpm)

= 332,000 gallons – 768,960 gallons

= -436,960 gallons

When using the current and projected ADD flows, sum of all sources (1,084 gpm combined), and removal of the largest capacity well (550 gpm, Well No. 1), the calculated SB is less than zero for each scenario.

VA Method – The Physical Security Design Manual for VA Facilities contains specific requirements needed for mission critical facilities. In addition to the volumes defined by this manual, the efficiency apartments will be provided with four days of water assuming no curtailment. ADDs for the efficiency apartments were taken from DOE Sewage Works Design Manual for like uses. Present day demands and populations were used in the example calculation below:

Potable Water$_{(present)}$	= 40 gpd/person for 4 days
	= 40 gpd/person X 428 persons X 4 days
	= 68,480 gallons
Industrial Water$_{(present)}$	= ADD for 7 days
	= 5,000 gpd X 7 days
	= 35,000 gallons
Efficiency Apartments$_{(present)}$	= 100 gpd/tenant for 4 days
	= 100 gpd/tenant X 4 days X 0 tenants
	= 0 gallons
Total SB$_{(present)}$	= 103,480 gallons

When using the projected flows using the Physical Security Design Manual for VA Facilities and anticipated flows for planned projects, SB volumes were 103,480 gallons (present), 107,260 gallons (2018), and 109,180 gallons (2032). Using this method, an SB volume of 109,180 gallons is required to provide the necessary SB for the VAMC Water System. For planning purposes, this SB is used throughout this report. SB calculations are included in Appendix D.

Fire Suppression Storage (FSS) – The volume representing the product of the needed fire flow (gpm) and flow duration (hours). For planning purposes, a flow rate of 4,000 gpm must be available for four hours. The 4,000 gpm requirement is derived from the maximum fire flow, 8,000 gpm, for a fully sprinklered building of any construction type. The IFC allows up to a 50-percent reduction for fully sprinklered buildings and the local fire marshal stated a 50-percent reduction will be applied to the required fire flow, reducing the demand to 4,000 gpm. This flow rate will need to be provided for four hours with a minimum operating pressure of 20 psi maintained throughout the system. Based on the Physical Security Design Manual for VA Facilities, this volume must be stored on site. However, the VAMC is proposing to upgrade the existing interties with the City of Walla Walla to convey the fire flow demand at the required pressures. This proposal will eliminate the need to store FSS on site. The VAMC has requested this variance from the VA and anticipates approval.

Dead Storage (DS) – The volume of stored water not available to all consumers at the minimum design pressure in accordance with WAC 246-290-230 / Chapters 5 and 6. In other words, DS is the amount of water needed to provide adequate pressure to all of the system's water users. The dead volume is excluded from the volume provided to meet the OS, ES, and/or FSS volumes. DS may be provided pending the final location, type, and size of the proposed water tower.

Based on the previous calculations, the VAMC does not have the capacity in the existing water tower for the present, 6-year, and 20-year conditions. A summary of the VAMC's storage requirements over the 20-year planning period is summarized in Table 3-6. This table assumes the existing 100,000-gallon water tower will be replaced by a minimum 150,000-gallon water tower within the next six years.

TABLE 3-6
Total Storage Requirements

Year	Storage Volume, gallons						
	OS	ES	SB	FSS[1]	Required Total	Total Available[2]	Surplus
Present	15,000	0	103,480	0	118,480	100,000	-18,480
2018	15,000	0	107,260	0	122,260	150,000	27,740
2032	15,000	0	109,180	0	124,180	150,000	25,820

[1] – *The VAMC has requested a waiver from the VA to allow interties to provide emergency fire flow. The City of Walla Walla is acceptable to this proposal and has sufficient capacity at the intertie locations to provide this service.*

[2] – *Assumes construction of a new water tower within the 6-year plan to replace the existing 100,000-gallon water tower. For planning purposes, a 150,000-gallon tank was used.*

Distribution System

There are two separate water distribution systems on the VAMC campus. Each of these systems is described in detail below.

Potable Water Distribution System

The potable water distribution system provides the entire campus with potable water. Potable water includes domestic water, irrigation water, and water used by the campus' energy centers. The VAMC's potable water distribution system is discussed in Chapter 1 and shown in Figure 1-3. The VAMC's water distribution system is a combination of pipe materials and sizes with installation dating back to 1921. The distribution system consists of 1- to 8-inch diameter pipes. The most prevalent pipe diameter used in the distribution system is six inches. These pipes create a majority of the distribution system and loop around the parade grounds. The second most prominent pipe diameters are 8-inch pipes.

Based on historical records, the water distribution system appears to be constructed of ductile and/or cast iron pipes. Records also indicate a majority of the water distribution system was constructed between 1921 and 1956. There have been miscellaneous improvements since 1956 to repair broken or leaking water mains, but the majority of the system has not been replaced.

A summary of the distribution system pipe size (not including service lines) is given in Table 3-7.

TABLE 3-7
Distribution System Pipe Size and Material Inventory

Pipe Diameter, inches	Length, feet[1]	Percent of Total
4	146	1
6	8,088	73
8	2,831	26
Total	11,065	100

[1] – *Lengths are approximated based on the site map provided by the VAMC. Pipe lengths exclude service connections and unlabeled stubs.*

Current materials of choice for replacement are ductile iron and PVC pipe (C900) based on VA Standard Specifications for lateral mains and copper for service lines. An inventory of the service lines was not completed.

The existing condition of the distribution system is poor based on reports provided by the VAMC. There is a significant problem with pipe corrosion and reliability due to the age of the system.

Fire Protection Main for OPC and RRU

In addition to the potable water distribution system, there is a 10-inch connection to the City of Walla Walla's water distribution system at the Avery/Poplar Street intersection that provides emergency fire flow to the OPC and RRU. This main was constructed in 2011 as part of the OPC construction project which is still underway. This main is not designed to convey potable water and has no domestic or irrigation connections. This is a non-looped main that dead ends at the southwest portion of the campus and does not connect to the VAMC's potable water system. This main provides the required fire flow demand, 1,500 gpm for four hours, to protect the OPC and RRU.

Hydraulic Capacity Analysis

Potable Water Distribution System – Anderson Perry conducted two flow tests on October 4, 2012 to evaluate the existing water distribution system capacity. The two flow tests were conducted at Hydrants No. 5 and 14. Locations of these hydrants are shown on the Fire Flow Test Exhibit in Appendix F. These tests were made during normal operating conditions with no well pumps in operation. Table 3-10 presents the observed and projected flow rates at each hydrant.

TABLE 3-10
Potable Water Distribution System Fire Flow Test Results

Hydrant No.	Static Pressure, psi	Residual Pressure		Observed Flow Rate, gpm	Flow Rate at 20 psi, gpm[2]
		Flowed Hydrant, psi	Residual Hydrant, psi[1]		
5	50	44	46	400	1,193
14	60	51	58	410	2,081

[1] – Residual Hydrant location is shown on the Fire Flow Test Exhibit in Appendix E

[2] – Calculated flow rate at 20 psi is based on the following formula from NFPA 291:

Qr = Qf X (Hr^0.54 / Hf^0.54)

Additionally, a flow test conducted by Cascade Fire on December 3, 2008 calculated the available flow rate at Hydrant No. 6 to be approximately 1,091 gpm at 20 psi. The results of this flow test confirm the available fire flow on site varies but is approximately 1,100 to 2,000 gpm. Variations in the available fire flow at 20 psi are caused by different elevations in the storage tank during each test and the elevation and location of the flowed hydrants relative to the water tower.

Based on the results of the flow tests conducted by Anderson Perry and Cascade Fire, the existing potable water distribution system is not capable of providing the required fire flow plus the MDD of 4,336 gpm.

Fire Protection Main for OPC and RRU – The 10-inch water main that provides fire flow for the OPC and RRU was evaluated for available fire flow at the intertie location with the City of Walla Walla. The VAMC and City of Walla Walla confirmed the layout and sizing provides adequate fire protection, and additional tests are planned upon completion of the construction contract in spring 2013.

System Deficiencies

A number of system deficiencies were identified when evaluating the existing system and comparing projected water system demands to the existing system capabilities. Noted deficiencies included the following:

Potable Water Distribution System

- Existing Buildings 99 and 101, which house Wells No. 1 and 2, respectively, have poor ventilation which results in hot and humid localized atmospheres. This condition promotes corrosion, which was observed in the wellhouses during site investigations.

- The existing 100,000-gallon water tower does not contain sufficient storage as required by the VA Site Utility Design Guidelines and Physical Security Design Manual for VA Facilities.

- A majority of the VAMC Water System was installed between 1921 and 1956. Pipe materials for this era were ductile or cast iron. There have been several documented water main breaks within the last several years caused by corroded pipes. In many cases, the existing pipes are so brittle they break on contact or when the surrounding soils are disturbed.

- VAMC staff has observed rust colored water and rust nodules being discharged from the piping on several occasions. When hydrant flushing occurs on site, maintenance staff must be on standby to clean clogged water filters that supply water to the VAMC's sensitive medical equipment and laboratories. This rust is attributed to various ferrous piping (ductile iron, cast iron, etc.) within the VAMC's system.

- The existing system does not contain service connection meters that monitor building usage. Due to lack of service meters, accurately determining authorized and non-authorized water usage is not possible. Additionally, the lack of meters prevents evaluating the system for leakage.

- Available fire flow demand is approximately 1,100 to 2,000 gpm on the campus. This is below the projected fire flow and MDD which totals approximately 4,336 gpm.

- Interties with the City of Walla Walla are not capable of conveying the fire flow demand plus MDD which totals approximately 4,336 gpm.

- Interties with the City of Walla Walla and the existing potable water distribution system are currently operated by manual shutoff valves that must be opened manually in case of an emergency.

- Wells No. 1 and 2 have existing wireless SeaMetrics meters that are not integrated into the VAMC's data collection software.

- Existing intertie locations are on dead-end mains which may create stagnant water in these locations.

- No current data on the well pumps' capacities or conditions is known.

- Static water level in the wells is unknown.

Fire Protection Main for OPC and RRU

- The main dead ends on site, is not designed to convey potable water, does not loop the OPC and RRU, and does not have a second City of Walla Walla intertie location as required by the current VA Site Utility Design Guidelines.

Proposed Projects

Specific improvement projects have been identified based on the preceding analysis and additional hydraulic modeling of the system at Year 2032 conditions (see Appendix D). Proposed improvement projects to correct the system deficiencies noted above are summarized in this section. Capital costs to complete each project are presented in Chapter 8.

Prioritized Improvements

The identified water system improvements were assigned into one of three priority groups with Priority 1 being the most critical projects and Priority 3 being long-term projects. Assignment of a

particular improvement into a specific priority group was based on a consideration of the following: identified health concerns, regulatory non-compliance, potential improvements to water use efficiency (WUE) (i.e., reduce leakage) and system operation, coordination with other infrastructure improvement schedules (i.e., repaving or chip sealing a street), improvement financing, and projected growth. Higher priority was given to those improvements that address identified health concerns and regulatory non-compliance.

A brief description of each priority group and the types of projects within each group is provided below.

Priority 1 – Projects considered the most critical to be undertaken as soon as funding can be made available. These projects are scheduled for completion within the next six years and include improvements to maintain the quality of the system, maintain health guidelines, bring the system into regulatory compliance (both short-term and/or long-term solutions), increase fire flow, and conserve water.

Priority 2 – Projects to be completed as funding becomes available. These improvements include further system improvements to upgrade the existing system, increase fire flow, bring the system into regulatory compliance, and conserve water.

Priority 3 – Projects to be implemented as needed to conserve water, address new development, and upgrade the existing system operation and function. These projects are not considered critical but would improve system efficiency and operation.

The priority groups were presented and discussed with the VAMC Resident Engineer, Tim Anderson, and his input was used to prioritize the projects.

Priority 1 Projects

Construct New Water Tower – Because the location of the future Washington State Department of Veterans Affairs Skilled Nursing Facility conflicts with the existing water tower location, the new tower will be built in a different location. A preliminary location is situated between Wells No. 1 and 2. The exact location will be determined during the design phase of the project. The new water tower and any necessary connections should be made prior to the Washington State Department of Veterans Affairs Skilled Nursing Facility construction which is tentatively scheduled for 2013 through 2014.

The existing 100,000-gallon water tower does not meet the physical capacity needs required by the VA design guidelines. As discussed previously in this chapter, the physical capacity of the new water tower needs to be a minimum of 150,000 gallons. Site improvements will consist of new water main construction to connect the existing water main to the new water tower and demolition/decommissioning of existing water system improvements that will be offline.

Improve Water Distribution System Flow Capacity – The existing water main system is capable of providing approximately 1,100 to 2,000 gpm of water for fire protection. Prior to construction of the Washington State Department of Veterans Affairs Skilled Nursing Facility, the water distribution system should be upgraded to convey the required fire flow, estimated to be 4,000 gpm, plus PHD, approximately 992 gpm. To provide sufficient fire flow demand and pressures, the existing interties with the City of Walla Walla and potable water distribution

system should be upgraded to convey this demand. This can be accomplished by converting the 10-inch main into a potable water main and connecting it to the existing potable water distribution system. A new 12-inch main will connect to the 10-inch stub and run along the south edge of the parade grounds down Wainwright Drive and connect back into the City of Walla Walla's water distribution system at Intertie No. 2. This intertie will be upgraded so the required fire flow plus PHD will be available through Interties No. 2 and 3. A conceptual routing of the new water mains and future water tower location is shown on Figure 3-2. Both connections should have a minimum of one backflow preventer and an automatic valve that opens when triggered. Triggers may include system pressures and/or the water elevation in the water tower.

Perform Pump Tests – Pump tests should be conducted to determine the pump curves for each pump. These tests should be conducted during the design of the water tower.

Priority 2 Projects

Install Service Connection Meters and Replace Remaining Potable Water Distribution System – The VAMC should install Service Connection Meters across campus. Installation of these meters will allow the campus to accurately monitor water usage at individual service connections. Currently, the number of service connection meters on campus is insufficient to evaluate campus water usage and potential water losses. Installation of these meters is critical in evaluating the campus water usage.

In addition to upgrading the potable water distribution system to convey the required fire flow demand as recommended in the Priority 1 projects, the remainder of the mains should be replaced due to their existing condition. Replacing the remainder of the VAMC's potable water distribution system will reduce undocumented system leaks and provide a more dependable system.

Priority 3 Projects

Wellhouse Maintenance and Improvements – The existing wellhouses are poorly ventilated which create corrosion issues due to the hot and humid atmosphere, lack of air circulation, and presence of corrosive salts used to chlorinate the source water. These conditions have caused visible corrosion of metallic materials inside the wellhouses. The VAMC has noticed the power supplies in the Clor-Tec water quality units have failed in the most humid wellhouse, Building 101. This causes the well to be taken offline until the power supply can be replaced. Installation of ventilation equipment and/or air conditioners is recommended to keep the wellhouses cooler in the hot summer months when the pumps are used more frequently. Existing heaters installed inside the wellhouses should continue to be operated in winter months to prevent freezing conditions.

In locations where visible corrosion has occurred, a thorough cleaning of the corroded surfaces is recommended to remove loose debris, followed by the application of a corrosive resistant finish. Equipment and materials that have corroded beyond repair should be replaced. Portions of this recommended project are currently under design as part of VA projects 687-11-011 and 687-12-001. Items not addressed in these two projects should be considered to improve the system lifespan.

Data Collection and Recording – Well No. 1 contains a Sensus W-2000 Magnetic Drive water meter and Well No. 2 contains a McCrometer Propeller Meter. Each meter is read on a bi-weekly basis and the data is collected in a logbook by VAMC staff. In addition to the meters that are manually read, each well also has a SeaMetrics Insertion Paddlewheel Flow Sensor that relays flow rates to the VA regional headquarters in Spokane, Washington. This data, however, has not been integrated into the VA's computer system and is not being monitored or stored. Integration of the wireless SeaMetric Flow Sensors into the VA's computer system is recommended so the sensor's future readings are monitored and compared with the manual readings. This will provide an early warning to staff if one of the meters is not calibrated correctly or experiences a mechanical failure.

Well Water Level Monitoring – Installation of equipment and implementation of a program that will monitor water levels in each well is recommended to assist in long-term planning. Additionally, the VAMC should record and document these readings on a monthly basis.

The purpose of such monitoring is to provide the purveyor the ability to determine if, and the extent of, any trends showing decreased capability of the aquifer, or a specific well, to provide water for utility services on an ongoing basis.

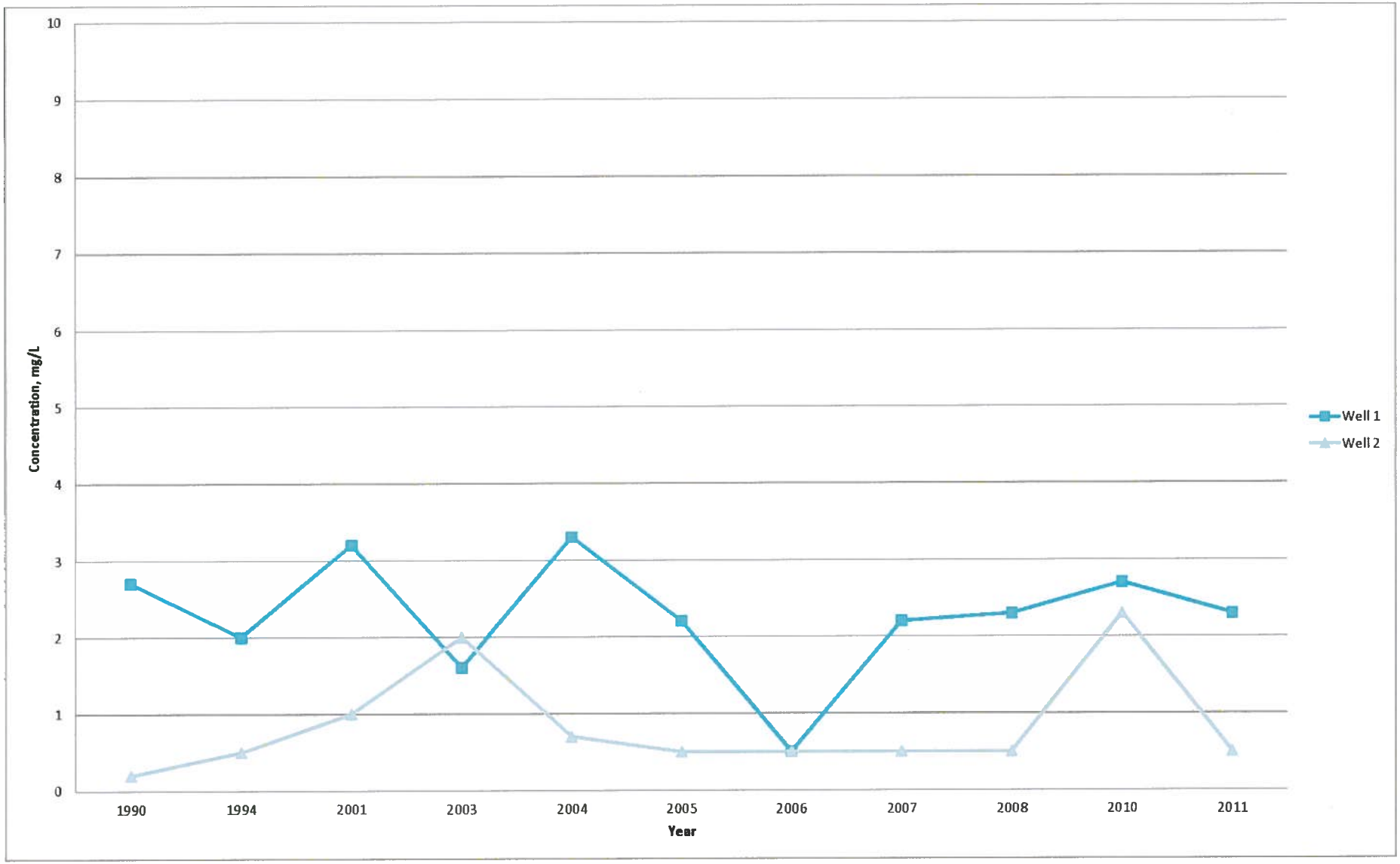
Summary of System Deficiencies and Proposed Improvements

The system deficiencies and proposed improvement projects are summarized by priority group in Table 3-9. The improvements are prioritized within each priority group as coordinated with the VAMC Resident Engineer. These and other program improvements are summarized in Chapter 8.

TABLE 3-9
Summary of System Deficiencies and Proposed Projects

No.[1]	System Improvement/Deficiency
Priority 1 Projects	
R-1	Construct New Water Tower – Required to meet VA storage requirements
D-1	Improve Water Distribution System Flow Capacity – Required to convey fire flow demand
S-1	Perform Pump Tests – Test well pumps to determine capacity
Priority 2 Projects	
D-2	Install Service Connection Meters and Replace Remaining Potable Water Distribution System – Allows staff to analyze losses in system and prevents undocumented losses
Priority 3 Projects	
S-2	Wellhouse Maintenance and Improvements – Reduces potential for source failure
S-3	Data Collection and Recording – Provides redundant metering and provides data beyond what the manual meters are capable of providing
S-4	Well Water Level Monitoring – Allows VAMC to evaluate aquifer and future water source availability

[1] – S – Source, R – Reservoir, D – Distribution



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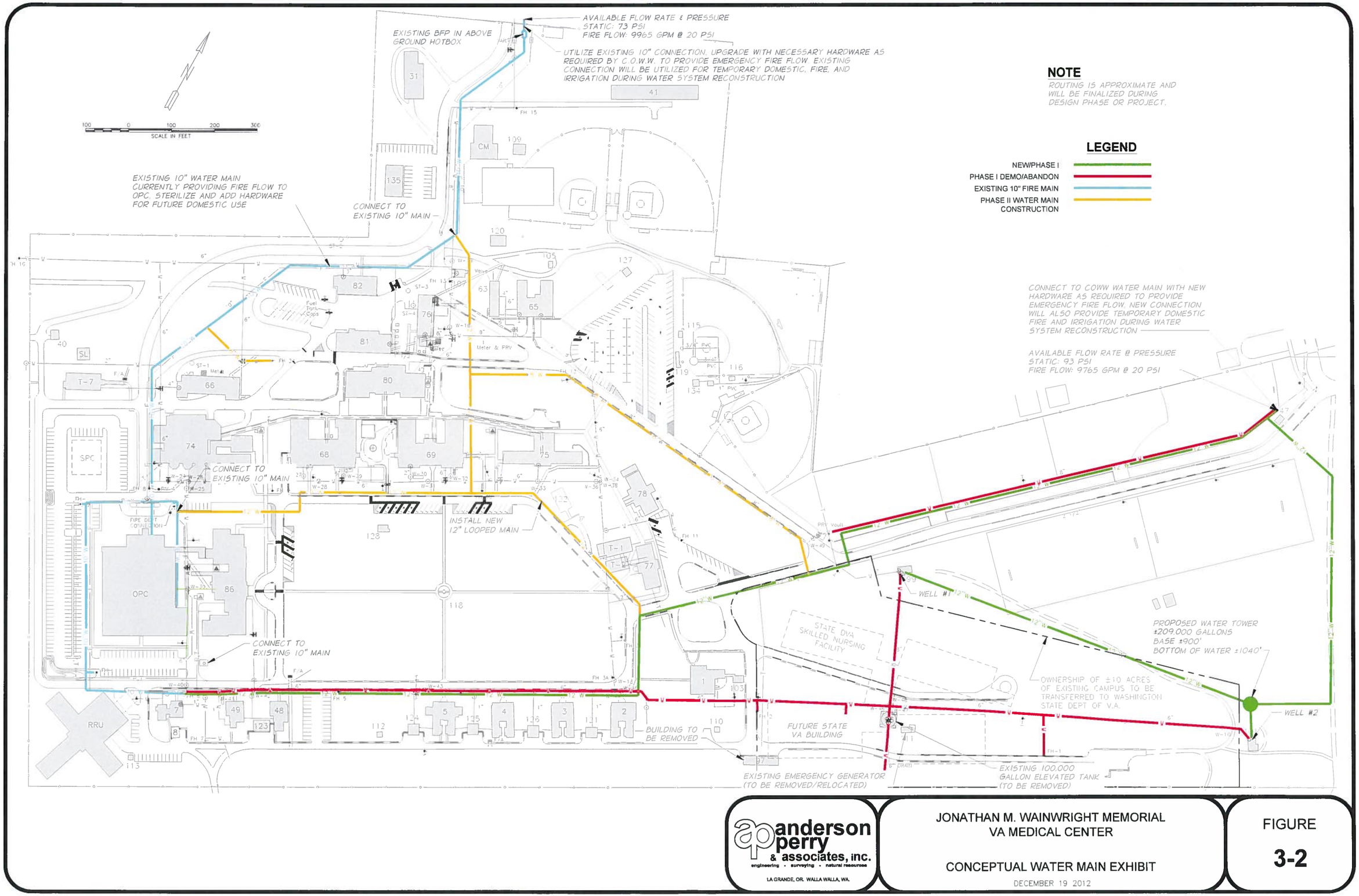
NITRATE-N CONCENTRATION VS. YEAR

FIGURE
3-1



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CONCEPTUAL WATER MAIN EXHIBIT

DECEMBER 19 2012

FIGURE
3-2

R:\Clients\Architects West\6006-42 VAMC - Water Study\DWG\Water System Plan\Figures\Figure 3-2 Water Main.dwg, 12/19/2012 2:06:56 PM

Chapter 4 - Conservation Program, Water Right Analysis, System Reliability, and Interties

The objective of this chapter is to describe the VAMC's water conservation program, existing water rights for future needs, system reliability and function, and existing and proposed interties.

Although the water distribution system is a federal facility, the elements mentioned below should be incorporated so VAMC staff can evaluate the water distribution system. Previous sections have identified the need for the VAMC to incorporate these elements into their water system monitoring program. Once planned and suggested projects are incorporated, these elements can be evaluated and a thorough analysis of the water distribution system will be possible.

Water Conservation Program

Water conservation measures consist of practices and activities that result in any beneficial reduction in water losses, waste, use, or demand. Efficient use of water benefits the water purveyor, its customers, the environment, and public health by improving water quality, maintaining aquatic ecosystems, reducing water system expenses and needed upgrades, and protecting water resources.

Conservation requirements set by the federal government for federal facilities are described in two executive orders. Executive Order 13423 requires all federal facilities reduce the overall water consumption by two percent per year until 2015, using 2007 as a baseline. Executive Order 13514 extends this conservation requirement for an additional five years. Executive Order 13514 also requires federal facilities to reduce industrial, landscaping, and agricultural (non-potable) water consumption by two percent per year, through Year 2020, using 2010 as a baseline. As discussed in Chapter 3, water use at the VAMC has decreased approximately nine percent per year since 2006 primarily by reducing irrigation clock times and replacing outdated water cooled appliances.

Additionally, conservation requirements for the State of Washington are described primarily in DOH's WUE Rule Guidebook (2011). The main elements of DOH WUE rules include Water Metering and Data Collection Requirements, Water Demand Forecasting, Distribution System Leakage (DSL) Standards, WUE Program Elements and Goals, and Submission of Annual Performance Reports. Although the VAMC, as a federal facility, is not required to meet DOH's WUE requirements, some reference and terminology will be used in discussing the VMAC's conservation program.

Water Metering and Data Collection

The VAMC currently meters both of its wells with a Sensus W-200 magnetic drive meter in Well No. 1 and a McCrometer propeller meter in Well No. 2. These meters are read on a bi-weekly basis and the readings are stored in a logbook on site. Each source is also equipped with a SeaMetrics flowmeter that wirelessly transmits data to the VA regional offices in Spokane, Washington. This data has not been integrated into the VA's monitoring system and is currently not being utilized. Both of these wells are located in the Water Resource Inventory Area (WRIA) 32. The City of Walla Walla obtains their water from WRIA 32 which is supplied to the VAMC through the interties.

There are outdated meters on Interties No. 1 and 2. Intertie No. 3 is for fire flow only and is currently not metered. The City interties will be upgraded and meters installed.

Not all of the services connected to the water distribution system are metered. The VAMC recognizes the need to install service meters and plans to incorporate these meters into future construction projects. While the VAMC does not have a formal timeline for when all service connections will be metered, new service meters would be installed along with the new proposed water main installations.

Distribution System Leakage (DSL)

DSL is defined as the difference between the amount of water produced and the amount of authorized water consumption. All unauthorized water use and any water that cannot be tracked, whether authorized or unauthorized, is considered DSL. The State has set a DSL standard of 10 percent (quotient of authorized consumption and water production) as the target for all municipal water systems. Water systems with DSL values over 10 percent are considered excessive and are required to implement Water Loss Control Action Plans to minimize water leakage within the system.

Because of the lack of service connection meters on site, an accurate calculation of the VAMC's DSL is not possible at this time. Once meters are installed at all of the service locations, the VAMC's DSL can be calculated.

Water Conservation Program Elements and Goals

The water conservation program elements and goals establish the framework for the VAMC to implement cost-effective water conservation measures. The VAMC's water conservation program elements and goals, including historical and current water conservation activities and evaluation of identification and various water conservation measures are discussed below.

Historical and Current Water Conservation Activities

In June 2005, the VAMC adopted the Green Environmental Management System (GEMS) which guides and encourages VA staff to be good stewards of the environment. The GEMS system is directed to prevent pollution, reduce waste, and conserve energy, water, and natural resources. GEMS is overseen by the VAMC's EOCC and Energy Committee whose goals are to reduce energy/natural resource consumption.

In the last five years, the VAMC has replaced multiple water cooled HVAC units in Building 74 and Building 80, removed water cooled ice making machines from campus, and reduced irrigation clock water cycle times.

The VAMC is currently in the process of replacing old steam lines throughout the campus which is estimated to conserve approximately 2,500 gallons of water per day.

Like any municipal purveyor, the VAMC repairs observed leaks in the water system and replaces old water mains and service lines as needed.

Water Conservation Requirements

As previously discussed, the VAMC has been complying with Executive Orders 13423 and 13514 to reduce water usage on campus.

Water Conservation Measures

The following measures are recommended to improve water conservation on campus:

- Continue bi-weekly readings of the well production meters.
- Ensure all interties are properly metered. Interties No. 2 and 3 will be upgraded with new meters as part of a future planned project.
- Install meters on all services.
- Upgrade the telemetry database for the SeaMetrics source meters to report and archive data from these meters. The meter data could be used to evaluate flow demand and to compare with the manually read source meters to determine if the source meters are calibrated.
- Calibrate the production meters, if necessary, or as recommended by the manufacturer.
- Install new water mains and service lines. Replacement of the water distribution system is necessary to convey the fire flow demand. The existing mains and service lines are very old and likely in poor condition. Once the water distribution system is replaced, system leakage will be minimized.
- Repair known water leaks in the system and document repairs on a map of the water system.
- Continue implementation of GEMS. Perform monthly and annual water audits of the system. This measure would be implemented in the future with the installation of meters on all services, which is needed to accurately compare water production with consumption and to determine DSL in the system.
- Provide water conservation information to staff on a quarterly or annual basis. Potential topics of discussion include detecting water leaks, water curtailment activities in times of emergency, water use on campus, VAMC's conservation goals, and general conservation awareness.
- Continue implementing measures to comply with Executive Orders 13423 and 13514.

Summary

A summary of the conservation measures or activities the VAMC plans to implement to improve water conservation is presented in Table 4-1 with a description of the measure or activity, schedule or start date, and activity (i.e., in compliance, planned project, etc.). The intent of these measures and activities

is for the VAMC to continue to meet the water reduction requirements mandated by the federal government.

TABLE 4-1
Summary of VAMC's Water Conservation Program

Measure/Activity	Start Date	Activity
Continue bi-weekly reading of well production meters.	N/A	In Compliance
Install meters at Interties No. 2 and 3.	2013 - 2014	Planned Priority 1 Project
Install new meters on previous unmetered services.	2013 - 2018	Initiate Meter Installation; Recommended Priority 2 Project
Upgrade data recording software that is compatible with the wireless source meters.	As Funding Is Available	Recommended Priority 3 Project
Calibrate production meters, if necessary, or as recommended by the manufacturer.	2013 - 2018	As Required
Install new water mains and service lines.	2013 - 2014	Planned Priority 1 Project
Repair leaks and start documenting repairs on water system map.	Ongoing	Repairs Made as Needed; Water Repair Map will Provide Pictorial History of System Leaks
Continuation of GEMS	N/A	Continuing Existing Program
Perform monthly and annual water audits of system.	2013 - 2018	Dependent on Metering of All Services
Provide water conservation information to staff.	Ongoing	Quarterly or Annual Basis Using GEMS and Other Means
Executive Orders 13423 and 13514 establish water reduction requirements.	Ongoing Since 2008	In Compliance

Water Supply Characteristics and Analysis

The purposes of the source of supply analysis are to evaluate opportunities to obtain or optimize the use of existing sources already developed and evaluate other innovative methods to meet water needs. As discussed in Chapter 3 and in more detail in the "Water Right Evaluation" section below, the VAMC has sufficient water rights to meet the 6- and 20-year water demands.

Interties

The VAMC currently has three interties with the City of Walla Walla's water distribution system. These interties provide the VAMC with fire flow in the event of a fire on campus. All interties with the City of Walla Walla supply emergency water only and are not intended to supply domestic or industrial water to the VAMC. In the event that on-site wells are down, the VAMC will have the ability to use the interties to supply potable water to the campus. Each intertie will be metered so the City can charge the VAMC for water usage. Service agreements with the City of Walla Walla are being pursued, but there are currently no agreements in place.

Intertie No. 1 – This intertie is located at the intersection of Poplar and Avery Street and connects the VAMC's potable water distribution system to the City of Walla Walla's water distribution system. This intertie is an 8-inch diameter pipe with a manual valve that is normally closed. The valve is only opened during an emergency when fire flow and/or emergency potable water is needed on campus.

Based on the City of Walla Walla's Geographic Information System (GIS), water pressures and availability at this location are 73 psi static and 9,965 gpm at 20 psi. Downstream of this intertie is an above grade backflow preventer and pressure reducing valve (PRV) which are owned and operated by the VAMC. This intertie is currently connected to the potable water system via a 6-inch water main. As part of a future project, this intertie will be abandoned.

Intertie No. 2 – This intertie is located at the intersection of Wainwright Drive and Chestnut Drive and is an 8-inch diameter pipe with a manual valve that is normally closed. The valve is only opened during an emergency when fire flow and/or emergency potable water is needed on campus. Based on the City of Walla Walla's GIS, water pressures and availability at this location are 93 psi static and 9,765 gpm at 20 psi. Downstream of this intertie is an above grade backflow preventer and PRV which are owned and operated by the VAMC. As part of a future project, this intertie will be upgraded to a 12-inch connection to improve flow characteristics. The existing backflow preventer and PRV will be replaced and the manual valve will be replaced with an automated valve. This automated valve will normally be closed, but will open to supply emergency fire flow and/or emergency potable water to the VAMC when system pressures and/or reservoir levels reach critically low elevations. This intertie is currently connected to the potable water distribution system via an 8-inch water main.

Intertie No. 3 – This intertie is located west of Intertie No. 1 and is a 10-inch dedicated fire main that dead ends just past the RRU and OPC buildings. There are no current service connections connected to the main. Water pressures and availability at this location are 73 psi static and 9,965 gpm at 20 psi (City of Walla Walla GIS). In series, above grade backflow preventers are located downstream of the intertie in a hot box. As part of a future project, upgrading this main and intertie is recommended to convey potable water and connect to the VAMC's potable water distribution system.

Artificial Recharge

There are no current opportunities for artificial recharge with surface and other available water in the project area.

Use of Reclaimed Water, Reuse, and other Non-Potable Sources

The VAMC currently does not use reclaimed water, reuse, and other non-potable sources for domestic or non-domestic uses.

Water Right Evaluation

In this section, the VAMC's existing water rights are identified and discussed. The VAMC has a federal reserved water right, which is a unique right in that it may be used without the benefit of a state-issued water right. The following is a brief overview of the VAMC's water right. This water right is further discussed in a November 13, 2013 email from Ms. Victoria Leuba of the DOE, which is located in Appendix A.

The VAMC's federal reserved water right allows the facility to use any quantity of water required to meet the mission of the campus as long as the property is in federal ownership and the mission does not change. This type of water right does not have quantification limits; VAMC may use as much water as is needed and beneficially used to meet the campus mission. Two limitations on this federal reserved water right are that the VAMC has a right to water required to meet its mission as long as 1) the property is in federal ownership and 2) the mission of the campus does not change. One implication of these limitations is if the VAMC sells

property to the Washington State Department of Veterans Affairs for their Skilled Nursing Facility, the VAMC would not be able to provide the nursing facility with water under its federal reserved water right.

A summary of the VAMC's existing water rights, existing consumption, and forecasted consumption is presented in Tables 4-2 and 4-3. Since quantification of the federal reserved water rights is not required, there are no quantifiable values under the water right status columns in these tables.

TABLE 4-2
Existing Water Rights Status

Certificate or Permit	Source	Use	Existing Water Rights		Existing Consumption		Current Water Right Status	
			Maximum					
			Instant. Flow	Annual Volume	Instant. Flow	Annual Volume	Instant. Flow	Annual Volume
			Qi, cfs	Qa, ac-ft	Qi, cfs	Qa, ac-ft	Qi, cfs	Qa, ac-ft
Federal Reserved Water Right	Surface or Groundwater	Beneficial Use to Meet VAMC's Mission	Quantification Not Required		1.03	185.5	Quantification Not Required	
		Total	–		**1.03**	**185.5**	–	

TABLE 4-3
Forecasted Water Right Status

Certificate or Permit	Source	Use	Existing Water Rights		Existing Consumption		Current Water Right Status	
			Maximum					
			Instant. Flow	Annual Volume	Instant. Flow	Annual Volume	Instant. Flow	Annual Volume
			Qi, cfs	Qa, ac-ft	Qi, cfs	Qa, ac-ft	Qi, cfs	Qa, ac-ft
Federal Reserved Water Right	Surface or Groundwater	Beneficial Use to Meet VAMC's Mission	Quantification Not Required		0.87	200.7	Quantification Not Required	
		Total	–		**0.87**	**200.7**	–	

Water System Reliability Analysis

The purpose of this analysis is to summarize efforts being undertaken to ensure an adequate quantity of water can be provided at all times.

Summary of System Reliability

Source Reliability – Source reliability relates to the dependability of drinking water sources to provide an adequate or desired quantity of water over a given period of time. The VAMC has two source wells; Well No. 1 is tapped into the shallower unconfined gravel aquifer, and Well No. 2 is tapped into the deeper confined basalt aquifer. There are concerns with the water quality of Well No. 1 since its location in an unconfined aquifer causes it to be more susceptible to pollutants infiltrating from the ground surface.

Records indicate the Well No. 1 pump was installed in 1977 and was relocated in 1980 to the new Well No. 1 location. The Well No. 2 pump was installed in 1982 when the well was drilled. The condition of the existing pumps is currently unknown.

Water Rights Adequacy – The VAMC has a federal reserved water right. This water right allows the facility to use any quantity of water required to meet the mission of the campus.

Facility Reliability – Facility reliability relates to the dependability of the water system facilities, such as pumps, storage tanks, and water mains, in delivering the desired quantities of water over given periods of time.

Source – Source reliability is discussed in the above portion of this section.

Storage Tanks – The existing 100,000-gallon water tower is in fair condition but does not contain sufficient storage as required by the Site Utility Design Manual and Physical Security Design Manual for VA Facilities.

Treatment – Each source contains an existing Clor-Tec water quality unit that disinfects water prior to its entering the distribution system. Based on discussions with VAMC staff, the systems are reliable, but the power supplies have a tendency to fail. The VAMC has attributed the power supply failures to the localized atmosphere inside the wellhouses which tend to be very hot and humid in the summer months. During this downtime, the VAMC must take the untreated source offline until the Clor-Tec unit can be repaired. If both Clor-Tec units were down simultaneously the VAMC would have to rely on storage water in the water tower or would need to utilize the City interties to supply potable water to the campus until the sources can be treated.

Distribution System – A majority of the VAMC water system was installed between 1921 and 1956. There have been several documented water main breaks within the last several years caused by corroded pipes. VAMC staff has observed rust colored water and rust nodules being discharged from the piping on several occasions.

In addition to the age and condition of the existing water distribution system, there is insufficient capacity to provide for planned fire flow plus MDD. The existing system is capable of providing approximately 1,100 to 2,000 gpm fire flow which is constrained by the existing water main sizes. The planned fire flow of 4,000 gpm plus the MDD_{2032} is approximately 4,313 gpm.

Water Supply Failure Contingency Plan

If the VAMC water distribution system experiences a water shortage, the VAMC can implement a water curtailment plan. This curtailment plan will ensure mission critical facilities have a minimum of four days of potable water supply and that energy centers have a minimum of seven days of potable water supply. In the event the well sources on site are offline, the VAMC can utilize the City of Walla Walla interties to supply water and resume normal operating conditions, but the VAMC will be charged a fee to use the City's water. The VAMC's water supply failure contingency plan is included in Appendix B.

Monitoring of Well Levels

The VAMC does not monitor the SWLs at Wells No. 1 and 2. Installation of equipment and implementation of a program to monitor water levels is recommended to assist in long-term planning. Additionally, the VAMC should record and document the water levels in all of its wells on a monthly basis.

The purpose of such monitoring is to provide the VAMC with the ability to determine if, and the extent of, any trends that show decreased capability of the aquifer, or a specific well, to provide water for utility services on an ongoing basis.

Chapter 5 - Source Water Production

The VA's program for protection of its source waters used for potable water at the VAMC water system is discussed in this chapter. The purpose of the source water, or in the VA's case, Wellhead Protection Program is to identify, monitor, limit, and control (to the extent feasible) all facilities and activities that may adversely impact the Wells No. 1 and 2. Source water protection for Group A systems is required under WAC 246-290-135, -668, and -690.

Susceptibility Assessment and Wellhead Protection Area (WHPA) Delineation

Copies of the susceptibility assessments for Wells No. 1 and 2 are given in Appendix F. The Calculated Fixed Radius (CFR) method was used to delineate the WHPAs around both wells. The CFR values for Wells No. 1 and 2 are summarized in Table 5-1.

TABLE 5-1
WHPAs for Wells No. 1 and 2

Estimated Groundwater Travel Time	CFR, feet[1]	
	Well No. 1	Well No. 2
6-Month	436	390
1-Year	617	552
5-Year	1,380	1,235
10-Year	1,951	1,746

[1] – *CFRs were calculated assuming 69 MG of water are used per year on the VAMC campus. The projected water usage for Year 2032 is approximately 49 MG. CFRs based on 69 MG per year will provide a larger WHPA that will account for future growth beyond the 20-year (Year 2032) projections.*

Contaminant Source Inventory and Contingency Plan

A contaminant source inventory was conducted in November 2012 by reviewing aerial photographs of the area in relation to the calculated CFR, reviewing previous sources identified on DOH's Source Water Assessment Programs website, and interviewing VMAC staff. For all practical purposes, the existing sanitary control area (100-foot radius) is considered the immediate area of concern due to possible contamination of the wellhead. The only contaminant in this area is sodium chloride (salt) which is used in the wellhouse for chlorination. Potential contaminant sources within the 10-year time of travel are shown on Figures F-1 and F-2 in Appendix F. The results of the inventory were summarized and utilized for notification of appropriate owner/operators of the identified known or potential sources of contamination, regulatory agencies, local governments, and emergency responders. Documentation of coordination with these parties is provided in Appendix F.

A contingency plan for wellhead contamination has been formulated; a copy of this plan is provided in Appendix F.

The status of the VAMC's Wellhead Protection Program in regard to the minimum elements required by WAC 246-290-135 is presented in Table 5-2.

TABLE 5-2
Wellhead Protection Plan Status

<table>
<tr><th>Element</th><th>Status</th></tr>
<tr><td>1. Susceptibility Assessments</td><td><table>
<tr><th></th><th>Well No. 1</th><th>Well No. 2</th></tr>
<tr><td>Susceptibility</td><td>Moderate</td><td>Low</td></tr>
<tr><td>SOC[1] Vulnerability</td><td>Moderate</td><td>Moderate</td></tr>
<tr><td>VOC[1] Vulnerability</td><td>Moderate</td><td>Low</td></tr>
<tr><td>IOC[1] Vulnerability</td><td>Low</td><td>Moderate</td></tr>
</table></td></tr>
<tr><td>2. WHPA Delineation</td><td>CFR method
Map of travel zones plotted; WPHA shown in Figure F-1</td></tr>
<tr><td>3. Inventory of Potential Contaminant Sources</td><td>Inventory of Potential Contaminant Sources has been compiled, plotted on maps, and updated. This inventory needs to be updated every two years.</td></tr>
<tr><td>4. Notification Documentation to Owners/Operators of Potential Contaminant Sources</td><td>Completed – See Appendix F for documentation.</td></tr>
<tr><td>5. Notification Documentation to Regulatory Agencies and Local Governments of WHPA Boundaries and Source Contaminant Inventory</td><td>Completed – See Appendix F for documentation.</td></tr>
<tr><td>6. Contingency Plan of Adequate Supply of Water</td><td>Completed – See Appendix F.</td></tr>
<tr><td>7. Notification documentation to Appropriate Emergency Response Agencies</td><td>Completed – See Appendix F for documentation.</td></tr>
</table>

[1] – SOC – Synthetic Organic Compound, VOC – Volatile Organic Compound, IOC – Inorganic Compound

Chapter 6 - Operation and Maintenance Program

The objective of the operation and maintenance (O&M) program is to assure the satisfactory management of the water system operations in accordance with WAC 246-290-100, -300, -320, -440, -480, and -490; WAC 246-292-020, -050, and -090.

Water System Management and Personnel

The Utilities Systems Management Program is overseen by the Facilities Support Service Manager and Assistant Manager. This staff is responsible for overseeing staff and monitoring and managing the water distribution system. The Facility Support Service Manager prepares a quarterly and annual report to be submitted to the (EOCC).

The EOCC is responsible for overseeing the Utilities Systems Management Program and maintaining a functional and safe environment. The EOCC reviews annual reports prepared by Facilities Support Services.

The staff and respective requirements are specified in Medical Center Memorandum 09-FM-2; Utilities Systems Management Plan, dated March 13, 2009. This memorandum is included in Appendix B.

Emergency Management Protocols

In emergency situations, VAMC staff follows the protocols listed in Medical Center Memorandum FM-15; Emergencies Involving Buildings, Grounds, Utilities, and Equipment, dated November 20, 2009.

In general, this memorandum states that staff shall notify Facilities Support Services and they will take appropriate action. This memorandum is included in Appendix B.

Water Quality, System Security, and Contingency Plan

VAMC staff follows requirements listed in Facilities Management Service Policy No. 16; Water Quality, System Security, and Contingency Plan, dated July 26, 2012 to maintain and monitor the Group A water distribution system in accordance with Environmental Protection Agency and DOH regulations.

In the event there are issues with the on-site water system, VAMC staff follows Facility Support Services Policy No. 19, Utility Systems Failure Contingency Plan (dated August 26, 2010), Facility Support Services Policy No. 36, and Water Supply Failure Contingency Plan. These policies are included in Appendix B.

Operator Certification

In accordance with Chapter 246-292-050 WAC, Waterworks Operator Certification, the VAMC has a certified Water Distribution Manager (WDM). Currently, Mr. Guy Jesse, Safety & Occupational Health Manager, is the certified WDM. Based on discussions with the VAMC, Tim Anderson, Chief of Facilities Management Services, will be taking over the role in the future.

System Operation and Control

In this section, the VAMC's operation and control of the water system will be discussed.

Major System Components

The major water system components include source wells, a water tower, hypo-chlorinators, and a water distribution system.

Source Wells – The VAMC operates two wells (Wells No. 1 and 2). Well No. 1 operates approximately six days a week, and Well No. 2 operates the remainder of the week. Well No. 1 is primarily the lead well because this well is cheaper to operate. Each well operates off of the existing 100,000-gallon water tower located on site.

Water Tower – The VAMC owns and operates an elevated 100,000-gallon water tower. The water level in this tower establishes the system pressures and operating capacity of the wells. In general, when the existing water tower is full, the static system pressure is approximately 60 psi. This pressure varies depending on the elevation of the water in the tower and the elevation of the sampled location. Under normal operating conditions, the operating capacity is approximately 15,000 gallons, which causes the water elevation in the water tower to fluctuate approximately 5.3 feet.

Hypo-Chlorinator – Both wells are currently disinfected with a hypochlorite solution at the well as water is pumped into the distribution system. The concentration of chlorine levels are tested daily in the Boiler Plant, Building 76.

Potable Water Distribution System – The VAMC's potable water distribution system consists of piping that is primarily 2 to 8 inches in diameter and constructed of ductile and cast iron pipe. The system is looped and has one pressure zone.

Dedicated Fire Main – The VAMC's dedicated fire main serves the OPC and RRU and is a 10-inch ductile iron water main. This fire main is not looped and has one pressure zone.

Routine System Operation and Preventive Maintenance Program

VAMC staff periodically review system status and performance by regular maintenance including, but not limited to the activities outlined in Table 6-1.

TABLE 6-1
System Performance and Preventative Maintenance Procedures

Wells	
Bi-Weekly	• Inspect wellheads, control valves, equipment, buildings, and fences • Inspect all piping for leaks and corrosion • Read and record source meter readings
Monthly	• Totalize source meter readings and calculate total water production • File monthly production data report • Inspect well pumps, motors, and controls • Complete preventative maintenance tasks, see Facility Support Services Policy No. 18
Annually	• Clean and inspect control valves • Exercise all valves • Inspect and prepare facilities for winter operations • Inspect safety equipment; repair and replace as needed • Check running amps on pump motors • Take required water quality sampling as required and scheduled • Test, inspect, and maintain backup power supply as required
Treatment	
Daily	• Test chlorine levels at Building 76
Bi-Weekly	• Check amount of salt and solution in storage tanks
Monthly	• File monthly chlorination report • Maintain 15- to 30-day supply of salt and hypochlorite solution
Annually	• Clean and/or flush solution tubing • Inspect and prepare facilities for winter operations
Reservoir Tank	
Weekly	• Conduct security check of facilities
Monthly	• Inspect storage tank for sanitary and structural deficiencies and defects
Annually	• Perform maintenance and cleaning as scheduled • Exercise all valves • Inspect ladders, hatches, floats, vents, and safety equipment • Clean tank interior and inspect interior condition as needed
Distribution System	
Monthly	• Record service meter readings • Inspect meters for damage, leaks, and proper operation • Maintain log of repairs to water mains and equipment
Annually	• Flush one third of distribution system and exercise one third of hydrants and valves • Inspect and perform maintenance on fire hydrants and guard posts, ensure hydrants are accessible • Exercise one third of mainline valves; record valve condition and turns to operate • Inspect valve box and lid; maintain access/visibility around valves and markers as needed

Equipment, Supplies, and Chemical Listing

The VAMC keeps hazardous materials and chemicals on site. Hazardous materials and chemicals are maintained by Facility Support Services. Brian Houdak, Maintenance and Operations Manager, is responsible for ensuring necessary materials are on site and in a secured location.

Comprehensive Monitoring Plan

The VAMC conducts regular testing of its groundwater wells and distribution system. With the exception of chlorine residual determinations (performed by VAMC staff), certified laboratories perform all the required water quality analysis. Testing requirements are included in the Facilities Management Service Policy No. 16; Water Quality, System Security, and Contingency Plan included in Appendix B.

Coliform Monitoring Program

All Group A public water systems are required by the "Group A Public Water Systems" regulations (WAC 246-290) to collect samples for coliform bacteria analysis. Coliform bacteria sample collection must be based upon a written monitoring plan that identifies sampling sites throughout the distribution system. A copy of the VAMC's Coliform Monitoring Plan is provided in Appendix A.

Emergency Response Program

The VAMC has prepared an emergency response plan. A copy of this plan in included in Appendix A.

Cross-Connection Control (CCC) Program

The VAMC has installed backflow preventers at all service connections. A list of the backflow preventers' serial numbers, test dates, hazard codes, location, and size is included in Appendix A.

Customer Complaint Response Program

All water quality complaints are reviewed and investigated by the Water Distribution Manager (WDM). The investigation of the water quality complaints is documented in an annual report prepared for the VA's EOCC. A copy of this report is available at the Facilities Management Office. The WDM indicated the majority of the water quality complaints were related to the rust color of the water which occurs when sediment is disturbed in the potable water distribution system.

Recordkeeping and Reporting

A sample of the records kept and maintained by the VAMC is summarized in Table 6-2.

TABLE 6-2
Summary of Records Maintained by the VAMC[1]

Type of Record	Minimum Time of Record Storage	Available on Campus	Available on DOH Website
Microbial and Turbidity Results	5 Years	Yes	Yes
Daily Chlorine Residual Readings	10 Years	Yes	No
Chemical Analysis Results	Indefinitely	Yes	Yes
Lead and Copper Sampling Results	End of Calendar Year, Plus 12 Years	Yes	Yes
Stage 2 Disinfection Byproducts Rule Data	5 Years	Yes	Yes
Bi-Weekly Source Meter Readings	Indefinitely	Yes	No
Copies of Sanitary Surveys and Associated Records	10 Years	Yes	No
Other O&M Records Including Records of Actions Taken to Correct MCL Violations, Water Quality Complaints, Etc.	3 Years After Last Action Taken to Remedy Deficiency	Yes	No
CCC Correspondence with DOH and Local Administrative Authority	5 Years	Yes	No
CCC Annual Summary Report	5 Years	Yes	No
Backflow Incident Reports, CCC Test Records	Indefinitely	Yes	No
Project Reports, Construction Documents, Drawings, Inspection Reports, and Approval of System Facilities	Life of the Facility	Yes	No

[1] – See Records Retention Reminder in Appendix A for additional information.

The above records can be obtained from the WDM or VAMC resident engineer.

Reporting requirements to DOH for the VAMC, include but is not limited to, the following:

- Failure to comply with monitoring requirements or the violation of a primary MCL
- Copies of water quality monitoring results
- Copies of information relating to the status of monitoring waivers
- Annual WFI form
- Notification of any positive coliform samples, reporting requirements are in the Coliform Monitoring Plan (Appendix A)
- CCC annual summary report

Chapter 7 - Distribution Facilities Design and Construction Standards

The purpose of this chapter is to describe and provide guidance on the project review procedures, design and construction standards, and required project documentation for the design and construction of distribution facilities within the VAMC. While the VAMC is not seeking approval from DOH for submittal exemption for future distribution facilities projects, the following is provided as a guide for developers and their design engineers on the VAMC's project review procedures and policies and their design and construction standards.

There are five elements to the VAMC's design and construction standards for distribution facilities: 1) project review procedures, 2) policies and requirements for outside parties, 3) design standards, 4) construction standards, and 5) construction certification and follow-up procedures. These elements are discussed in further detail below.

Project Review Procedures

All projects are reviewed and approved by the VAMC with assistance from VA staffed engineers to ensure the proposed improvements are in conformance with the jurisdictional standards.

With approval of the project, a pre-construction meeting is scheduled between VAMC staff, the contractor, and the design firm, if applicable, to review items including, but not limited to, the following: construction schedule, communication during construction, VAMC standards, traffic control, and making sure the necessary permits have been obtained and fees paid.

Design Standards (Performance and Sizing Criteria)

The design of the water distribution system for the VAMC will be in accordance with the VA Site Utility Design Manual and the Physical Security Design Manual for VA Facilities except where waivers have been requested and approved in writing by the VA.

Construction Standards (Materials and Methods)

Construction materials and methods shall be supplied, installed, and tested pursuant to VA Standard Specifications.

Construction Certification and Follow-Up Procedures

During construction, VA staff or designated representatives will observe construction on a regular basis to ensure the completed work complies with VA standards. The contractor is required to keep a record of all pressure and leak tests, disinfection procedures and results, and any changes during construction from approved drawings or specifications. Prior to completion of the project, a final site visit is made to identify those

items (i.e., punchlist) that need to be addressed for the VAMC to consider the project complete. Prior to final acceptance by the VAMC, the following items must be addressed and/or submitted to the VAMC.

- Satisfactory completion of final punchlist items
- Submission of bonding, insurance, easements, and any other requirements
- As-built drawings of completed work, stamped and signed by a professional engineer registered in the State of Washington
- Completed DOH Construction Completion Report Form stamped and signed by a professional engineer registered in the State of Washington, if applicable
- Documentation of pressure test and disinfection results
- O&M Manual, if applicable, of constructed facilities
- Submission of warranty by the contractor or developer on the project materials and workmanship with one-year correction period
- All fees paid

The VAMC requires a warranty period on all construction related projects. Warranties vary by project and are discussed in the contract documents.

Chapter 8 - Improvement Program

The VAMC's Improvement Program for its water system is summarized in this chapter. The Improvement Program includes a summary and schedule of all capital improvements and system measures identified in previous chapters. This program provides the VAMC staff with a systematic approach to dealing with the short-term and long-term infrastructure needs and demands of their water system.

WAC 246-290-100 requires systems to identify their planned improvements in the WSP. In certain health threatening situations, DOH has the legal authority to order specific improvements pursuant to WAC 246-290-050.

The following is a discussion and summary of the improvement schedule for the proposed capital improvements and system measures for the VAMC's system.

Improvement Priority

The priority of proposed capital improvements and system measures is discussed and developed in previous chapters. In Chapter 3, the proposed capital improvements to correct system deficiencies were assigned into one of three priority groups with Priority 1 being the most critical projects and Priority 3 being long-term projects. A summary of the proposed improvements to correct system deficiencies or improve system performance and associated priority group is given in Table 3-9.

Priority of system measures was determined based on discussions with the members of the VAMC staff, available funding, regulatory compliance issues, and other factors.

Project Cost Estimates

The project cost estimates typically include five components: 1) construction, 2) contingency, 3) architectural/engineering (A/E) cost, 4) permits, reports, and investigations, and 5) sales tax. The estimates presented are preliminary and are based on the level and detail of planning presented in this WSP. These estimates are not based on actual design data so discrepancies in anticipated costs and actual costs should be considered. As projects proceed and site-specific information becomes available, these estimates will need to be revised accordingly.

Construction

The estimated construction costs are based on actual construction bidding results from similar work, published cost guides, other construction cost experience, and material prices. Reference was made to system maps of the existing facilities to determine construction quantities and locations of distribution lines. The estimated construction cost was compiled in December 2012.

Future changes in the cost of labor, equipment, and materials will require comparable changes in these cost estimates. The amount of adjustment will depend on such factors as future cost changes and when the improvement is scheduled for construction.

Contingency

A planning level contingency factor equal to 15 percent of the estimated construction cost has been added. In recognition that the cost estimates are based on conceptual planning, allowances must be made for variations in final quantities, bidding market conditions, adverse construction conditions, unanticipated specialized investigation and studies, and other difficulties which cannot be foreseen at this time but may tend to increase final costs. The amount of contingency applied for a specific cost estimate was based on the amount of information available on the proposed improvement and site conditions.

Architectural/Engineering (A/E)

The cost of A/E services for major projects typically includes planning, special investigations, a predesign report, surveying, foundation exploration, preparation of contract drawings and specifications, bidding services, construction management, construction observation, construction staking, start-up services, and the preparation of O&M manuals. Depending on the size and type of project, and A/E services to be utilized, engineering costs may range from 15 to 20 percent of the contract cost depending on such factors as size and type of project. The lower percentage applies to large projects without complicated mechanical systems, while the higher percentage applies to small, complicated projects. These fees include planning, design, preparation of construction documents, and construction administration.

Additional A/E services may be required for specialized projects. These services could include geotechnical evaluations, structural evaluations, and other specialized consulting activities.

Permits, Reports, and Investigations

Permits, reports, and investigations are required to provide documentation needed for project design and/or identify potential cultural and environmental resources. Documentation needed for design or project construction includes a geotechnical review and evaluation of reservoir subsurface and trench conditions along the proposed water main alignment. The purpose of cultural and environmental reports is to consider any adverse effects the project may have on existing cultural and surrounding environments and to propose mitigation measures to minimize potential impacts. A significant cultural resource evaluation and monitoring during construction is anticipated since the VAMC is located on the site of a historic cavalry fort, Fort Walla Walla, established in 1858.

Sales Tax

A sales tax of 8.9 percent of the construction cost was included as part of the total project cost.

Capital Improvement Plan and Schedule

The plan and schedule for the VAMC's Water System Improvement Program is provided in this section. The recommended improvements were derived from proposed improvements to correct system deficiencies and to perform conservation system tasks, and other system measures and recommendations presented in previous chapters.

A summary of the VAMC's Capital Improvement Program is presented in Table 8-1. This table includes a brief project description, reference page, cost, funding source, and anticipated year of construction. Improvements are ordered in this Table by priority group. Anticipated construction of each priority group is as follows:

- **Priority 1** – Year 2013 through 2015
- **Priority 2** – Year 2013 through 2018
- **Priority 3** – Year 2013 through 2032

Actual funding and construction of the improvements within each priority group may change depending on such factors as additional information, system failure, project funding, and regulatory mandates.

TABLE 8-1
Capital Improvement Program

Project No.	Description	Reference	Total Cost Estimate, $[1]	Anticipated Funding Source	Year
Priority 1 Improvements					
R-1 and D-1	Construct New Water Tower and Improve Water Distribution System Flow Capacity	3-14,15	3,500,000	Government Funds	2013 - 2015
S-1	Perform Pump Tests	3-15	5,000	Government Funds	2013 - 2015
	Total Priority 1 Project Costs		**3,505,000**	-	-
Priority 2 Improvements					
D-2 and D-3	Install Service Meters and Replace Remaining Potable Water Distribution System	3-15	990,000	Government Funds	2013 - 2015
	Total Priority 2 Project Costs		**990,000**	-	-
Priority 3 Improvements[2]					
S-2	Wellhouse Maintenance and Improvements	3-15	TBD	Government Funds	2013 - 2032
S-3	Data Collection and Recording	3-16	TBD	Government Funds	2013 - 2032
S-4	Well Water Level Monitoring	3-16	10,000	Government Funds	2013 - 2032
	Total Priority 3 Project Costs		**TBD[3]**	-	-

[1] – Total project cost estimates based on November 2012 estimates.
[2] – Priority 3 project costs, unless otherwise provided, will require a thorough review of the existing infrastructure to remain and was not completed as part of this WSP.
[3] – TBD – To be determined.

System Measure Plan and Schedule

The plan and schedule for the VAMC's water distribution system improvements are presented in Table 8-2. This table includes a brief description, reference page, anticipated budget, start date, and a measured frequency/completion date. Implementation of the system measures may vary from what is shown in Table 8-2 depending on such factors as additional information, feedback, funding, and regulatory mandates.

In addition to the system plan measures discussed in previous chapters, the VAMC should plan and budget for an update of their WSP. DOH requires a WSP be updated every six years. The next update is scheduled for 2018 and is estimated to be $40,000.

TABLE 8-2
System Measure Improvement Program

Description	Reference	Budget, $	Start Date	Frequency/Completion
Water Conservation Program				
Install Production Meters at Interties	4-3	92,500[1)]	2013	Once
Test and Calibrate Production Meters	4-3	2,000	2013	Every 6 Years
Install Consumption Meters at Service Connections	4-3	-	2013	Once
Coordinate Production Meters	4-3	TBD	2013	Monthly
Water Leakage – Repair Leaks and Document Location of Leaks on Map	4-3	-	Ongoing	Ongoing
Perform Water Audits	4-3	-	2013	Annually
Wellhead Protection Program				
Update Inventory of Potential Contaminants	5-2	NA	Ongoing	Biennially
Notification of Emergency Response and Local Planning Agencies	5-2	NA	Ongoing	Annually
Administrative, Management, and Planning Measures				
Water System Plan Update	8-3	40,000	2018	Every 6 Years

(1) – This improvement is part of the Priority 1 Improvements listed in Table 8-1. The shown budget includes additional improvements at the intertie locations.

Chapter 9 - Financial Program and Implementation

The objective of a financial program is to identify the total cost of providing water service, assure the utility improvements are funded, and assist in establishing sufficient fees for providing water service. A "financially viable" system has the capacity to obtain sufficient funds to develop, construct, operate, maintain, and manage a public water system on a continuing basis in full compliance with federal, state, and local requirements. This water system is maintained by the federal government and improvements are made as funding is requested and allocated for future projects.

Current Annual Water System Costs

Current and anticipated water system costs were discussed with VAMC staff and are shown in Table 9-1. These values are approximate based on information provided by VAMC staff and water system costs obtained from the City of Walla Walla. The costs presented below are operational and do not include maintenance or planned/unplanned projects.

TABLE 9-1
Current and Anticipated Water System Costs

No.	Item[1]	2012		2018 - 2032	
		Approximate Monthly Cost, $	Approximate Annual Cost, $	Approximate Monthly Cost, $	Approximate Annual Cost, $
1	Labor (Bi-Weekly Checks) (F)	254	3,052	254	3,052
2	Salt for Chlorinators (V)	110	1,322	110	1,322
3	Monthly Maintenance of Chlorinators (V)	225	2,701	225	2,701
4	Pump No. 1 – Electricity (V)	1,462	17,543	1,462	17,543
5	Pump No. 2 – Electricity (V)	24	286	24	286
6	City of Walla Walla Connections[2] (F)	1,423	17,076	3,320	39,840
7	Water Quality Testing (F)	292	3,500	583	7,000
8	Manager/Operator Costs	625	7,500	625	7,500
	Total	**$4,415**	**52,980**	**6,603**	**79,244**

[1] – F – Fixed, V – Variable

[2] – Based on 2012 City of Walla Walla rates and proposed intertie upgrades

Current Water Rates

The VAMC does not provide water to or charge other federal agencies for any of the existing federal connections as there are no other federal agencies on the campus. Businesses, charities, and recreational buildings that require water usage pay a nominal fee as part of their lease agreement to cover water usage or they are charged directly per volume of water used. The VAMC currently charges $0.24/100 cubic feet of water used by tenants with metered service connections.

Chapter 10 - Miscellaneous Documents

This chapter provides documentation on county/adjacent utility correspondence and references to other supportive documents for this plan.

Meetings

The VAMC's WSP and its various elements were discussed on a number of occasions at meetings with the Engineer and VAMC staff.

Local Consistency

The City of Walla Walla and Walla Walla County will be provided a draft copy of this WSP for review, comment, and completion of the WSP and Small Water System Management Program Consistency Statement Checklist. A copy of this completed checklist is provided in Appendix A.

Other Supportive Documents

The VAMC's Local Government Consistency Review Checklist is provided in Appendix A.

All supportive documents referred to or used in the writing of this plan are included in the Appendices.

APPENDICES

APPENDIX A

Background Information

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 2
Updated: 09/06/2011
Printed: 9/5/2012
WFI Printed For: On-Demand
Submission Reason: No Change

RETURN TO: Eastern Regional Office, 16201 E Indiana, Suite 1500, Spokane Valley, WA, 99216

1. SYSTEM ID NO.	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
90542 0	VETERANS AFFAIR MED CTR, DEPT OF	WALLA WALLA	A	NTNC

6. PRIMARY CONTACT NAME & MAILING ADDRESS	7. OWNER NAME & MAILING ADDRESS	8. Owner Number 006220
GUY D. JESSEE [SAFETY MANAGER] 77 WAINWRIGHT DR WALLA WALLA, WA 99362	VETERANS AFFAIR MED CTR DEPT OF GUY D. JESSEE 77 WAINWRIGHT DR WALLA WALLA, WA 99362	TITLE: SAFETY MANAGER
STREET ADDRESS IF DIFFERENT FROM ABOVE	**STREET ADDRESS IF DIFFERENT FROM**	
ATTN ADDRESS 142 LEONARD CITY WALLA WALLA STATE WA ZIP 99362	ATTN ADDRESS CITY STATE ZIP	

9. 24 HOUR PRIMARY CONTACT INFORMATION	10. OWNER CONTACT INFORMATION
Primary Contact Daytime Phone: (509) 525-5200 x22848	Owner Daytime Phone: (509) 527-3489
Primary Contact Mobile/Cell Phone: (509) 240-6991	Owner Mobile/Cell Phone: (509) 240-6991
Primary Contact Evening Phone: (xxx) xxx-xxxx	Owner Evening Phone: (xxx) xxx-xxxx
Fax:(509) 527-3473 | E-mail: XXXXXX	Owner Fax Phone: | E-mail: XXXXXX

WAC 246-290-420(9) requires that water systems provide 24-hour contact information for emergencies.

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)

- [x] Not applicable (Skip to #12)
- [ ] Owned and Managed SMA NAME: _____ SMA Number:
- [ ] Managed Only
- [ ] Owned Only

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)

- [ ] Agricultural
- [ ] Commercial / Business
- [ ] Day Care
- [ ] Food Service/Food Permit
- [ ] 1,000 or more person event for 2 or more days per year
- [x] Hospital/Clinic
- [ ] Industrial
- [ ] Licensed Residential Facility
- [ ] Lodging
- [ ] Recreational / RV Park
- [ ] Residential
- [ ] School
- [ ] Temporary Farm Worker
- [ ] Other (church, fire station, etc.): _____

13. WATER SYSTEM OWNERSHIP (mark only one)

- [ ] Association
- [ ] City / Town
- [ ] County
- [x] Federal
- [ ] Investor
- [ ] Private
- [ ] Special District
- [ ] State

14. STORAGE CAPACITY (gallons)

100,000

15	16	17	18										19			20	21						22	23	24			
	SOURCE NAME	INTERTIE	SOURCE CATEGORY										USE				TREATMENT								SOURCE LOCATION			
Source Number	LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER. Example: WELL #1 XYZ456 IF SOURCE IS PURCHASED OR INTERTIED, LIST SELLER'S NAME Example: SEATTLE	INTERTIE SYSTEM ID NUMBER	WELL	WELL FIELD	WELL IN A WELL	SPRING	SPRING FIELD	SPRING IN A WELL	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANEANT	SEASONAL	EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)	OTHER	DEPTH TO FIRST OPEN INTERVAL IN FEET	CAPACITY (GALLONS PER MINUTE)	1/4, 1/4 SECTION	SECTION NUMBER	TOWNSHIP	RANGE
S01	Well #1		X										X			Y		X					83	600	NW SE	30	07N	36E
S02	Well #2		X										X			Y		X					558	550	NE SE	30	07N	36E
S03	City of Walla Walla (2)	92500 2													X	N	X							0			00N	00E

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID	2. SYSTEM NAME	3. COUNTY	4. GROUP	5. TYPE
90542 0	VETERANS AFFAIR MED CTR, DEPT OF	WALLA WALLA	A	NTNC

	ACTIVE SERVICE CONNECTIONS	DOH USE ONLY! CALCULATED ACTIVE CONNECTIONS	DOH USE ONLY! APPROVED CONNECTIONS
25. SINGLE FAMILY RESIDENCES (How many of the following do you have?)	0	0	31
A. Full Time Single Family Residences (Occupied 180 days or more per year)	0		
B. Part Time Single Family Residences (Occupied less than 180 days per year)	0		
26. MULTI-FAMILY RESIDENTIAL BUILDINGS (How many of the following do you have?)			
A. Apartment Buildings, condos, duplexes, barracks, dorms	0		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	0		
C. Part Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied less than 180 days/year	0		
27. NON-RESIDENTIAL CONNECTIONS (How many of the following do you have?)			
A. Recreational Services and/or Transient Accommodations (Campsites, RV sites, hotel/motel/overnight units)	0	0	0
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	20	20	0
28. TOTAL SERVICE CONNECTIONS		20	31

29. FULL-TIME RESIDENTIAL POPULATION

A. How many residents are served by this system 180 or more days per 0

30. PART-TIME RESIDENTIAL POPULATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many part-time residents are present each month?												
B. How many days per month are they present?												

31. TEMPORARY & TRANSIENT USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. How many total visitors, attendees, travelers, campers, patients or customers have access to the water system each month?	14470	13160	14570	14100	14570	14100	14570	14570	14100	14570	14100	14570
B. How many days per month is water accessible to the public?	31	28	31	30	31	30	31	31	30	31	30	31

32. REGULAR NON-RESIDENTIAL USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A. If you have schools, daycares, or businesses connected to your water system, how many students daycare children and/or employees are present each month?	250	250	250	250	250	250	250	250	250	250	250	250
B. How many days per month are they present?	31	28	31	30	31	30	31	31	30	31	30	31

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	1	1	1	1	1	1	1	1	1	1	1	1

35. Reason for Submitting WFI:

☐ Update - Change ☐ Update - No Change ☐ Inactivate ☐ Re-Activate ☐ Name Change ☐ New System ☐ Other _____

36. I certify that the information stated on this WFI form is correct to the best of my knowledge.

SIGNATURE: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

(1) OWNER: Name VETERANS ADMINISTRATION MEDICAL CENTER Address WALLA WALLA WA 99362

(2) LOCATION OF WELL: County WALLA WALLA SW¼ SE¼ Sec. 30 T. 7 N., R. 36 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☒ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) 3

New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 12 inches.
Drilled 103 ft. Depth of completed well 103 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 12" Diam. from +2 ft. to 103 ft.
Threaded ☐ ....." Diam. from ..... ft. to ..... ft.
Welded ☐ ....." Diam. from ..... ft. to ..... ft.

Perforations: Yes ☒ No ☐
Type of perforator used TORCH
SIZE of perforations 1/4 in. by 6 in.
115 perforations from 83 ft. to 103 ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name.....
Type..... Model No.....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☒ No ☐ To what depth? 20' + ft.
Material used in seal BENTONITE
Did any strata contain unusable water? Yes ☐ No ☒
Type of water?..... Depth of strata.....
Method of sealing strata off.....

(7) PUMP: Manufacturer's Name.....
Type: ..... H.P.....

(8) WATER LEVELS: Land-surface elevation above mean sea level.... 870 ft.
Static level Est. 26 ft. below top of well Date 7/12/80
Artesian pressure ..... lbs. per square inch Date.....
Artesian water is controlled by..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?.....
Yield: gal./min. with ft. drawdown after hrs.
Est. 800 g.p.m. AIR TEST "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test .....
Bailer test..... gal./min. with..... ft. drawdown after..... hrs.
Artesian flow..... g.p.m. Date.....
Temperature of water COLD Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
TOPSOIL / OVERBURDEN	0	3
SMALL BOULDERS WITH LARGE GRAVELS AND COARSE SAND	3	38
LARGE GRAVELS AND COARSE SAND	38	103
WATER BEARING FORMATION 1ST ENCOUNTERED AT 38' VOLUME INCREASE WAS CONSISTENT FROM 83'-103'		

RECEIVED
AUG 26 1980
DEPARTMENT OF ECOLOGY
SPOKANE REGIONAL OFFICE

RECEIVED
AUG 25 1980
DEPARTMENT OF ECOLOGY
CENTRAL REGION

Work started 7/10, 1980. Completed 7/12, 1980

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME AQUARIUS DRILLING INC. (Person, firm, or corporation) (Type or print)
Address P.O. BOX 290 PASCO WA 99301

[Signed] [signature] (Well Driller)

License No. 1057 Date 7/14, 1980

8/26/80

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

3

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

(1) OWNER: Name Veterans Adminstration Address 77 Wainright Dr. Walla Walla Wa 99362

(2) LOCATION OF WELL: County Walla Walla SE ¼ SE ¼ Sec 30 T. 7 N., R 36 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☑ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....

New well ☑ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☑ Driven ☐
Reconditioned ☑ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well ..... inches.
Drilled ..... ft. Depth of completed well ..... ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 12 " Diam. from +2 ft. to 551' 5" ft.
Threaded ☐ " Diam. from ..... ft. to ..... ft.
Welded ☑ " Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☑
Type of perforator used .....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☑
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☑ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☑ No ☐ To what depth? 30 ft.
Material used in seal Cement Grout
Did any strata contain unusable water? Yes ☐ No ☑
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... 870 ft.
Static level 268 ft. below top of well Date Sept 25 1982
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☑ No ☐ If yes, by whom? My Self
Yield: 500 gal./min. with 32 ft. drawdown after 28 hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
Instant Recovery (within 30 sec)					

Date of test 25 Sept 82
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☐ No ☐

9/7/83

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Overburden	0	546
Basalt	546	780
(Water bearing 765 - 780)		

RECEIVED
SEP 7 1983
DEPARTMENT OF ECOLOGY
SPOKANE REGIONAL OFFICE

Work started 3 Aug, 19 82 Completed 1 Oct, 19 82

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Roberts Jungmann & Kofler Drilling (Person, firm, or corporation) (Type or print)

Address PO 474 Walla Walla Wa 99362

[Signed] [signature] (Well Driller)

License No. 610 Date 5 Sept, 1983

(USE ADDITIONAL SHEETS IF NECESSARY)

Backflow Preventers Installed

			Backflow Preventors		Current As of: 1 September 2011	
Serial Number	**Test Due**	**Hazard Code**	**Location**	**Size Preventor**	**Hazard**	**Comments**
1005D8	08/14/13	AFIR	Bldg. 69/Vault South side	6.000	FIRE SYSTEM	
102480	08/13/13	AIRRI	By West Score board	2.000	IRRIGATION - ALL	
106030	08/13/13	ICHLO	Well #2	1.000	CHLORINATOR	
109845	08/13/13	ICHLO	Well 1	1.000	CHLORINATOR	
11569	08/13/13	AIRRI	N of water tower	2.000	IRRIGATION - ALL	
118952	11/15/12	IHOTW	Bldg.86/room B103	1.500	HOT WATER HEATER AND TANK	
159070	08/13/13	AIRRI	Basement Bldg 77	0.000	IRRIGATION - ALL	
1602499	11/16/12	IACCH	Bldg 68/Room B116	0.750	AIR CONDITIONING, CHILL WATER	
1759394	08/13/13	AIRRI	E of parking lot #1 by sidewalk	2.000	IRRIGATION - ALL	
191353	08/13/13	AIRRI	N of bldg 75 by road	2.000	IRRIGATION - ALL	
199916	11/15/12	ICOMW	Bldg.80	0.750	COMPRESSOR, WATER COOLED	
20099	08/14/13	IACCH	Bldg.74/Outside entrance	0.750	AIR CONDITIONING, CHILL WATER	
217717	11/15/12	IKITC	Bldg.75/Canteen	0.750	KITCHEN EQUIPMENT	
21L0619	08/13/13	AFIR	Bldg. 31	4.000	FIRE SYSTEM	
235218	11/16/12	IDISC	Bldg.80	0.750	DISHWASHER, COMMERCIAL	
235286	11/16/12	IKITC	Bldg.80/Patio/top unit	0.750	KITCHEN EQUIPMENT	
235288	11/15/12	AMEDI	Bldg.86/room336	0.750	MEDICAL - ALL	
235297	11/16/12	IKITC	Bldg.80/Patio	0.750	KITCHEN EQUIPMENT	
235298	11/15/12	ICOMW	Bldg.80/ B102	0.750	COMPRESSOR, WATER COOLED	
235318	11/15/12	AMEDI	Bldg.86/Room 336	0.750	MEDICAL - SCOPE WASHER	
238443	11/16/12	IGARD	Bldg.80	0.750	GARBAGE DISPOSAL	
238468	11/16/12	IGARD	Bldg.80	0.750	GARBAGE DISPOSAL	
24228	08/13/13	APRE	Bldg.76	2.500	PREMISES ISOLATION	
253283	11/15/12	AMEDI	Bldg.86/Room336	0.750	MEDICAL - SCOPE WASHER	
259106	08/14/13	CFOUN	W of Bldg 69	2.000	FOUNTAIN - ORNAMENTAL	
259110	11/16/12	IHOTW	Bldg.69/room B118A	2.000	HOT WATER HEATER AND TANK	
259111	11/16/12	IHOTW	Bldg.68/room B105	2.000	HOT WATER HEATER AND TANK	
259264	11/15/12	APRE	Bldg.80/B118	2.000	PREMISES ISOLATION	
279799	08/13/13	AIRRI	300' E of water tower	2.000	IRRIGATION - ALL	
280344	11/15/12		Bldg 86/Attic	0.750	HEATING SYSTEM MAKE UP LINE	
297955	11/15/12		Bldg 86/room 223	0.500	ICE MAKER	
297992	08/13/13	IACCH	Bldg.63/swamp cooler	0.500	AIR CONDITIONING, CHILL WATER	
298732	11/15/12	IDISC	Bldg.75/Canteen	0.500	DISHWASHER, COMMERCIAL	
298740	11/15/12	IICEM	Bldg.75 Canteen	0.500	ICE MAKER	
298743	11/15/12	IKITC	Bldg.75/canteen	0.500	SOAP DISPENSER	
298745	11/16/12	IICEM	Bldg. 80	0.500	ICE MAKER	
298754	11/15/12	IKETT	Bldg.75/Canteen	0.500	KETTLE, COOKING	
298762	11/18/11	IGARD	Bldg.75/Canteen	0.000	GARBAGE DISPOSAL	Has this been removed?
298779	08/30/12	IACSY	Bldg.65/swamp cooler supply	0.500	AIR CONDITIONING SYSTEM	
299060	11/15/12	IMEDI	Bldg.86/room B103	0.500	DENTAL VACUUM PUMP	
299074	11/16/12	IDISC	Bldg.80	0.500	DISHWASHER, COMMERCIAL	
299082	08/13/13		Bldg 65/backroom	0.500	AIR CONDITIONING, CHILL WATER	
299104	11/28/12		Bldg 86/room 124	0.500	LAB STERILIZER	
299109	11/16/12	IICEM	Bldg.69/room 108	0.500	ICE MAKER	
2GL1098	08/13/13	AFIR	Bldg. 76/boiler room	3.000	FIRE SYSTEM	
2JL1945	08/13/13	AFIR	T-1 T-2	4.000	FIRE SYSTEM	
2K11564	08/14/13	AFIR	Bldg. 86/room 103B	6.000	FIRE SYSTEM	
3179727	08/14/13		Sweat Lodge/NW corner outside	1.000	PREMISES ISOLATION	
40052	11/15/12	IACCH	Bldg.86/room 103	1.250	AIR CONDITIONING, CHILL WATER	
6498	08/14/13	AFIR	Bldg. 74A/room 147B	3.000	FIRE SYSTEM	
6615	08/14/13	AFIR	Bldg 80/room 118B	4.000	FIRE SYSTEM	
675053	08/19/11	AIRRI	SW side of Bldg. 74	0.000	IRRIGATION - ALL	Disabled due to construction. Keeping BFP on the list due to reinstallation for irrigation of grass for new parking lot near 74.
9610211330	0813/13	AFIR	Bldg. 41	4.000	FIRE SYSTEM	
9612131352	08/13/13	AFIR	Bldg. 78/room B201	6.000	FIRE SYSTEM	
9612261607	08/13/13	AFIR	Bldg. 82/room 105	4.000	FIRE SYSTEM	
9701231351	08/13/13	AFIR	Bldg. 77/outside entrance	0.000	FIRE SYSTEM	
A112039	08/14/13	AFIR	Bldg. 7	2.000	FIRE SYSTEM	
C3685	08/13/13	AFIR	Bldg. 63 & 65/vault	6.000	FIRE SYSTEM	
F0506301030	08/14/13	AFIR	Bldg.T 7/Vault	4.000	FIRE SYSTEM	
F0507060712	08/13/13	AFIR	Bldg 75 vault	4.000	FIRE SYSTEM	
F0507060724	08/14/13	AFIR	Bldg 74 Fire vault	4.000	FIRE SYSTEM	
F0507060728	08/14/13	AFIR	Bldg.66 / Basement	4.000	FIRE SYSTEM	
F0508161637	08/13/13	APRE	Popular Street City conn./hot bo	8.000	PREMISES ISOLATION	
F0509230919	08/14/13	APRE	Chestnut St. Feed/behind sign	8.000	PREMISES ISOLATION	
H008898	08/13/13	AIRRI	SW of Quarters #1	2.000	IRRIGATION - ALL	
H26022	08/13/13	AIRRI	Well house #1	2.000	IRRIGATION - ALL	
HL-1708	08/13/13	AFIR	Bldg 135/Utility room	3.000	FIRE SYSTEM	
KL-0736	08/14/13		Bldg 68	6.000	FIRE SYSTEM	
L50989	08/13/13	AFIR	Bldg 81/Crawl Space	4.000	FIRE SYSTEM	
LG-0989	11/15/12	AFIR	Bldg 81/Crawl Space	4.000	FIRE SYSTEM	
W03275	11/16/12	IKITC	Bldg.80	0.500	POT SINK GARBAGE DISPOSAL	
W03370	11/16/12	IKITC	Bldg.80	0.500	STEAMER	

***Due for Triennial Cross Connection Control Survey. Best time for contractor to re-survey is November-February.

Backflow Preventers Removed

			Backflow Preventors		Current As of: 1 September 2011	
Serial Number	**Test Due**	**Hazard Code**	**Location**	**Size Preventor**	**Hazard**	**Comments**
235280	11/18/11	IMEDI	Bldg.68/room B110	0.000	MEDICAL EQUIPMENT	
235282	11/18/11	IACCH	Bldg.68/roomB110	0.000	AIR CONDITIONING, CHILL WATER	
235291	11/19/11	IMEDI	Bldg.68/room Bldg 110	0.000	MEDICAL EQUIPMENT	
235295	11/18/11	IMEDI	Bldg.68/room B110C	0.000	MEDICAL EQUIPMENT	
39884	11/18/11	IMEDI	Bldg.68/room B110A	0.000	MEDICAL EQUIPMENT	
39896	11/18/11	IMEDI	Bldg.68/room B110C	0.000	MEDICAL EQUIPMENT	
40042	11/18/11	IMEDI	Bldt.68/room 110 A	0.000	MEDICAL EQUIPMENT	
40050	- -	AMEDI	Bldg 86 / room 228	0.000	MEDICAL - ALL	
W03304	- -	IKITC	Bldg.80	0.000	KITCHEN EQUIPMENT	

Backflow Preventers Relocated

			Backflow Preventors		Current As of: 1 September 2011	
Serial Number	**Test Due**	**Hazard Code**	**Location**	**Size Preventor**	**Hazard**	**Comments**
235218	- -	ICOMW	Bldg.80	0.000	COMPRESSOR, WATER COOLED	

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

Local Government Consistency Review Checklist

Water System Name: **Veterans Affairs Medical Center** PWS ID: **90542**

Planning/Engineering Document Title: **Water System Plan** Plan Date: **November 2012**

Local Government with Jurisdiction: **Walla Walla County Joint Community Development Agency**

WAC 246-290-108 Consistency with local plans and regulations:
Consistency with local plans and regulations applies to planning and engineering documents under WAC 246-290-106, 246-290-107, and 246-290-110(4)(b (ii).

1) Municipal water suppliers must include a consistency review and supporting documentation in its planning or engineering document describing how it has addressed consistency with **local plans and regulations**. This review must include specific elements of local plans and regulations, as they reasonably relate to water service as determined by Department of Health (DOH). Complete the table below and see instructions on back.

Local Government Consistency Statement	Page(s) in Planning Document	Yes – No – Not Applicable
a) The water system service area is consistent with the adopted land use and zoning within the applicable service area.	**Pages 1-5 to 1-6**	
b) The six-year growth projection used to forecast water demand is consistent with the adopted city/county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	**Pages 2-6 to 2-10**	
c) Applies to cities and towns that provide water service: All water service area policies of the city or town are consistent with the utility service extension ordinances of the city or town.	**N/A**	
d) Service area policies for new service connections are consistent with the adopted local plans and adopted development regulations of all jurisdictions with authority over the service area [City(ies), County(ies)].	**Page 1-5**	
e) Other relevant elements related to water supply are addressed in the water system plan, if applicable; Coordinated Water System plans, Regional Wastewater plans, Reclaimed Water plans, Groundwater Area Management plans, and Capital Facilities Element of Comprehensive plans.	**Page 1-6**	

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

Signature Date

Printed Name, Title, & Jurisdiction

Consistency Review Guidance

For Use by Local Governments and Municipal Water Suppliers

This checklist may be used to meet the requirements of WAC 246-290-108. When using an alternative format, it must describe all of the elements; 1a), b), c), d), and e), when they apply.

For **water system plans (WSP)**, a consistency review is required for the retail service area and any additional areas where a municipal water supplier wants to expand its water right's place of use.

For **small water system management programs**, a consistency review is only required for areas where a municipal water supplier wants to expand its water right's place of use. If no water right place of use expansion is requested, a consistency review is not required.

For **engineering documents**, a consistency review is required for areas where a municipal water supplier wants to expand its water right's place of use (water system plan amendment is required). For non-community water systems, a consistency review is required when requesting a place of use expansion. All engineering documents must be submitted with a service area map per WAC 246-290-110(4)(b)(ii).

A) Documenting Consistency: Municipal water suppliers must document all of the elements in a consistency review per WAC 246-290-108.

1 a) Provide a copy of the adopted **land use/zoning** map corresponding to the service area. The uses provided in the WSP should be consistent with the adopted land use/zoning map. Include any other portions of comprehensive plans or development regulations that are related to water supply planning.

1 b) Include a copy of the **six-year growth projections** that corresponds to the service area. If the local population growth rate projections are not used, provide a detailed explanation on why the chosen projections more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.

1c) Include water service area policies and show that they are consistent with the **utility service extension ordinances** within the city or town boundaries. This applies to cities and towns only.

1 d) Include all **service area policies** for how new water service will be provided to new customers.

1 e) **Other relevant elements** related to water supply planning as determined by the department (DOH). See Local Government Consistency – Other Relevant Elements, Policy B.07, September 2009.

B) Documenting an Inconsistency: Please document the inconsistency, include the citation from the comprehensive plan or development regulation, and provide direction on how this inconsistency can be resolved.

C) Documenting Lack of Consistency Review by Local Government: Where the local government with jurisdiction did not provide a consistency review, document efforts made and the amount of time provided to the local government for their review. Please include: name of contact, date, and efforts made (letters, phone calls, and e-mails). In order to self-certify, please contact the DOH Planner.

The Department of Health is an equal opportunity agency. For persons with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY 1-800-833-6388).

Michael Melder

From: Leuba, Victoria (ECY) <VLEU461@ECY.WA.GOV>
Sent: Tuesday, November 13, 2012 8:26 AM
To: Dave Jepsen
Cc: Michael Melder; timothy.anderson2@va.gov
Subject: RE: Water Right Determination for Walla Walla VAMC

Dave,

It seems there are two questions about water rights currently: 1) What is the nature of the water right being used by the federal VA facility in Walla Walla? and 2) Is it feasible and or advisable to use that water right in a state operated VA facility?

In response to those questions about water rights associated with the federal VA facility in Walla Walla and the proposed state VA facility I've completed some research and consulted with the state's attorneys general offices. My response is based on information gleaned from Water Law: in a nutshell by David H. Getches and information from Barbara Munson, an assistant attorney general for the state.

1) The federal VA hospital in Walla Walla has a federal reserved water right. In essence, the facility has a right to water required to meet its mission as long as the property is in federal ownership and the mission does not change. That federal reserve water right has a resemblance to the tribal water right in that quantification is not required and as much water as is needed and beneficially used to meet the mission may be used without benefit of a state issued water right. (See chapter 8 in Getches)
2) The answer to question 2 has alternate pathways:
    a. If the state VA purchases the land for the VA facility from the federal government, it severs the water right. The state facility would then need to acquire (nearly impossible currently) a state water right or hook-up to a local purveyor such as College Place or the city of Walla Walla.
    b. If the state leased the land from the federal VA facility it might be possible to argue that the VA could provide water under the federal water right as the stated purpose does not change. This interpretation has not been tested in court and any litigation that might arise would be both time consuming and costly.

Barbara Munson of the AGs office tells me that there is "very little case law on this topic. However, in *Law of Water Rights and Resources*, Tarlock 2012 edition, the author concludes at 593 that "Non-Indian federal reserved rights exist only on land retained by the federal government." The author cites to *State of N.M. ex rel. State Engineer v. Comm'r of Public Lands*, 145 N.M. 433, 200 P.3d 86 (2008). In that case before the Court of Appeals of New Mexico, the court first explained that "courts must construe the doctrine of federal reserved water rights narrowly." Id. at 442. Then the court concluded at 443 that:

> As the term "federal purpose" has been construed in non-Indian federal reserved water right cases, continuing federal ownership of the reserved lands appears to be a prerequisite to a determination that such rights exist."

The most prudent course for the state VA facility might be to obtain water from one of the cities or other purveyors regardless of whether or not the land for the state VA facility is purchased or leased from the federal VA facility. There are undoubtedly other considerations at play for this project. If I can be of further assistance, please don't hesitate to contact me.

Respectfully,

Victoria Leuba
Permitting Unit Supervisor
Water Resources Eastern Region
Washington State Department of Ecology
4601 N. Monroe Street
Spokane, WA 99205-1295
www.ecy.wa.gov
telephone: (509) 329-3616
e-mail: vleu461@ecy.wa.gov
fax: (509) 329-3529

"Boundaries don't protect rivers, people do." -- Aristotle

Please consider the environment before printing this e-mail

From: Dave Jepsen [mailto:djepsen@andersonperry.com]
Sent: Monday, November 12, 2012 4:10 PM
To: Leuba, Victoria (ECY)
Cc: Michael Melder; timothy.anderson2@va.gov
Subject: Water Right Determination for Walla Walla VAMC

Victoria:

While we appreciated our telephone conversation on the initial findings of the Attorney General's office, we would appreciate an email summarizing the opinion of the Attorney General's office and DOE's view of the potential water use at the proposed State VA community home. This documentation is needed for VAMC staff to review and make a decision on the disposition of the property for the State VA community home. As we are wrapping up our water system plan for the VAMC, we would appreciate this documentation when possible.

Thank you.

Dave

File No. W6006-42-02

David Jepsen, P.E.
Project Engineer
Anderson Perry & Associates, Inc.
214 E Birch / PO Box 1687
Walla Walla, Washington 99362
509-529-9260 phone
509-529-8102 fax
djepsen@andersonperry.com
www.andersonperry.com

Source Production, gallons

Month/Year	1984	1985	1995	1997	1998	1999	2000	2001	2002
January	1,499,900	1,799,880	1,517,019	3,008,905	2,261,653	2,094,026	2,815,098	2,542,153	1,480,786
Febuary	1,399,906	1,199,920	1,387,914	2,639,991	1,797,294	1,771,638	2,800,138	2,367,570	1,376,283
March	1,499,900	1,399,906	1,591,295	3,071,886	2,320,894	1,834,021	3,152,521	2,711,126	1,454,389
April	1,399,906	3,099,793	2,224,552	3,160,150	3,492,412	1,921,612	3,750,779	2,675,005	1,553,200
May	4,599,693	9,199,385	6,463,543	6,545,224	5,246,098	4,812,856	5,939,576	7,789,089	3,798,194
June	6,499,566	11,199,251	9,259,866	7,926,706	7,745,615	11,283,505	8,825,989	12,759,062	8,409,293
July	10,499,298	14,599,024	12,102,864	14,251,270	15,670,824	13,822,816	15,938,324	14,340,821	13,833,325
August	13,599,091	11,899,205	14,588,094	12,149,390	12,339,457	13,326,518	17,048,970	13,151,396	12,715,940
September	7,099,525	4,599,693	6,178,405	7,575,819	8,533,932	9,940,920	9,432,998	21,252,887	7,650,103
October	3,899,739	1,699,886	3,294,865	4,340,644	3,835,594	6,594,069	5,182,967	8,428,023	4,403,005
November	1,399,906	1,199,920	1,615,381	2,179,747	2,254,771	2,919,594	2,789,718	1,809,262	1,257,208
December	1,299,913	1,399,906	1,325,306	2,000,601	2,685,694	2,940,089	3,441,668	1,819,226	1,187,802
Total	**54,696,344**	**63,295,769**	**61,549,105**	**68,850,333**	**68,184,239**	**73,261,663**	**81,118,745**	**91,645,618**	**59,119,526**

Month/Year	2003	2004	2005	2006	2007	2008	2009	2010	2011
January	1,448,180	2,060,082	1,673,942	2,198,836	4,651,800	2,074,645	1,306,195	1,109,926	1,873,244
Febuary	1,362,796	1,832,024	1,561,263	2,149,371	2,972,032	2,474,549	1,281,743	1,920,872	1,575,177
March	1,878,467	2,145,653	1,703,069	2,945,916	1,713,365	1,649,998	1,578,647	1,574,895	1,744,436
April	2,110,288	2,265,430	2,400,953	2,627,687	2,514,776	2,781,169	2,593,847	2,944,803	1,627,356
May	6,109,335	8,222,285	6,624,864	6,966,835	9,477,675	4,629,716	8,736,992	4,456,702	1,958,858
June	14,725,300	9,936,843	12,666,273	9,131,030	11,778,721	9,530,844	12,498,205	6,332,577	3,856,893
July	16,062,103	18,061,432	16,983,998	17,839,179	15,532,242	6,461,905	15,129,415	7,837,812	10,783,082
August	16,386,990	13,486,649	16,617,269	18,046,293	14,567,299	18,061,747	13,598,401	15,056,405	12,600,338
September	5,300,178	6,595,041	10,251,452	11,189,354	9,790,658	16,535,191	8,996,555	8,528,081	10,028,377
October	6,423,046	4,101,965	3,603,011	6,457,290	3,316,276	4,317,179	2,546,820	3,066,886	3,878,741
November	1,661,114	1,734,911	2,024,776	4,817,240	1,906,992	2,130,626	1,023,922	2,019,166	1,875,875
December	1,691,774	2,004,446	2,108,178	4,650,593	1,757,031	1,317,408	1,586,889	1,723,885	2,110,859
Total	**75,159,571**	**72,446,762**	**78,219,048**	**89,019,622**	**79,978,866**	**71,964,975**	**70,877,630**	**56,572,008**	**53,913,234**

Records Retention Reminder

Public water system owners and operators must keep at their utility, or a nearby location, the following records for the minimum timeframes listed below:

- ☐ **Microbial and turbidity** analyses: **5 years.**
- ☐ **Chemical analysis (IOC, VOC, SOC, etc.):** As long as the system is in operation.
- ☐ **Copies of monitoring plans: As long as the corresponding monitoring occurs. Keep replaced plans 5 years** for microbial and turbidity analysis and **10 years** for chemical analyses.
- ☐ **Records of action taken by the system to correct violations**: **3 years** after the last action taken for that violation.
- ☐ **Copies of written reports, summaries, or communications relating to sanitary surveys** conducted by the state, local health jurisdiction, or contracted third party: **10 years** after the sanitary survey is completed.
- ☐ **Records concerning a variance or exemption** granted to the system: **5 years** once the variance or exemption expires.
- ☐ **Copies of public notices: 3 years** after issued.
- ☐ **Copies of Consumer Confidence Reports: 3 years.**
- ☐ **Lead/Copper:** Retain original records of all sampling data and analyses, reports, surveys, letters, evaluations, and schedules for **12 years.**
- ☐ **Groundwater Rule:** Effective December 2009, systems required to perform compliance monitoring have additional record retention requirements. These include:
  - Records of the state-specified minimum disinfectant residual: **10 years.**
  - Keep records of the lowest daily residual disinfectant concentration and records of the date and duration of any failure to maintain the state-prescribed minimum residual disinfectant concentration: **5 years.**
  - Records of state-specified compliance requirements for membrane filtration and parameters for alternative treatment: **5 years**
  - Records of the date and duration of any failure to meet the membrane operating, membrane integrity, or alternative treatment operating requirements: **5 years**.
- ☐ **Stage 2 Disinfection Byproducts Rule:**
  - Initial Distribution System Evaluation (IDSE) reports: **10 years**
  - Compliance monitoring results: **10 years**
  - Compliance monitoring plans: **As long as the corresponding monitoring occurs.** Keep the previous monitoring plan **for 10 years**
- ☐ **Enhanced Filtration and Disinfection for Surface Water and GWI Systems:** Your system is required to maintain records described in the following table, if it is subject to the specific rule requirement in the first column.

Rule Requirement	Description of necessary records	Period of time records must be kept
Individual Filter Turbidity Requirements	Results of individual filter monitoring	**3 years**
Disinfection Profiling	Results of Profiling (including raw data and analysis)	**Indefinitely**
Disinfection Benchmarking	Benchmark (including raw data and analysis)	**Indefinitely**

- ☐ **Stage 2 Disinfection Byproducts Rule:**
  - Initial Distribution System Evaluation (IDSE) reports: **10 years**
  - Compliance monitoring results: **10 years**
  - Compliance monitoring plans: **As long as the corresponding monitoring occurs.** Keep the previous monitoring plan **for 10 years**
- ☐ **Enhanced Treatment for Cryptosporidium:**
  - Keep results from the initial round of source water monitoring and the second round of source water monitoring until **3 years** after bin classification for filtered systems, or a determination of the mean Cryptosporidium level for unfiltered systems for the particular round of monitoring.
  - Keep any notification to the state that the system will not conduct source water monitoring due to meeting the criteria for **3 years**.
  - Keep the results of treatment monitoring associated with microbial toolbox options and with uncovered finished water reservoirs for **3 years.**

If you've been confused in the past as to how long to keep your records, you can start from this point forward based on the information in this document.

The Department of Health is an equal opportunity agency. To request this document in other formats, please call 1-800-525-0127 (TTY 1-800-833-6388).

March 2009
DOH 331-431

Washington State Department of Health
Division of Environmental Health
Office of Drinking Water

APPENDIX B

VAMC Memorandums

MEDICAL CENTER MEMORANDUM 09-FM-2

JONATHAN M. WAINWRIGHT MEMORIAL VA MEDICAL CENTER WALLA WALLA, WASHINGTON

March 13, 2009

UTILITIES SYSTEMS MANAGEMENT PLAN

1. PURPOSE

To establish and maintain a utility management program that ensures that critical operating components are maintained, inspected and/or repaired, and addresses emergency procedures when operational reliability is affected.

2. POLICY

It is the policy of this Medical Center that all utilities that support patient care be safe and reliable.

3. RESPONSBILITY

a. The Environment of Care Committee is charged by the Director or designee to oversee the implementation of the Utilities Systems Management Program to ensure a functional and safe environment.

b. The Facilities Support Service Manager, appointed by the Director or designee, is responsible for the development, implementation, monitoring, and day-to-day operations of the Utilities Systems Management Program.

4. PROCEDURE

a. Criteria for Selecting Utilities into Program

Risk criteria used to identify which utilities will be included in the program are: Life support, environmental support, infection control, and equipment support.

b. Utilities Included in the Plan

1) *Electrical Power*
   - a) High Voltage Distribution System
   - b) Secondary Electrical Distribution System – Buildings 69, 74, 76, 80, 86
   - c) Emergency Generator Sets:
     - (1) Boiler Plant serves Buildings 76, 81 and 82
     - (2) Building 80 serves Buildings 68, 69, 74, 75 and 80
     - (3) Building 129 serves Building 86 except for A/C systems/units and x-ray units in Radiology
     - (4) Building 78 serves Buildings 75, 77, 78, T-1, and T-2
     - (5) Building 111 serves Buildings 99 and 111

2) *Natural Gas System*
   a) Mains
   b) Valves
   c) Meters
3) *Water Distribution System*
   a) Exterior water mains and valves
   b) Water wells/pumps
   c) Water treatment
   d) Water storage
   e) Interior distribution lines
   f) Hot water heaters
4) *Elevators:* Buildings 68, 69, 74, 78, 80, 82 and 86
5) *Medical Air:* Building 86
6) *Medical Vacuum:* Building 86
7) *Medical Oxygen:* Buildings 74 and 86
8) *HVAC Systems:* Buildings 74 and 86
9) *Boilers:* Building 76
10) *Plumbing, Sewer, and Steam Systems*
11) *Communication Systems and Data Exchange:*
   a) Nurses' Call Systems – Buildings 69 and 86
   b) Telephone System, Public Address, Radio Paging
   c) Computer and data systems

c. **Objectives**

1) **Promote a safe, controlled, comfortable environment of care**

The Facilities Support Service Manager and Assistant Manager are responsible for monitoring the utility management program and addressing issues that affect the operation of the physical plant and systems to provide a safe, controlled, comfortable environment of care.

2) **Reduce the potential for hospital-acquired illness**

The utility systems are operated and managed to reduce the potential for hospital-acquired illness.

a) Potable water is tested monthly by the Walla Walla County Health Department,
b) Boiler Plant Operators test the chlorine level daily,
c) Ice machines are cleaned and disinfected quarterly or as needed,
d) Housekeepers clean patient areas daily, provide terminal cleaning upon discharge using disinfectants approved by Infection Control,
e) Patients and staff are provided and use gloves, face masks, and protective clothing when necessary, and
f) Filters in air handling systems are changed on a routine basis or as necessary.

3) **Assess and minimize risks of utility failures**

A quarterly and annual evaluation of the utility management program is reported to the Environment of Care Committee. Report indicates any utility failures, causes, and corrective actions. Modifications to systems and/or processes are conducted as a result of failures, internal or external reviews, recognized standards, or sentinel events.

4) **Ensure operational reliability of utility systems**

Operational reliability is ensured through a comprehensive maintenance program, testing, daily operation of the system, correction of any noted deficiencies.

5) **The plan provides processes for**

a) **Establishing criteria for identifying, evaluating, and taking inventory of critical operating components of systems to be included in the utility management program. These criteria address the impact of utility systems on:**

(1) Life support systems
(2) Infection control systems
(3) Environment support systems
(4) Equipment-support systems, and
(5) Communication systems

Any system that meets the following criteria: Life support systems infection control systems, environmental control systems, equipment support systems, and communication systems are included in the Utility Systems Management Program.

b) **Inspecting, testing, and maintaining critical operating components:**

The Utility Systems Management Program includes testing of maintenance protocols for all critical components included in the Utility Systems Management Program.

c) **Inspecting, testing, and maintaining critical components of piped medical gas systems including master signal panels, area alarms, automatic pressure switches, shutoff valves, flexible connectors, and outlets:**

Facilities Support Service Policy No. 44 *Medical Gas Alarm Testing* provides procedures for inspection, testing, and maintenance of medical gas systems and shut-off valve locations.

d) **Testing piped medical gas systems when the systems are installed, modified, or repaired including cross-connection testing, piping purity testing, and pressure testing:**

Facilities Support Service Policy *Operational and Failure Contingency Plan for Medical Gas, Medical Vacuum,* and *Medical Air* establish procedures for testing systems after installation, modifications, or repairs.

e) **Managing pathogenic biological agents in cooling towers, domestic hot water, and other aerosolizing water systems:**

Monthly water samples are submitted to the County Health Department. All water is chlorinated as it enters the system.

f) **Installing and maintaining appropriate pressure relationships, air exchange rates, and filtration efficiencies for ventilation systems that serve areas specially designed to control airborne contaminants (such as biological agents, gases, fumes, dust):**

Airborne contaminants are controlled by negative or positive air systems, and/or filtration. Filters are changed as required. Hoods that are either negative or positive airflow, are also used to control airborne contaminants.

g) **Developing and maintaining current utility system operational plans to help ensure reliability, minimize risks, and reduce failures:**

For each utility in the *Utility Program,* there is an operational plan to help ensure reliability, minimize risks and reduce failures.

h) **Mapping the distribution of utility systems and labeling controls for a partial or complete emergency shutdown:**

The *Utility Operation Plan* includes utility drawings and emergency shutoff locations.

i) **Investigating utility systems management problems, failures, or user errors and reporting incidents and corrective actions:**

As part of the *Utility Failure Contingency Plan,* utility problems, failures, or user errors are reported to the Environment of Care Committee and, if necessary, for corrective action.

6) **In addition, the plan establishes**

a) **An orientation and education program that addresses:**

(1) Utility systems' capabilities, limitations, and special applications,
(2) Emergency procedures in the event of system failure,

(3) Information and skills necessary to perform assigned maintenance responsibilities,

(4) Processes for reporting utility system management problems, failures, and user errors, and

Each individual utility plan will include utility's operation responsibilities; emergency procedures; location of emergency shutoff controls; process reporting process; failures and use; errors; and requirements for maintenance.

(5) **Ongoing monitoring of performance regarding actual or potential risk related to one or more of the following:**

(a) Staff knowledge and skills
(b) Level of staff participation
(c) Monitoring and inspection activities
(d) Emergency and incident reporting

(6) **Inspection, preventive maintenance, and testing of equipment:**

Ongoing monitoring of the utility systems is done by the trained facility staff or contract/manufacturer service personnel with knowledge and skills to perform inspections, testing, and maintenance.

b) **Emergency procedures for utility system disruptions or failures that address:**

(1) Specific procedures in the event of utility systems malfunction
(2) Identification of an alternative source of essential utilities
(3) Shutoff of malfunctioning systems and notification of staff in affected areas
(4) Obtaining repair services
(5) How and when to perform emergency clinical interventions when utility systems fail

Each utility system has a contingency plan, on who to notify in event of a problem or failure, obtaining repair service, what to expect with a failure, and what to do in the event of a failure. A quick-answer card was developed and is posted throughout the facility.

c) **How an annual evaluation of the utility systems management plan's objectives, scope, performance, and effectiveness will occur:**

An annual evaluation of the Utility Systems Management Plan, which includes objectives, performance, and effectiveness is provided to the Environment of Care Committee.

7) **Information Collection and Evaluation**

The Information Collection and Evaluation for the Utility Systems Program includes process information from maintenance activities and system evaluations. The Safety Officer communicates with the responsible entities regarding failures, user errors and recalls that have been identified through other mechanisms. Extensive reviews are conducted as warranted and are communicated to upper management through a documented information-sharing system. Coordination of activities and follow-up may involve other functions such as Safety Management and Emergency Preparedness.

8) **Sources of Information**

* Utility outage reports
* User error notifications
* Product recall and information bulletins
* Outside agency reports
* Laboratory reports
* Maintenance surveys and evaluations
* Emergency drill critiques

9) **Manpower and Education**

Managers are committed to ensuring that staff who maintain utility systems are adequately trained and are competent to provide the highest level of reliability and integrity of support systems. Staff are involved to the degree necessary to design and implement department level plans to ensure the delivery of services during emergency situations.

The education and training of users of utility systems are primarily done at the department level. Staff response to emergencies and drills is evaluated and communicated to various program committees such as Emergency Preparedness and Environment of Care Committee.

10) **Preventive Maintenance**

Maintenance will generally be performed according to manufacturer's recommendation, or as addressed in the individual utility operational plan. The operational plan gives a detailed explanation of the utility, record drawings, utility operation, emergency procedures, any preventive maintenance and maintenance requirements and responsible personnel.

All preventive maintenance will be documented and kept on file in the Facilities Support Service office.

11) **System Failures**

a) System failure shall be defined as partial loss or failure of the system
b) System failures shall be documented and submitted to the Environment of Care Committee

12) **Performance Improvement Plan**

Utilities performance improvement plan will be reported quarterly to the Environment of Care Committee.

5. **REFERENCES**

The Joint Commission Standards
Facilities Support Service Policies

6. **RESCISSION**

Medical Center Memorandum 04-FM-2, dated June 14, 2004

7. **EXPIRATION DATE**

March 13, 2012

8. **ISSUING DEPARTMENT**

Facilities Support Service

//bww//
Brian W. Westfield, MSN
Director

Distribution: E

Facilities Management Service Policy No. 16

Jonathan M. Wainwright Memorial
VA Medical Center
Walla Walla, Washington

July 26, 2012

WATER QUALITY, SYSTEM SECURITY, AND CONTINGENCY PLAN

1. PURPOSE

To provide policy and procedure to meet Environmental Protection Agency (EPA) and Washington State Department of Health (WSDOH) regulations for maintaining an adequate supply of safe drinking water and controlling domestic hot water temperatures.

2. POLICY

To provide a safe environment by monitoring of the water system for contaminants, chlorine levels, system security, and hot water temperatures. Water sampling will be in compliance with requirements of EPA Clean Water Act and WSDOH regulations for water supply systems. Domestic hot water temperatures will be maintained at levels mandated by VHA Directive 2009-009, "Domestic Hot Water Temperature Limits."

3. PROCEDURES

a. Monitoring of Water Quality

1) Water system contaminant testing will be performed as required by WSDOH to ensure a safe, clean water supply from the facility wells. Testing requirements vary each year as to the required testing with only lead, copper, and nitrates requiring annual testing. Coliform bacteria require monthly testing.

2) Water temperatures exiting the steam and electric hot water generators in the facility buildings will be a minimum of 140 degrees F. Hot/cold water mixing units will be installed as necessary in areas where patients may be insensitive to hot water temperatures to ensure water temperatures are between 120^0-129^0 F, as per VHA Directive 2009-009, "Domestic Hot Water Temperature Limits."

3) Annual water sampling for Legionella is required for the MHRRTP, Building 140, as outlined in Medical Center Memorandum, IC-13.

4) Coliform Sampling Plan:

a) Sampling will be performed by the Facilities Management Service (FMS) Plumbing Shop personnel
b) Samples will be taken at locations designated by the facility Coliform Monitoring Plan (Attachment A).
c) Prior to drawing sample, any aeration device will be removed from faucet and end of faucet will be flamed to prevent potential cross-contamination
d) Plumbing Shop personnel will ensure proper protocol is followed for coliforn sampling as required in the Coliform Monitoring Plan.

e) Sampling will occur at least once per month, no more than 45 days apart and no less than 10 days apart – no later than the the 3rd week of the month.
f) Samples will be taken to the Walla Walla Regional Water Testing Services lab for testing
g) Sample results will be kept on file in the GEMS Office.

5) Chlorine levels are tested daily in the Boiler Plant, Building 76 by the Boiler Plant personnel. The purpose of the tests is to ensure the residual chlorine level in the water supply system is kept between 3.0 parts per million (ppm) and 4.0 ppm as the ideal. The log of the daily chlorine tests is kept in the Boiler Plant, Building 76.

b. Response to Water Quality Problem:

1) In the event that there is a contamination problem with the water supply the following actions will be taken:

a) Notification will be made station-wide concerning the details and if it is localized to a building, all occupants will be warned not to consume the water. If necessary, a boil order will be placed in effect and ice will be purchased for use.

b) All necessary steps will be taken to identify and alleviate the issue through proper corrective actions.

c) Ice from the ice machines will not be used. FMS will remove the ice from the machines and disconnect the machines until the issue is resolved. FMS will disinfect the machines prior to being placed back in service

d) Follow-up tests will be conducted to determine if corrective actions have eliminated the contamination prior to returning to normal water use.

e) Notification will be sent to facility water consumers to inform them that the problem has been corrected and that normal water use can be resumed.

2) In the event of any other water quality testing not being in compliance, the following actions will be taken:

a) An investigation into the cause of the out-of-range result will be conducted to find the source of the problem.

b) Washington State Department of Health will be contacted for consultation in the remediation of the contaminant.

c) All recommended steps will be taken to ensure the water system is in compliance with Washington State regulations.

c. Water Temperature:

1) FMS will ensure that the hot water leaving the steam and electric hot water generators in each building are functioning properly and the water leaving the units is set at the proper levels.

2) Hot water will be maintained in the system at the tape, between 120^0-129^0 F and the chlorine residual level will be maintained at 3.0 parts per million (ppm) or higher to limit the potential for the growth of bacteria in the system.

3) Plumbed emergency equipment (e.g., eye washes and showers) are recommended to have tepid (i.e., moderately warm; 60^0 F – 100^0 F) water flow to exposed areas, which generally necessitates the piping of hot and cold water to the equipment and mixing to the appropriate temperature.

d. System Security:

1) All well houses and the water tower generator building shall be kept locked and secured whenever personnel are not present.

2) The water tower ladder shall be kept locked and secured whenever not in use.

4. CONTINGENCY PLAN

a. The facility primary water source consists of two wells and a 100,000 gallon water tower. Well #1 and the water tower are on emergency power from a dedicated emergency generator. Each well has a rock salt electro-phoritic separator chlorine injector.

b. In the event of well or tower failure, the facility maintains two separate and remote connections to the City of Walla Walla municipal water system. The valves shall be exercised annually by the Plumbing Shop through the preventive maintenance system to ensure functionality.

5. REFERENCES

VHA Directive 2006-007 – Ensuring the Security & Availability of Potable Water at VHA Facilities
VHA Directive 2009-009, Guidance for Domestic Hot Water Temperatures
VHA Directive 2008-010, Prevention of Legionella Disease
Washington State Department of Health Water System regulations

6. RESCISSIONS

Facilities Support Service Policy No. 16, *Water Quality, System Security, and Contingency Plan*, dated February 20, 2009

7. EXPIRATION DATE

July 26, 2015

//TA//
Timothy Anderson
Manager, Facilities Management Service

Attachment A

Coliform Monitoring Plan for: Jonathan M. Wainwright Memorial VAMC

A. System Information

Water System Name Dept of Veterans Affairs	County Walla Walla	System I.D. Number 90542
System Narrative	Source: Well 1, 83' deep Well 2, 558' deep City of Walla Walla connections (2) Treatment: Electrophoretic Sodium Chloride Separation Distribution System: A single pressure zone. Water is pumped from the well to the storage tank. Gravity flow from the tank to all service connections. Storage: 100,000 gallon water tower Residential Connections/Population: 0 Non-Residential Connections/Pop: 320	
Number of Routine Samples Required Monthly by Regulation: 1	Number of Sample Sites Needed to Represent the Distribution System: 3	

B. Routine and Repeat Sample Locations

Location/Address for Routine Sample Sites	Location/Address for Repeat Sample Sites
X1.	1-1.Bldg 86, 3rd Floor, Room 342
Bldg 86, 3rd Floor, Room 342	1-2. Bldg 86, 3rd Floor, Room 341
	1-3. Bldg 86, 3rd Floor, Room 343
	1-4. Bldg 99, Well 1 sample tap
X2.	2-1. Bldg 74, Team D, Room 156
Bldg 74, Team D, Room 156	2-2. Bldg 74, Team D, Room 154
	2-3. Bldg 74, Team D, Room 158
	2-4. Bldg 99, Well 1 sample tap
X3.	3-1.Bldg 86, 1st floor, Room 105
Bldg 86, 1st floor, Room 105	3-2. Bldg 86, 1st floor, Rm 104/105
	3-3. Bldg 86, 1st floor, Room 107
	3-4. Bldg 99, Well 1 sample tap

C. Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	X1	July	X1
February	X2	August	X2
March	X3	September	X3
April	X1	October	X1
May	X2	November	X2
June	X3	December	X3

D. Month Following Unsatisfactory Samples

Description of Sample Collection Locations for Month Following Unsatisfactory Samples
The month after coliform positive sample, five (5) follow-up samples will be
submitted, marked as "Routine" type samples. We will collect these samples from
the three (3) Routine sample sites, as well as from two (2) of the Repeat sample
sites. Which Repeat sites are used will depend on where the contamination
occurred.

E. Water Sampling Procedures

1) A sampling bottle and Coliform Bacteria Analysis form is picked up from the testing laboratory:

   Walla Walla Regional Water Testing Services
   714 S. College Avenue
   College Place, WA 99324
   PH#: (509) 526-9287

2) Checking Chlorine Residual: The Colorimeter II handheld water analyzer, located at Well Number 2, is available for testing Free Available Chlorine Residual.

   a. Remove any sink attachments (i.e. aerators, laminar flow) from the faucet to be tested.
   b. Turn on the colorimeter.
   c. Turn on the cold water tap and allow it to flow with a steady stream for five minutes, then turn the water down to a thin stream (about the width of a pencil). Let the water run for one more minute before checking the residual chlorine level.

d. Fill the colorimeter sample vial with water from the faucet to be tested.
e. Screw on the cap and insert the vial into the colorimeter.
f. Depress the zero button (0).
g. Remove the vial from the colorimeter.
h. Add a powder pillow packet to the vial of water and screw the cap back on.
i. Shake the vial to mix the powder with the water in the vial.
j. Insert the vial back into the colorimeter.
k. Depress the check mark button on the colorimeter.
l. If an adequate reading, between 0.02 ppm and less than 0.05 ppm, has not been attained, the chlorination units at Wells 1 and/or 2 may require adjustment to increase or decrease chlorination levels. Contact the facility plumbers or electrician for assistance.
m. After the Free Available Chlorine Residual on the colorimeter meter shows that it is in the proper range (between 0.02 ppm and less than 0.05 ppm), the water sample can be taken at the required tap. Ensure you annotate the Free Available Chlorine Residual on the Coliform Bacteria Analysis form. Please see monthly schedule above for tap locations.

3) Taking the water sample:

a. After the Free Available Chlorine Residual has been determined, the water sample can be taken. To avoid contamination while taking the sample, hold the bottle near the bottom with one hand, hold the top of the cap with the other, and then unscrew the cap. **Do not** set the cap down, touch any part of the cap that touches the bottle, or let anything touch the rim of the bottle or the inside of the cap.
b. Hold the bottle under the stream of water. Be careful not to let the bottle touch the sample tap. Fill the bottle to the neck or indicated fill line, but do not allow it to overflow. Remove the bottle from the water flow and replace the cap.
c. Complete the lab slip. If there was anything unusual about the sample collection, note it on the lab slip.
d. Include at least the following information on the laboratory form: Water system ID number, water system name, collection date and time, type of sample (routine distribution sample, repeat, raw water, information only), sample location, system type (Group A or B).
e. Secure the lab slip to the bottle with a rubber band. Deliver the sample to the lab. The phone number and address is included above.

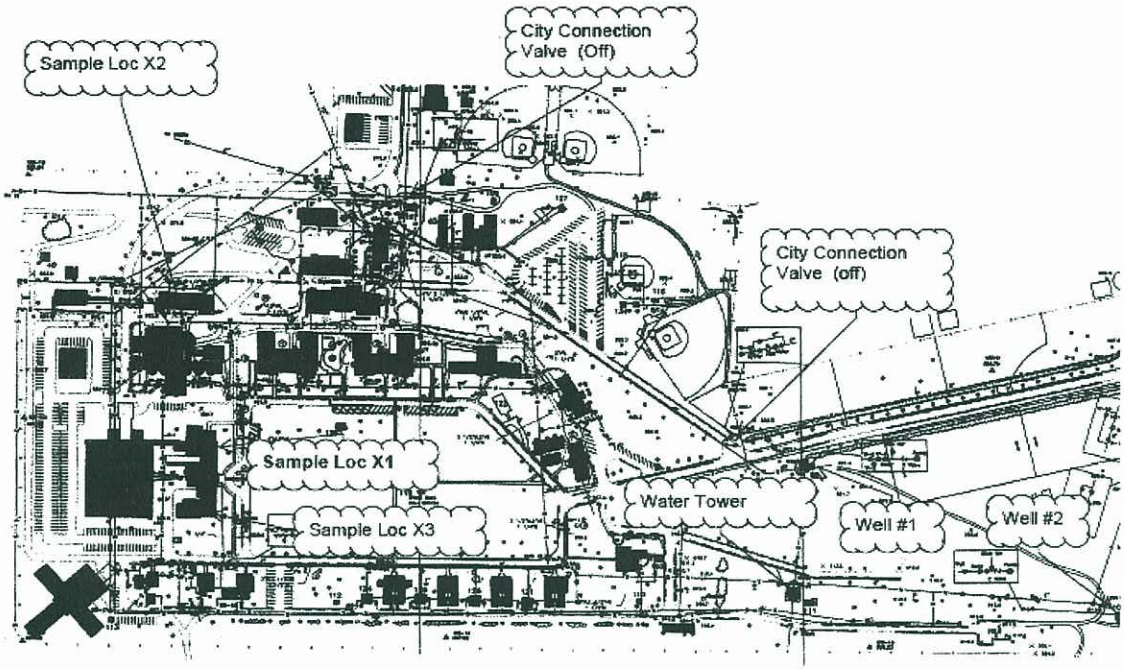
F. Designated Employee Collecting Facility Samples

Chuck Kimzey
Phone Number: (509) 525-5200 Extension: 22514

G. Preparation Information

System Name	Date Plan Completed	Dates Modified
Dept of Veterans Affairs	4/09/2012	Not Applicable
Name of Plan Preparer: Randy Stujenske Position: GEMS Coordinator Signature: Randy L. Stujenske Date: 9 Apr 2012		Daytime Phone # (509) 5255200 Ext 22379
~~State Reviewer~~ Joseph Fiumara, R.S. WWCHD - Joe Fiumara R.S.	Date Last Review 4-12-12	

System Map
Coliform Monitoring Plan



Attachment A

Coliform Monitoring Plan for: Jonathan M. Wainwright Memorial VAMC

A. System Information

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Number of Routine Samples Required Monthly by Regulation: 1	Number of Sample Sites Needed to Represent the Distribution System: 3	

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Location/Address for <u>Routine</u> Sample Sites	Location/Address for <u>Repeat</u> Sample Sites
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Bldg 86, 3rd Floor, Room 342	1-2. Bldg 86, 3rd Floor, Room 341
	1-3. Bldg 86, 3rd Floor, Room 343
	1-4. Bldg 99, Well 1 sample tap
X2.	2-1. Bldg 74, Team D, Room 156
Bldg 74, Team D, Room 156	2-2. Bldg 74, Team D, Room 154
	2-3. Bldg 74, Team D, Room 158
	2-4. Bldg 99, Well 1 sample tap
X3.	3-1.Bldg 86, 1st floor, Room 105

Bldg 86, 1st floor, Room 105	**3-2. Bldg 86, 1st floor, Rm 104/105**
	3-3. Bldg 86, 1st floor, Room 107
	3-4. Bldg 99, Well 1 sample tap

C. Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	X1	July	X1
February	X2	August	X2
March	X3	September	X3
April	X1	October	X1
May	X2	November	X2
June	X3	December	X3

D. Month Following Unsatisfactory Samples

Description of Sample Collection Locations for Month Following Unsatisfactory Samples
The month after coliform positive sample, five (5) follow-up samples will be
submitted, marked as "Routine" type samples. We will collect these samples from
the three (3) Routine sample sites, as well as from two (2) of the Repeat sample
sites. Which Repeat sites are used will depend on where the contamination
occurred.

E. Water Sampling Procedures

1) A sampling bottle and Coliform Bacteria Analysis form is picked up from the testing laboratory:

   Walla Walla Regional Water Testing Services
   714 S. College Avenue
   College Place, WA 99324
   PH#: (509) 526-9287

2) Checking Chlorine Residual: The Colorimeter II handheld water analyzer, located at Well Number 2, is available for testing Free Available Chlorine Residual.

   a. Remove any sink attachments (i.e. aerators, laminar flow) from the faucet to be tested.
   b. Turn on the colorimeter.
   c. Turn on the cold water tap and allow it to flow with a steady stream for five minutes, then turn the water down to a thin stream (about the width of a pencil). Let the water run for one more minute before checking the residual chlorine level.
   d. Fill the colorimeter sample vial with water from the faucet to be tested.
   e. Screw on the cap and insert the vial into the colorimeter.
   f. Depress the zero button (0).
   g. Remove the vial from the colorimeter.
   h. Add a powder pillow packet to the vial of water and screw the cap back on.
   i. Shake the vial to mix the powder with the water in the vial.
   j. Insert the vial back into the colorimeter.
   k. Depress the check mark button on the colorimeter.
   l. If an adequate reading, between 0.02 ppm and less than 0.05 ppm, has not been attained, the chlorination units at Wells 1 and/or 2 may require adjustment to increase or decrease chlorination levels. Contact the facility plumbers or electrician for assistance.
   m. After the Free Available Chlorine Residual on the colorimeter meter shows that it is in the proper range (between 0.02 ppm and less than 0.05 ppm), the water sample can be taken at the required tap. Ensure you annotate the Free Available Chlorine Residual on the Coliform Bacteria Analysis form. Please see monthly schedule above for tap locations.

3) Taking the water sample:

   a. After the Free Available Chlorine Residual has been determined, the water sample can be taken. To avoid contamination while taking the sample, hold the bottle near the bottom with one hand, hold the top of the cap with the other, and then unscrew the cap. **Do not** set the cap down, touch any part of the cap that touches the bottle, or let anything touch the rim of the bottle or the inside of the cap.
   b. Hold the bottle under the stream of water. Be careful not to let the bottle touch the sample tap. Fill the bottle to the neck or indicated fill line, but do not allow it to overflow. Remove the bottle from the water flow and replace the cap.
   c. Complete the lab slip. If there was anything unusual about the sample collection, note it on the lab slip.
   d. Include at least the following information on the laboratory form: Water system ID number, water system name, collection date and time, type of sample (routine distribution sample, repeat, raw water, information only), sample location, system type (Group A or B).
   e. Secure the lab slip to the bottle with a rubber band. Deliver the sample to the lab. The phone number and address is included above.

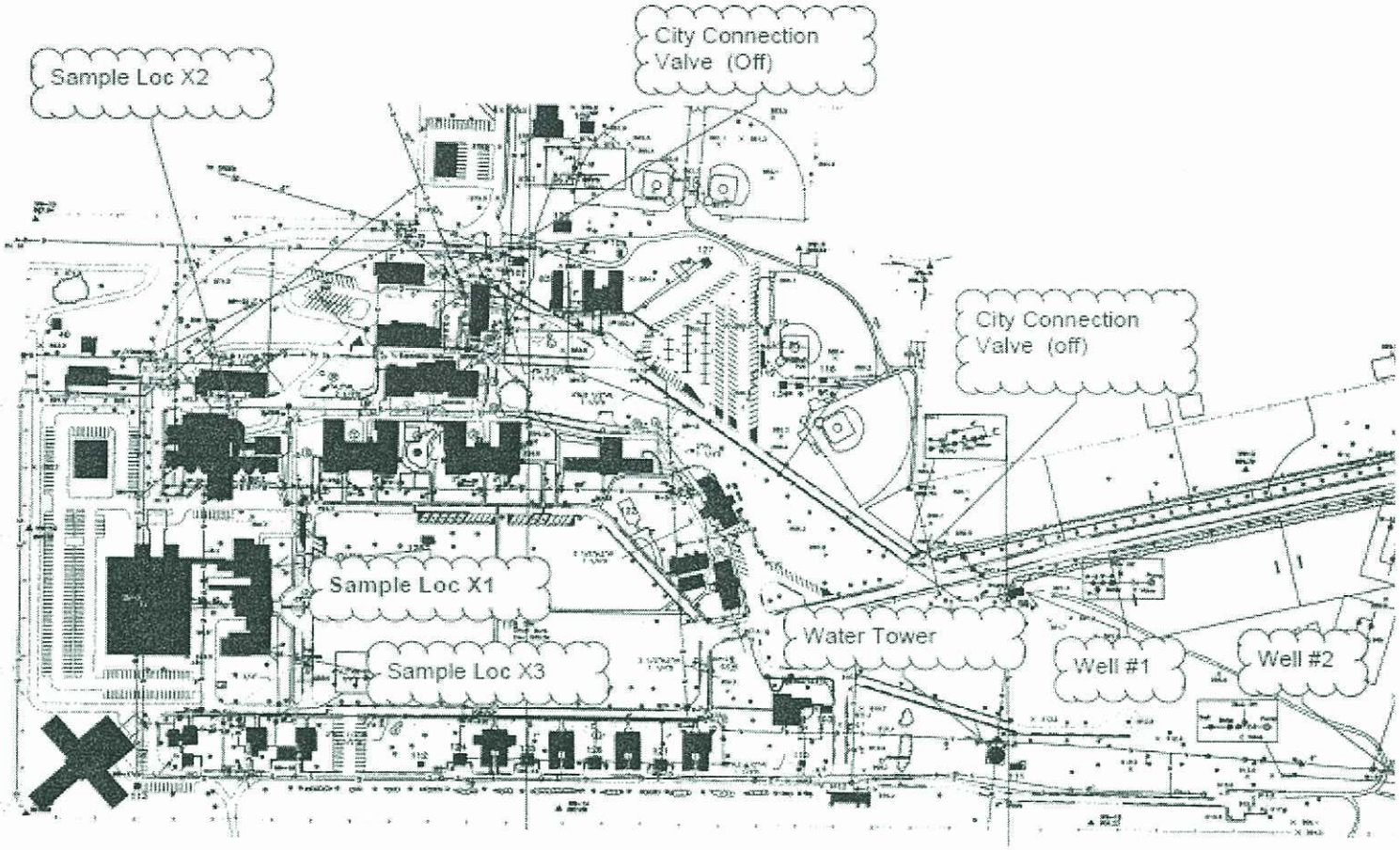
F. Designated Employee Collecting Facility Samples

Chuck Kimzey
Phone Number: (509) 525-5200 Extension: 22514

G. Preparation Information

System Name Dept of Veterans Affairs	Date Plan Completed 4/09/2012	Dates Modified Not Applicable
Name of Plan Preparer: Randy Stujenske **Signature:**_____	**Position: GEMS Coordinator** **Date:** _____	**Daytime Phone #** **(509) 5255200 Ext 22379**
State Reviewer	**Date Last Review**	

System Map
Coliform Monitoring Plan



Facilities Support Service Policy No. 19

Jonathan M. Wainwright Memorial
VA Medical Center
Walla Walla, Washington

August 26, 2010

UTILITY SYSTEMS FAILURE CONTINGENCY PLAN

1. PURPOSE

To delineate a comprehensive utilities systems contingency plan to ensure adequate service for the Medical Center in the event of a utility system failure and to affect prompt repairs to return the system to normal operation.

2. POLICY

A contingency plan exists that ensures adequate service is available for the continued operation of the Medical Center in the event of a utility system failure.

3. RESPONSIBILITY

a. Facility Support Services is responsible for all utility systems and shall ensure that a contingency plan is followed for each identified system to ensure adequate service to the Medical Center in the event of a system failure.

4. PROCEDURE

a. Utility systems which have been identified as critical to the operation of the Medical Center have individual contingency plans to be followed in the event of a system failure. The current plans are as follows:

	System	FSS Policy No.
1)	Steam (Boiler) Failure Contingency Plan	22
1)	Utility Outage Reporting	27
2)	Sewer System Failure Contingency Plan	29
3)	HVAC Equipment Failure Contingency Plan	35
4)	Water System Failure Contingency Plan	36
5)	Electrical Power Failure Contingency Plan	37
6)	Natural Gas Failure Contingency Plan	39
7)	Elevator Transport Equipment Failure Contingency Plan	40
8)	Medical Air System Failure Contingency Plan	41
9)	Medical/Surgical Vacuum System Contingency Plan	42

		MCM Policy No.
12)	Operational and Failure contingency Plan for Medical Gas (Oxygen)	FM-5

b. Facilities Support Service will provide advance notice to all affected departments when there is a planned utility shutdown.

c. ***During normal duty hours***, utility system failures are to be reported to Facilities Support Service, Ext. 22855 or 22489.

d. ***During other than normal duty hours***, the Medical Administrative Assistant shall confirm the utility system failure and take the following actions:

1) Call in Facilities Support Service personnel as delineated in FSS Policy No. 20, *After-Hours Notification for Emergencies Dealing with Utilities, Buildings, Grounds and Equipment.*

2) Review the applicable contingency plan and notify all appropriate personnel as indicated.

3) Initiate any actions as indicated by the responding FSS personnel.

e. The responding FSS personnel shall evaluate the situation and, if deemed appropriate, initiate the appropriate contingency plan. The responding FSS personnel shall immediately notify the following individuals, as deemed necessary, of the situation and actions being taken:

1) Maintenance and Operations Foreman
2) Assistant Manager
3) Facilities Manager
4) Safety Manager
5) Medical Staff, as necessary

f. A log of all events and actions shall be maintained by Facility Support Service for the duration of the emergency.

g. Upon restoration of the utility system, Facility Support Service shall report the outage per Facilities Support Service Policy No. 27, *Utility Outage Reporting*.

5. REFERENCES

The Joint Commission Standards
Facilities Support Service Policy No. 27, *Utility Outage Reporting*
Facilities Support Service Policy No. 37, *Electrical Power Failure Contingency Plan*

6. RESCISSION

Facilities Support Service Policy No. 19, dated November 7, 2006

7. EXPIRATION DATE

August 26, 2013

//TA//
Tim Anderson
Facilities Manager

cc: IRM

Jonathan M. Wainwright Memorial
VA Medical Center
Walla Walla, Washington

January 12, 2010

WATER SUPPLY FAILURE CONTINGENCY PLAN

1. PURPOSE

To delineate the action to take in the event of the failure of the potable water system.

2. POLICY

To ensure that there is an adequate supply of portable water for the essential functions of this Medical Center at all times.

3. RESPONSIBILITY

Facilities Support Service is responsible for ensuring that there is an adequate supply of potable water for the essential functions of this Medical Center and that any system failures are expeditiously resolved.

4. PROCEDURE

a. Potable water is supplied by either one of the following two deep-water wells:

1) **Well No. 1** is on emergency power supplied from the generator in Building 111.

2) **Well No. 2** is not on emergency power.

b. There is also an alternate source of water from the City of Walla Walla. It comes through an 10-inch main located on the south side of Wainwright Drive near the entrance to the facility and goes into a pressure reducing valve, then into the facility's distribution system. There is also an 8-inch connection at the Poplar Street entrance. Under normal operation, this water main is valved off.

c. The water distribution systems consist of an underground water main, isolation valves, wells/pumps, water treatment by chlorine injection, water tower for storage of 100,000 gallons, interior distribution lines/valves, heaters, and fixtures.

d. In the event of an interruption in the water supply, the following steps should be taken:

1) If the well in service fails, immediately isolate the well and start up the alternate well and check the chlorine for 0.3-4 ppm residual.

2) If a leak develops in the water storage tower, the tower should be isolated by closing supply and feed valves and by opening the bypass valve until the storage tank can be repaired.

3) If a building develops a problem in the interior distribution system that cannot be isolated and repaired, the building supply valve should be closed to isolate the building from the system until repairs can be made. Building water use should be curtailed. Potable water containers can be obtained from Dietetics Department and limited water supply can be provided.

4) If the distribution system fails or develops a leak, the leakage area should be isolated by valving off until repairs can be made. Buildings affected should be treated as mentioned above.

5) In the event that both wells fail, the wells should be isolated and the following action taken to turn on the water main from the City of Walla Walla:

a) The alternate water source from the City of Walla Walla will be turned into the system. The primary source is the 10-inch line and valve pit located at the Wainwright "Y". The following procedure will be used:

(1) Using radios for communication all times, check the water pressure with the Boiler Plant Operator after closing or opening each valve.
(2) Close valve No. W2 the middle most valve of the three valves in the 8-inch line just east of the Boiler Plant, Building 76.
(3) Close valve No. W34 the northernmost valve of the three valves southeast of Building 75.
(4) Close valve No. W6 in Building 99 on the 8-inch line which leaves the west side of the pump room.
(5) Open fire hydrant No. 12 at the base of the steps leading to the ballpark parking lot and No. 13 located off the corner of building 107 (the old incinerator building).
(6) Go to the PRV station at the "Y" in Wainwright Drive and open the PI valve No. W49 at that location.
(7) At this time, run city water from hydrant No. 12 until it is clear and grit free and then close the hydrant.
(8) Open valve No. W2 and then check with the Boiler Plant Operator to ensure adequate pressure.
(9) Go to the pit north of the water tower and close the western most valve No. W46 of three valves.
(10) Open valve No. W34.

b) The following procedure will be used when returning the water system back to service at this Medical Center:

(1) Flush each well thoroughly through the bypass located in each well house until the water is clear and dirt/grit-free.
(2) Open the western most valve No. W46 in the pit north of the water tower and open the valve No. W6 in Building 99 located at the west side of the pump room.
(3) Go to the PRV station at the "Y" in Wainwright Drive and close PI valve No. W49.
(4) Check with the Boiler Plant Operator to see if adequate pressure is maintained after each valve closing or opening.

c) After completing the turn on of the alternate water source, the responsible party in charge will:

(1) Contact the City of Walla Walla Utility Engineer at 527-2111 to inform him/her that the VAMC is using city water and advise as to the duration of the usage, if possible.
(2) Obtain water sample for analysis by the county. The sample should be taken at an appropriate location after 12 hours of usage.
(3) Test the chlorine level of the city water for a residual of 0.3-4 ppm.

d) The following employees will be notified of water interruption:

During normal duty hours:

Facilities Support Service
Deputy Director
Pipefitters, Boiler Plant Operators

During other than normal duty hours: Boiler Plant Operator who in turn will notify:

Manager, Facilities Support Service
Assistant Manager, Facilities Support Service
Pipefitters
Officer of the Day

e) In the event that Facilities Support Service personnel cannot make the repairs, the following contractor shall be contacted for emergency repair:

Mike Harvey's Plumbing Service
1024 S. Second
Walla Walla, Washington 99362
(509) 525-1039

f) In the event of a prolonged outage and the wells or city water supply have failed, contact should be made with:

Department of Emergency Services
310 W. Poplar Street
Walla Walla, Washington 99362
(509) 527-3223

They can arrange to have water delivered by tanker trucks.

5. SYSTEM FAILURES

a. System failure shall be defined as any component failure that will cause complete loss/failure of the system.

b. All system failures shall be documented stating cause, type of failure, corrective action, or user/operator error. Failure documentation shall be submitted to the Safety Committee. The number of incidents/failures on each specific system will determine effectiveness and frequency of education needs per Facilities Support Service Policy No. 27, *Utility Outage Reporting*.

6. TRAINING

All users and maintenance personnel shall receive orientation and at least annual training on each utility system that they use or maintain.

a. ***Minimum user training***

- Who to contact when failure occurs
- When systems are tested
- Where system shutoff valves and controls are located
- What backup system is available

b. ***Minimum maintenance personnel training***

- Maintenance and preventive maintenance requirements
- System operation
- Emergency procedures

7. REFERENCES

The Joint Commission Standards
Facilities Support Service Policy No. 27, *Utility Outage Reporting*

8. RESCISSION

Facilities Support Service Policy No. 36, dated October 21, 2006

9. EXPIRATION DATE

January 12, 2013

//TA//
Tim Anderson
Manager, Facilities Support Service

Distribution: 200, 300
All Facilities Support Service Employees

MEDICAL CENTER MEMORANDUM FM-15

JONATHAN M. WAINWRIGHT MEMORIAL
VA MEDICAL CENTER
Walla Walla, Washington

November 20, 2009

EMERGENCIES INVOLVING BUILDINGS, GROUNDS, UTILITIES, AND EQUIPMENT

1. PURPOSE

To establish Medical Center policy for response to emergency situations involving damage of buildings and grounds, critical equipment failures, or utility interruption within the Medical Center or from the municipal source.

2. POLICY

This Medical Center will provide safe, protected working conditions, housing, and uninterrupted utilities to ensure patients, visitors, and employees the highest degree of service possible.

3. PROCEDURE

a. During normal duty hours, Facilities Support Service will take appropriate action when an emergency situation occurs. If necessary, the Manager of Facilities Support Service, the Safety Officer, or designee, will contact the Director's Office and request activation of the Medical Center Emergency Preparedness Plan.

b. During other than normal duty hours when an emergency situation occurs, the Medical Administrative Assistant (MAA) will contact one of the following:

1) Manager, Facilities Support Service
2) Assistant Manager, Facilities Support Service
3) Safety Officer
3) Director

4. RESPONSIBILITY

a. **Facilities Support Service** is responsible for initial response and damage control/repair activities when an emergency situation arises involving buildings, grounds, utilities, fire and safety alarms, building service equipment, and personal property.

b. **All employees** are responsible for notifying Facilities Support Service during normal duty hours when such situations arise or appear imminent. During other than normal duty hours, employees should notify the Medical Center switchboard operator or the police officer on duty.

5. REFERENCE

Medical Center Emergency Preparedness Plan
Management of the Environment of Care, Joint Commission
Utilities Management Plan

6. RESCISSION

Medical Center Memorandum 06-FM-15, dated September 1, 2009

7. EXPIRATION DATE

November 20, 2012

8. ISSUING DEPARTMENT

Facilities Support Service

//bww//
Brian W. Westfield, MSN
Director

Distribution: F

Facilities Support Service Policy No. 20

Jonathan M. Wainwright Memorial
VA Medical Center
Walla Walla, Washington

August 20, 2010

AFTER-HOURS NOTIFICATION FOR EMERGENCIES DEALING WITH UTILITIES, BUILDINGS, GROUNDS, AND EQUIPMENT

1. PURPOSE

To establish which Facilities Support Service employees will be called for after-hours emergencies.

2. POLICY

Facilities Support Service will take all necessary measures to respond to after-hours emergencies.

3. RESPONSIBILITY

a. The Manager, Assistant Manager, and Maintenance & Operations Supervisor of Facilities Support Service are responsible to assure that after-hours emergencies will be responded to.

b. The Medical Administrative Assistants (MAA's) are responsible to call in Facilities Support Service employees for after-hours emergencies.

4. PROCEDURE

a. In the event of an emergency, contact the employees listed below the specific problem:

(1) Electrical

(a) Dave Buttice..... 240-7464
(b) Nels Fanciullo.....520-9703
(c) Donny Clark..... 520-0900

(2) Plumbing/Steam

(a) Chuck Kimzey 301-2038
(b) Derek Eves.....701-2445

(3) Medical Equipment

(a) James Roe 525-7112
(b) Hugh (Hawk) Moore..... 520-0566

(4) Oxygen System

(a) James Roe 525-7112
(b) Hugh (Hawk) Moore..... 520-0566

(5) Medical Air & Vacuum Systems

(a) Nels Fanciullo.....520-9703
(b) Donny Clark..... 520-0900

(6) Elevators/Non-Medical

(a) Donny Clark..... 520-0900
(b) Dave Buttice..... 240-7464
(c) Brian Houdak 520-0357

(7) Buildings

(a) Tim Anderson..... 240-5914

(8) Air Conditioning

(a) Nels Fanciullo.....520-9703
(b) Donny Clark..... 520-0900

(9) Heating - All heating, except as noted in (10) below

(a) Chuck Kimzey 301-2038
(b) Derek Eves.....701-2445

(10) Heating – Building 74 & Building 86 (1st and 2nd Floors)

(a) Nels Fanciullo.....520-9703
(b) Donny Clark..... 520-0900

(11) Grounds

(a) Dave Petersen..... 525-0894
(b) Dan Carlisle (Contractor) 526-0313

(12) Transportation

(a) Chuck Cook 240-4553
(b) Ken Cowden..... 525-8360
(c) Butch Drake..... .240-4153
(d) Brian Houdak... 520-0357

(13) Housekeeping

Steve Bash..... 301-2087

(14) Laundry

Dean Rencken 938-6000

(15) Safety and Industrial Hygiene

Guy Jessee..... 525-3619

b. If none of the above employees can be reached, then call the supervisors, as listed in the following order:

(1) Brian Houdak, Maintenance & Operations Supervisor
Facilities Support Service 520-0357
(2) Mike McQuaid..... 876-4016
(3) Tim Anderson, Manager, FSS 240-5914

5. **RESCISSION**

Facilities Support Service Policy No. 20, June 1, 2006

6. **EXPIRATION DATE**

August 20, 2013

Tim Anderson
Manager, Facilities Support Service

Distribution: MAAs

Facilities Support Service Policy No. 18

Jonathan M. Wainwright Memorial
VA Medical Center
Walla Walla, Washington

July 30, 2010

PREVENTIVE MAINTENANCE FOR UTILITY SYSTEMS

1. PURPOSE

To establish criteria for a Preventive Maintenance (PM) Program for utility systems.

2. POLICY

To assess and control the risks of utility system failure for which Facilities Support Service has maintenance responsibility. The Preventive Maintenance (PM) Program shall address the periodic maintenance and inspection requirements of the utility systems included in the Utilities Support Service Program and shall be in accordance with the procedures outlined in this policy.

3. PROCEDURE

a. Monthly PM assignments will be given to each journeyman on or before the beginning of each month. All assigned PM's are to be completed within the month assigned unless circumstances prevent the PM from being done.

b. The PM work lists will be printed by the Work Order Clerk at the start of each month. Each journeyman will be responsible for writing all pertinent information on the PM work order including associated cost, corrective action taken, and any additional remarks beneficial for future use.

c. PM's shall be completed per the PM procedure indicated on the PM assignment sheet. If no PM procedure is indicated, the manufacturer's specifications shall be used.

d. Systems that do not pass the PM procedure shall have work orders issued for their repair.

e. The PM assignment sheets shall be reviewed for accuracy, completeness, and timeliness. The PM program will be reviewed by the Safety Committee on an annual basis for its effectiveness.

4. RESPONSIBILITY

a. The individual **journeyman** assigned the PM shall be responsible for completing and documenting the PM and for feedback to the supervisor on repair needs and any anticipated delays.

b. The Manager, Facilities Support Service shall be responsible for ensuring the PM Program meets the goals of the overall Utilities Support Service Program.

5. REFERENCES

Management of the Environment of Care, JCAHO
VHA Supplement, MP-3, Chapter 2, paragraph 2.22

6. **RESCISSION**

Facilities Support Service Policy No. 18, dated October 7, 2006

7. **EXPIRATION DATE**

July 30, 2013

//TA//
Tim Anderson
Manager, Facilities Support Service

APPENDIX C

Water System Plan, April 1987,

Prepared by Sorenson & Company

V.A. MEDICAL CENTER

WALLA WALLA, WASHINGTON

PROJECT 83-117

WATER SYSTEM STUDY

FINAL DRAFT

SECOND SUBMITTAL

APRIL, 1987

DOCUMENT NO. 1

Engineer's Project No. 85-09-07

SORENSON & COMPANY

2500 Murphy • (406) 728-4611
P.O. Box 3418 • Missoula, MT 59806

ENGINEERING • LAND SURVEYING • PLANNING

V.A. MEDICAL CENTER

WALLA WALLA, WASHINGTON

PROJECT 83-117

WATER SYSTEM STUDY

FINAL DRAFT

SECOND SUBMITTAL

APRIL, 1987

Prepared By:

Sorenson & Company
P.O. Box 3418
Missoula, MT 59806

Engineer's Project No. 85-09-07

DENNIS C. MUTH
STATE OF WASHINGTON
14837
REGISTERED
PROFESSIONAL ENGINEER
4/6/87

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2. Water Use

3. Supply System

4. Distribution System

5. Storage

6. Financial

7. Conclusions and Recommendations

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B. Computer Analysis of Distribution System

C. Electrical Review by General Engineers, Inc.

D. Well Logs for Well #1 and Well #2

E. Summary of City of Walla Walla Water Rates

F. Cost Estimates (V.A. Form 10-6238) for 20 Year Capital Improvement Plan

G. Drawing - Exhibit 1-1, Water System Plan

CHAPTER 1

INTRODUCTION

A. Purpose

This report presents the results of an engineering study of the V.A. water system by Sorenson & Company. The report is to make recommendations on upgrading the system and improving the method of operation.

B. Description of System

The V.A. water system provides domestic, fire and lawn irrigation water for a 150 patient medical facility with 320 employees. A number of employees with their families live on site in government housing. This V.A. facility has all the typical water uses an institution normally has.

The water system consists of 6" and 8" cast iron water mains throughout the compound which are looped. Fire hydrants are located throughout the compound. The supply consists of two water wells which are connected into the water main grid. Also, the V.A. has two connections to the City of Walla Walla water system. The storage consists of a 100,000 gallon elevated steel reservoir located in the southeast portion of the V.A. grounds which also pressurizes the water system.

C. History of V.A. Water System

1. Water Supply

Prior to 1928, the Veterans Hospital obtained its water from the City of Walla Walla water system. The V.A. system was and still is connected into the city main in Chestnut Street with a 6" main. There was a storage reservoir 170 feet north of the present water tower that was used for a fire protection system.

a. Well #1

In 1926 the original well #1 was drilled north of the water tower near Wainwright Drive. The original well pump was in a pit. In 1928 the present 100,000 gallon water tower was constructed along with the water main from well #1 to the water tower. The new main was connected into the existing 6" mains with a 6"x8" cross. The original well #1 was a 12" diameter well, 275 feet deep. The static water level was 29 feet below the surface. The well had 69 feet of drawdown at a pumping rate of 600 gpm. The motor used was a 30 hp. In 1932 the pit was concreted and

a house was built over the top. Also, a new pump was installed. The pump for well #1 was replaced again in 1960. A 550 gpm pump at 215 feet TDH and a 40 hp electric motor was installed.

In 1977, well pump #1 was again replaced. A 550 gpm pump at 220 TDH with a 50 hp electric motor was installed. At this time the well casing was videotaped and a hole was found in the casing. In 1980 a new well was drilled 20 feet northwest of the original well. See Appendix D for well log. A 12" casing was installed to a depth of 103 feet. The casing was perforated from 83 to 103 feet. The well was grouted with bentonite to a depth of 20 feet. The static water level was 26 feet below the top of the well. The present well #1 pump was relocated to the new well #1. The pump house was enlarged to house the new well. The existing piping was connected to the new location inside the well house. The controls and electrical supply were redone. The well does have a chlorination system which is in use. This well presently pumps +600 gpm with about 12 feet of drawdown. This well is in the gravel aquifer.

The pump motor for well #1 has an auxiliary generator located at the water tower. The generator has an automatic start.

b. Well #2

Another groundwater well was drilled in 1933. This well was located in the southeast corner of the V.A. grounds along the 6" supply main from the City of Walla Walla connection on Chestnut Street. Well #2 had a 16" casing at the top and reduced down to an 8" casing at the bottom. The total depth of the well was 550 feet. The pump was installed in 1935 and set at 145 feet. A 350 gpm pump at 270 feet TDH with a 40 hp motor was installed. A pump house, Building 101, was constructed.

In 1982 a new well #2 was drilled 20 feet southwest of the original well #2. A 12" casing was installed and the well is 780 feet deep. (See well log, Appendix D.) The static water level is about 220 feet depending on the time of the year. A 100 hp submersible pump was installed with a capacity of 534 gpm at 497 feet TDH. This well presently pumps +600 gpm with 20 feet of drawdown. The existing pump house was added onto so as to house the new well. The new pump was connected into the existing piping.

This well is in the Basalt Aquifer.

c. Connections to City of Walla Walla

The 6" connection on Chestnut Street was installed prior to 1921. Old drawings show a 6" connection before the present 6" connection on Chestnut Street. A second connection to the City system was installed from near Building 99 to Willow Street in 1956. These connections are normally closed and used only for emergencies.

2. Distribution

The water mains are either 6" or 8" cast iron pipe. The mains have been in use many years. The last main installed was in 1956 which is the 8" connection to the City of Walla Walla on Willow Street. In 1939 a number of mains were replaced or extended. The 8" water main from well #1 (Building 99) to the water tower was installed in 1928. The remaining water mains were installed prior to 1921. See Exhibit 1-1 for location of the different aged water mains.

CHAPTER 2

WATER USE

A. Existing

Water use records were gathered from the V.A. and tabulated for the years 1984 and 1985. The monthly water use was plotted for the two years (see Figure 2-1). The peak in this curve is the irrigation period. The irrigation months are April through October. From the data gathered, the following was determined:

Average Daily Use: 170,000 gallons
Average Daily Use (Winter): 50,000 gallons
Maximum Day: 1,000,000 gallons (694 gpm)

From the high range side of typical rates for institutions, the following is calculated:

Hospital Bed:	251 gpd x 150 =	37,650 gal./day
Employees:	15.9 gpd x 320 =	5,088
Residents:	12 each x 350 =	4,200
		46,938 gal./day

The present water use is within the range of flows for similar facilities. The maximum day is 5.9 x the average day. The area has hot summer days and the landscaping requires large amounts of water. During the hot, dry period is when the maximum day occurs.

B. Projected Use

Unless the mission of the institution is greatly changed, the water use should stay constant. The irrigation portion could change if more landscaped areas are added or if landscaped areas are abandoned. No change is contemplated. A 100 bed nursing home has been talked about. This usage would be about:

100 beds x 106 gal./bed = 10,600 gal./day

The present system could provide the nursing home adqeuately.

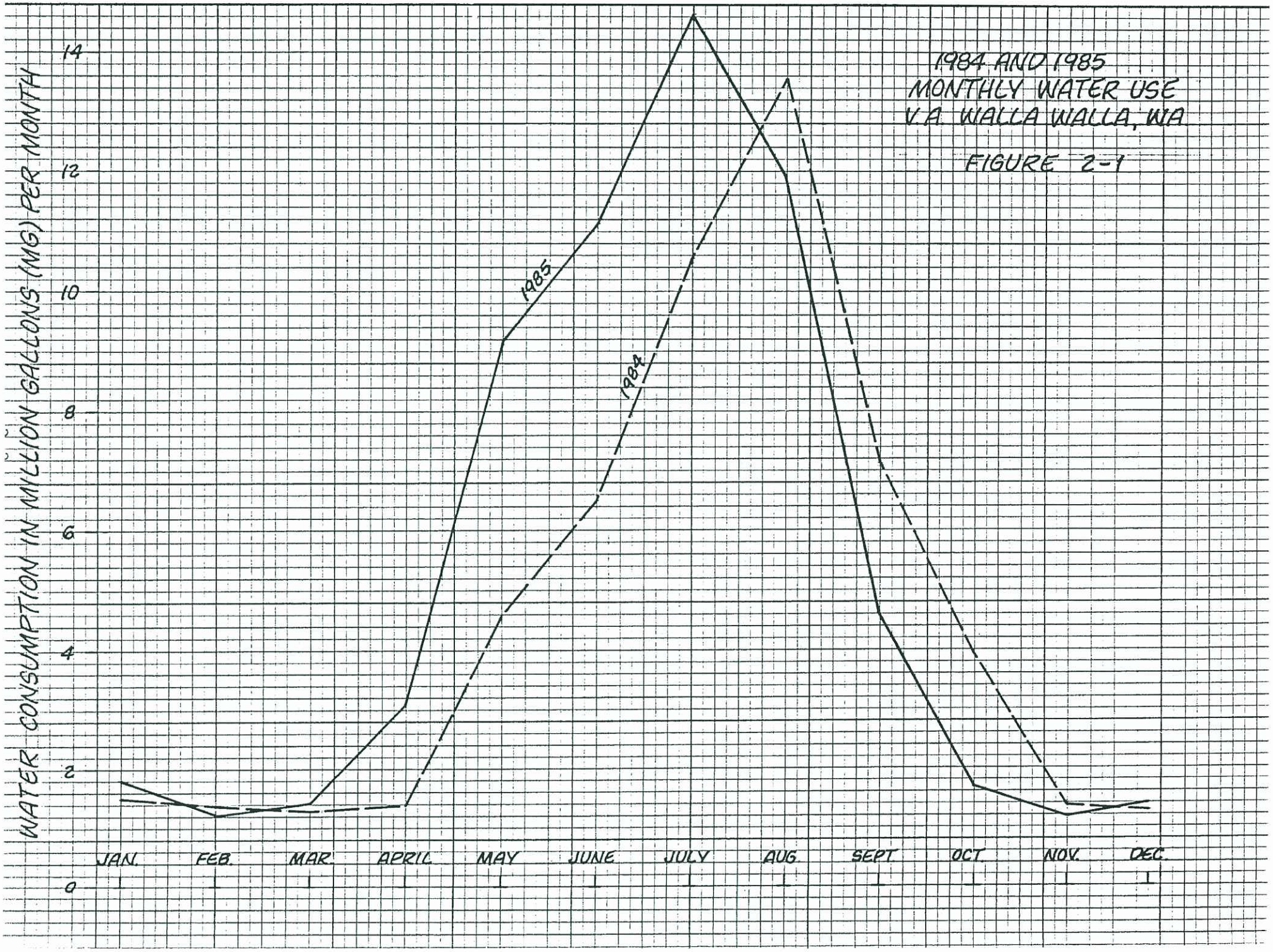
C. Fire Flow

The fire flows required for this institution are as follows:

1000 gpm for 2 hours at a residual pressure of 20 psi.

Insurance Services Office (ISO), for rating purposes, requires the water system to provide the fire flow plus consumption at the maximum daily rate.

Many of the buildings have automatic fire sprinkler systems.


1984 AND 1985
MONTHLY WATER USE
V.A. WALLA WALLA, WA
FIGURE 2-1
WATER CONSUMPTION IN MILLION GALLONS (MG) PER MONTH
14
12
10
8
6
4
2
0
1985
1984
JAN.
FEB.
MAR.
APRIL
MAY
JUNE
JULY
AUG.
SEPT.
OCT.
NOV.
DEC.

CHAPTER 3

SUPPLY

A. General

The V.A. has two groundwater wells on site which are the present source of water. See Figure 3-1 for location. The V.A. has been using a groundwater source for the past 57 years. The V.A. also has two connections to the City of Walla Walla water system for emergency use.

B. Well #1 - Building 99

Well #1 is a 103 foot deep groundwater well in the "gravel" aquifer which was drilled in 1980. See Appendix D for well log. This well replaced an existing well drilled in 1928. It has a line shaft turbine pump with a 50 hp electric motor. A pump house, Building 99, is constructed over the well. This well has a chlorination system with a separate room for the chlorine gas cylinders. This pump is presently run one day a week unless the reservoir level falls to second pump level. The pump has a check valve, water meter and gate valve located in the pump house. The pumping level is about 45 feet below the surface.

The northwest corner of the pumphouse has settled causing a 1/4" crack to appear in the brick. The mortar should be repointed in the disturbed area. If the crack worsens, other corrective measures may need to be taken. Also the mortar has fallen out between the new wall and the old wall west of the door. The area should be repointed with mortar.

An electrical review was made. For those comments see Appendix C.

A pump test was performed on 3/5/86. For the results see Figure 3-2. This pump operates at about 51% overall efficiency in its normal operating range. Overall efficiency is pump efficiency times motor efficiency. Typical motor efficiency is 75% to 80%. Therefore, the pump efficiency is 64% to 68%. The pump efficiency from the pump manufacturer's curve is 68% at the normal operating conditions. This pump is operating in the expected efficiency range. The electricity required to pump 1000 gallons of water is 1.06 Kw hours.

C. Well #2 - Building 101

Well #2 is a 780 foot deep well in the Basalt Aquifer drilled in 1982. See Appendix D for well log. This well has a 100 hp submersible motor and pump. A check valve water meter and gate valve are located inside the pump house. This well has a chlorination system similar to well #1. This pump runs six days a week unless the reservoir level

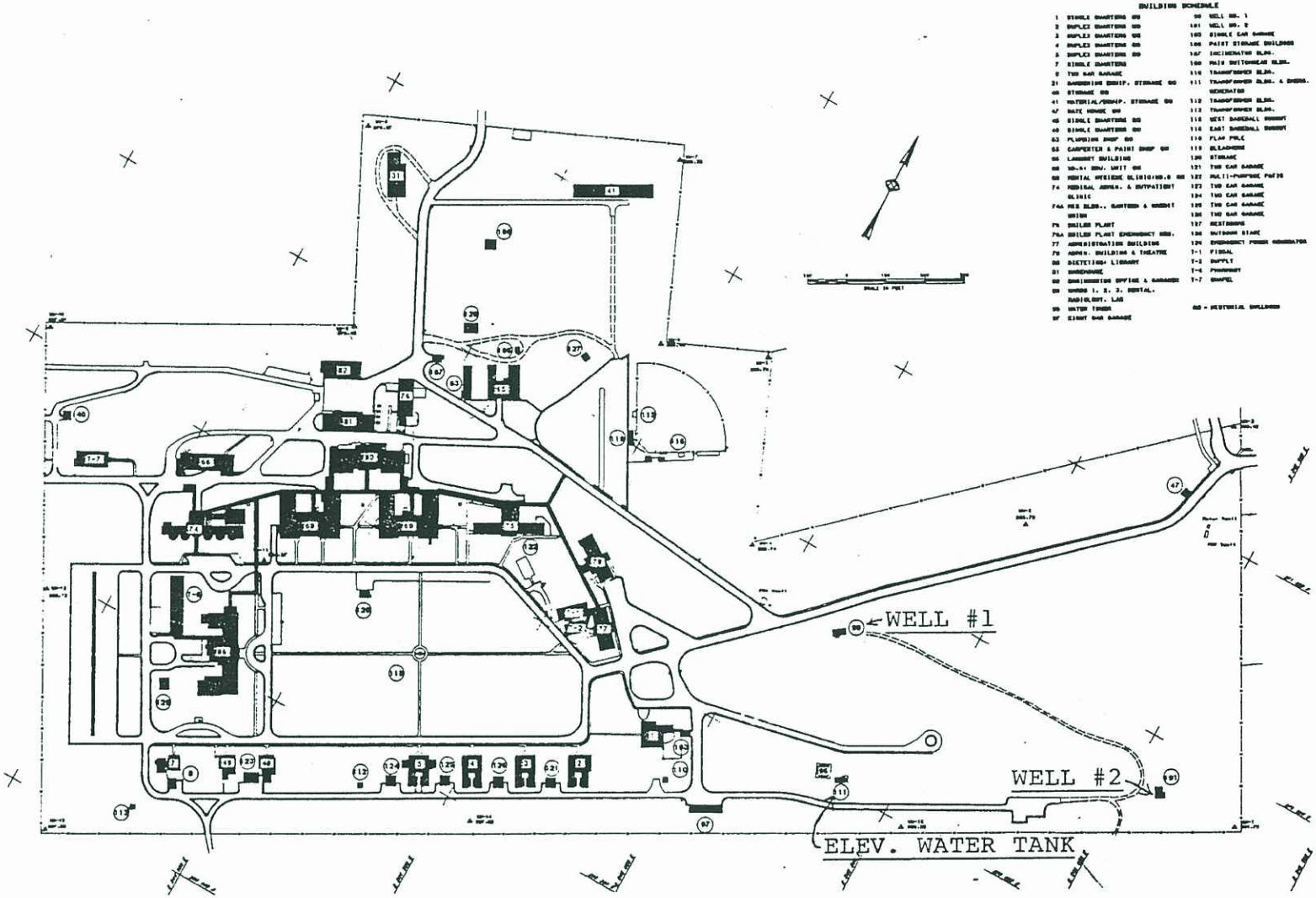


FIGURE 3-1

BUILDING NUMBER & LOCATION

VAMC, WALLA WALLA, WA

Veterans Administration

WELL #1 - PUMP TEST ON 3/5/86

TIME	WATER METER (C.F.)	WATER PUMPED (C.F.)	KWHR USED	KWHR/ 1000 GAL.	HEAD (FT.)	OVERALL EFFI-CIENCY	REMARKS
1530	27,362,530						Drawn Down 16 ft.
		1,295 (646 gpm)	10	1.03	159	49%	
1545	27,363,825						Drawn Down 16 ft.
		1,284 (640 gpm)	10	1.04	159	48%	
1600	27,365,109						Drawn Down 13 ft.
		1,291 (644 gpm)	10	1.04	162	49%	
1615	27,366,400						Drawn Down 13 ft.
		1,255 (626 gpm)	10	1.07	164	48%	
1630	27,367,655						Drawn Down 13 ft.
		1,260 (628 gpm)	10	1.06	169	50%	
1645	27,368,915						Drawn Down 13 ft.
		1,260 (628 gpm)	10	1.06	171	51%	
1700	27,370,175						Reservoir ±1½' From Overflow

$$\text{Overall Efficiency} = \frac{H(\text{ft.}) \times 0.00315}{\text{Kwhr. per 1000 gal.}}$$

NOTE: Water tower was empty when pump test started. Test began at 1431.

FIGURE 3-2

would drop to the second pump on the seventh day. The pumping level is about 220 feet below the surface. This well pump has excessive water hammer. When the pump stops, the gauge has a ±40 psi bounce.

An electrical review was made. For those comments see Appendix C.

A pump test was performed on 3/6/86. For the results see Figure 3-3. This pump operates at about 57% overall efficiency in its normal operating range. Overall efficiency is pump efficiency times water efficiency. Typical motor efficiency is 75% to 80%. Therefore, the pump efficiency is 71% to 76%. The pump efficiency from the pump manufacturer's curve is 75% at the normal operating conditions. This pump is operating in the expected efficiency range. The electricity required to pump 1000 gallons of water is 2.17 Kw hour. This pump is a little more efficient than well #1, but still requires twice the energy to pump the same amount of water. More energy is required because of the additional 175 feet of pumping head.

D. City Connections

This system has two connections to the City of Walla Walla water system. There is an 8" water main connection to Willow Street and a 6" water main connection to Chestnut Street. Each connection has a water meter, manual gate valve and a Clayton #90 pressure reducing valve. The sizes of valves are the same as the pipe size. The city operates on a higher pressure than the V.A. The manual valves are normally closed. If the V.A. would require the city supply, the manual valves would be opened. The Clayton #90 reduces the pressure down to the V.A. operating pressure. When the V.A. is operating on the 8" city supply main, the static pressure at the boiler plant (Building 76) is 63 psi. The static pressure is 60 psi at the boiler plant when the V.A. operates on their own system. There is water hammer when the V.A. operates on the city supply. The 8" Clayton valve cannot operate properly at low flows. This valve was not designed to operate at low flows. The Clayton valve manuals recommend using a 2" valve in parallel with the larger valve on dead end systems. The small valve handles the low flows and the larger valve opens when the flow increases.

The 6" city supply has not been used in a number of years. It is not known what pressure the 6" Clayton 90 valve is set at. The supply main will have the same water hammer problem as the 8" city supply main. The 6" Clayton valve would require a small valve in parallel to prevent the water hammer.

All the valves, piping, joints and pits are in good condition.

WELL #2 - PUMP TEST ON 3/6/86

TIME	WATER METER (C.F.)	WATER PUMPED (C.F.)	KWHR USED	KWHR/ 1000 GAL.	HEAD (FT.)	OVERALL EFFI-CIENCY	REMARKS
0930	7,830,870						Drawn Down 9 ft.
		1,270 (633 gpm)	20	2.11	372	56%	
0945	7,832,140						Drawn Down 9 ft.
		1,270 (633 gpm)	20	2.11	379	57%	
1000	7,833,410						Drawn Down 9 ft.
		1,250 (623 gpm)	20	2.14	382	56%	
1015	7,834,660						Drawn Down 9 ft.
		1,250 (623 gpm)	20	2.14	384	57%	
1030	7,835,910						Drawn Down 9 ft.
		1,250 (623 gpm)	20	2.14	386	57%	
1045	7,837,160						Drawn Down 9 ft.
		1,240 (618 gpm)	20	2.16	389	57%	
1100	7,838,400						Drawn Down 9 ft.
		1,230 (613 gpm)	20	2.17	391	57%	Reservoir ±1½' From Overflow
1115	7,839,630						

$$\text{Overall Efficiency} = \frac{H(\text{ft.}) \times 0.00315}{\text{Kwhr. per 1000 gal.}}$$

NOTE: Water tower was empty when pump test started. Test began at 0848.

FIGURE 3-3

E. Operation

The V.A. water system has an Autocon control system which works off pressure. The pressure is sensed in the pit below the water tower. The control system will start and stop the pumps as required to keep the reservoir full. The control system has a pump off level (reservoir full), first pump on and second pump on. If the reservoir level drops to the second pump on level, both pumps will run until the full level is reached. In addition to the Autocon control, the system has a time clock which designates the lead and lag pump. The lead pump is well #2 for six days a week and the lag pump is well #1. One day a week this sequence is reversed to allow regular operating time on the lag pump.

On April 17, 1986, the operation of the control system was checked. The reservoir was filled and then drained to see what level the lead pump comes on and what level the lag pump comes on. The following levels are where the control is set:

Gauge Reading at Building 111	Remarks
110 ft.	Pump off, target down
106.3 ft.	Lead pump on
96 ft.	Red line on gauge (lag pump should start)

The lag pump never came on. The lag pump was started by tripping the relay manually and the reservoir allowed to fill with both pumps running. It appears the mercury switch for starting the lag pump has malfunctioned. Once the pump was running, the control shut both pumps off at the full level. The pump off level is 1.9 feet below the top of overflow. The lag pump should be made to be operational in the automatic mode. The lag pump "on" level should be raised to 103 feet. Each vertical foot in the tank is 2,843 gallons. An additional 28,430 gallons is used before the second pump comes on. At 103 feet, only 9,382 gallons would be used before the lag pump comes on.

With both pumps running, each pump is pumping at its normal pumping capacity.

Both wells have an automatic gas chlorination system which is in use. The chlorination system meets present day standards. The V.A. adds 0.2 ppm of chlorine.

The V.A. can utilize the City of Walla Walla water supply by opening a manual gate valve for either of the two connecting mains. Before these connecting mains are put in service, they are flushed for 30 minutes or so. Each connection has a pressure reducing valve, a Clayton 90-01 series. The water tower is not used when the V.A. is using the city water supply.

F. Critical Water Supply Service Area

The two V.A. wells are located in a Critical Water Supply Service Area (CWSSA). See Figure 3-4 for location of this area in Walla Walla County.

The Washington State Legislature enacted the Public Water System Coordination Act, RCW 70.116, which established a procedure for water utilities to coordinate their planning and construction activities with other water utilities in the same area. This law requires that a Coordinated Water System Plan (CWSP) be prepared for the study area. A CWSP has been prepared for that portion of Walla Walla County and the V.A. water system is included in the plan. The Walla Walla/College Place Coordinated Water System Plan Regional Supplement and Water General Plan was prepared by Economic and Engineering Services, Inc. in January, 1984.

Declining water levels of the basalt aquifer is the key concern for the water users in the Walla Walla area. One of the programs implemented by the CWSP is the groundwater monitoring program. This program is to be carried on continuously in the future by the area water utilities. The V.A. is participating in the program. The static and dynamic water levels are checked bi-monthly and the results sent to the county and published annually. See Table 3-1 for results of the V.A. wells for 1983 through 1985. Along with the groundwater monitoring program, the utilities will continue to pursue water quality testing as required by Department of Social and Health Services (DSHS). The testing will be done to ensure water quality and to identify trends in deteriorating water quality.

A water supply reservation petition has been developed as part of the CWSP. One option is to utilize the basalt aquifer and Mill Creek in a conjunctive manner such that Mill Creek supplies are utilized to the maximum degree during the winter high stream flow, thereby allowing the basalt aquifer to rest, and optimum use of the basalt aquifer during the summer months with augmentation from Mill Creek supplies. A second option involves artificial recharge of the basalt aquifer using excess flows from the Mill Creek water supply.

Section VII of the Engineering and Economic Services, Inc. report, page VII-3, A, second paragraph, states, "It would appear that the V.A. Hospital has insufficient supply capability based upon current peak day demands." I believe this is incorrect. The well data shown in the report has the two V.A. wells at 300 gpm each, which, at this well capacity, the V.A. would be deficient in supply. The V.A. wells are 600 gpm each and the V.A. has capacity to provide supply for their peak day demands.

For more information on the Critical Water Supply Service Area (CWSSA), see the Critical Water System Plan (CWSP) prepared by Economic and Engineering Services, Inc., January, 1984.

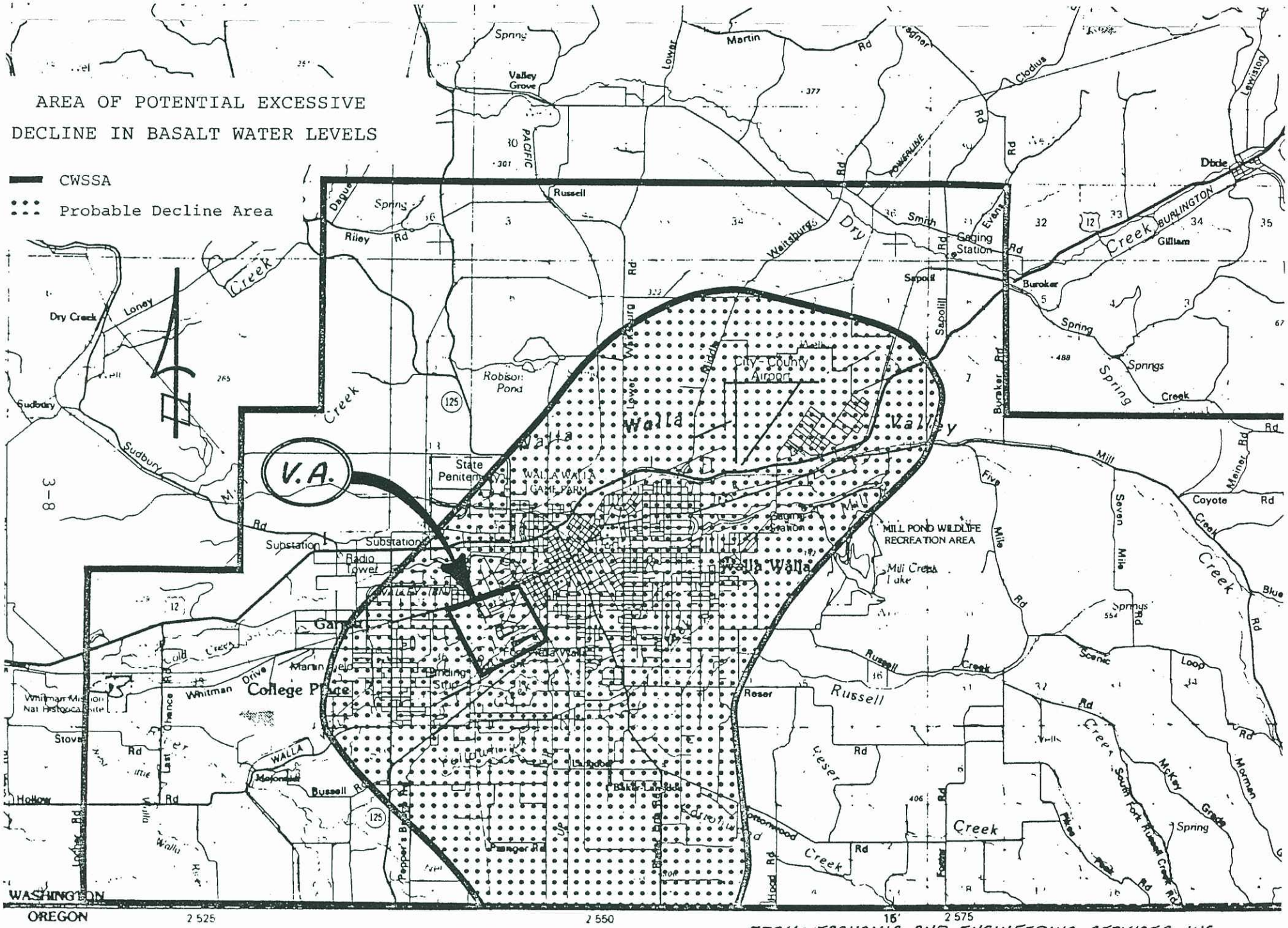


FIGURE 3-4

FROM: ECONOMIC AND ENGINEERING SERVICES, INC. REPORT, JANUARY, 1984, EXHIBIT VI-5

TABLE 3-1

WATER LEVEL MONITORING RESULTS

Utility Well Number	Approx. Elev. of Meas. Point	Depth Below Measuring Point											
		Static Water Level						Dynamic Water Level					
		Feb.	Apr.	Jun.	Aug.	Oct.	Dec.	Feb.	Apr.	Jun.	Aug.	Oct.	Dec.
V.A. Well #1 - 1983	896	-	29	-	34	32	30	-	42	-	46	44	42
V.A. Well #2 - 1983	896	223	-	-	-	-	232	239	-	-	-	-	241
V.A. Well #1 - 1984	896	29	28	30	32	31	30	42	39	42	44	44	43
V.A. Well #2 - 1984	896	202	200	216	250	250	227	-	216	223	260	260	236
V.A. Well #1 - 1985	896	-	30	32	35	32	33	-	44	44	46	44	44
V.A. Well #2 - 1985	896	-	206	206	*	*	230	-	216	216	*	*	243

*Pump removed for repairs.

CHAPTER 4

DISTRIBUTION SYSTEM

A. Water Mains

The distribution system has 11,000 l.f. of 6" and 8" cast iron water mains. The system is looped and only has a couple dead end mains. See Exhibit 1-1 for schematic of the V.A. water system. The mains are all old, being installed from before 1921 to 1939. The system has been added onto and modified many times in the past. Fire hydrants and gate valves are located throughout the system.

On April 16, 1986 an inspection was made of the main line gate valves. See Table 4-1 for the results. Many of the valves turn hard and would not close shut all the way. The valves that were installed recently work fine. Valves were not checked for leakage. Many old valves which can be closed will still leak. Table 4-1 lists which valves should be replaced. It is important to have workable gate valves so, if an area has to be shut down, the whole system does not have to be shut down. The present valve locations are adequate except three gate valves should be added at the main intersections 140 feet east of F.H. #12.

A 4" main goes to a live fire hydrant (F.H. #16) outside the V.A. fence near an old stable which recently was used by the U.S.F.S. This main should be capped off past the tee on the main that goes between Building 66 and Building T-7.

B. Service Connections

Each building has at least one service connection to the water main. Many buildings have separate fire service connections and these connections have Post Indicator Valves (P.I.V.'s) at the shut-off. The service lines range from 1" on the residences to 6" on the larger buildings. Each service line has a shut-off valve near the main. These services are all old and are presumed to be installed at about the same time as the mains. The service lines are copper and galvanized for the smaller water lines and cast iron pipe for the larger water lines. Only two users have meters, the laundry and boiler plant.

C. Pressure

The system has a static pressure of about 55 psi. The pressure at building 76, the boiler plant, is 60 psi. This pressure is adequate for the fire sprinkler systems. The water system obtains its pressure from the +100' water tower located in the southeast corner of the V.A. grounds.

TABLE 4-1

GATE VALVE INSPECTION REPORT

Valve #*	Size	Remarks	Replace
W-2	8"	Turns hard - couldn't close	Yes
W-10	6"	Turns OK	No
W-18	6"	Turns hard - couldn't close	Yes
W-18A	6"	Turns hard	Yes
W-19	6"	Turns OK	Yes
W-24	6"	Turns OK	Yes
W-25	6"	Turns moderate	Yes
W-26	6"	Turns moderate	Yes
W-28	6"	Turns hard - couldn't close	Yes
W-31	6"	Turns hard - difficult to get key on	Yes
W-34	6"	Turns OK	Yes
W-36	6"	Turns hard	Yes
W-38	6"	Turns moderate	Yes
W-39	4"	Won't shut off	Yes
W-40	6"	Turns OK	Yes
W-41	6"	Tight at first	Yes
W-43A	6'	Turns OK	Yes
W-44	6"	Valve box full of dirt	Yes
W-45	6"	Turns OK	Yes
W-46	6"	Turns OK	Yes
W-47	6"	Turns OK	Yes
W-48	6"	Turns OK	Yes
W-49	8"	Turns OK	No
W-50	6"	Turns OK	No
W-51	6"	Turns OK	No

*See Exhibit 1-1 for valve location.

D. System Analysis

A computer model was made of the existing V.A. water system for flow and pressure analysis. A modified city system was added to the basic V.A. system for analysis of the V.A. using the City of Walla Walla water system.

A number of runs were made simulating different operating conditions. Results of the computer modeling are included in Appendix 'B'.

The present V.A. water system cannot provide 1000 gpm fire flow on the maximum day and maintain 20 psi residual at the fire hydrant. The residual pressure is 16 psi. There is little change in pressure by running the second well pump. The system can provide 750 gpm fire flow with maximum day consumption and maintain 20 psi residual pressure at the fire hydrant. The system can provide the 1000 gpm flow during an average day use. If the 8" main from the tee at the 8" city connection to the entrance of the ballfield parking lot (existing cross) was increased to 10" diameter, the system could provide 1000 gpm fire flow on the maximum day.

As part of the analysis, we were to model the two inner tees to the City of Walla Walla water system. The 8" connection on Willow Street can supply the V.A. water system in the same manner as the water tower and one pump. The 8" city supply can provide 1000 gpm fire flow on the average day, but not on the maximum day. The 6" connection cannot provide the required fire flow on even an average day consumption. If both connections are used together, the 6" pipe only flows about 170 gpm. The 8" city supply main, even with the 6" city supply main, cannot supply the maximum day consumption and a 1000 gpm fire. The city cannot provide the water through their 6" and 8" looped system in the Blue Ridge School area. A new connection on Avery Street was simulated on the computer model. With the new Avery Street connection and the existing 8" connection, a maximum day consumption and 1000 gpm fire flow can be provided with a residual pressure above 20 psi. The Avery Street connection would require about 250 feet of 8" main and a new PRV station. Increasing the main capacity from the tee at the 8" city connection to the ballfield does not help the system when using the city for supply.

E. Fire Hydrants

The V.A. has 16 fire hydrants located throughout the V.A. grounds. Each building has good access to a fire hydrant. All the hydrants have an auxiliary gate valve for valving off the hydrant if it malfunctions.

The fire hydrants were all replaced in 1966. The only old fire hydrant is F.H. #3, which has a new fire hydrant 70 feet away, F.H. #3A. This old fire hydrant should be removed. The new hydrants are made by "Darling" with a 5¼" valve,

one steamer nozzle and two 2½" nozzles. The hydrants meet today's standards for fire hydrants.

Actual flow tests were run on 10 different hydrants. The results are tabulated in Table 4-2. These results were compared with the computer model results and similar pressures were obtained at the same flow.

TABLE 4-2

FIRE HYDRANT FLOW TEST RESULTS

HYDRANT NO.	HYDRANT LOCATION	PRESSURE (PSI) STATIC	PRESSURE (PSI) RESIDUAL	FLOW (GPM)	NODE*
2	Between Building 1 & W.T.	46	26	840	5
3	North of Building 2	47	35	940	26
4	Near Building 5	50	26	875	7
5	Between Buildings 5 & 48	50	27	875	8
8	Near Building 74	55	34	950	12
9	Near Building 68	55	30	890	24
10	Near Building 69	50	31	905	23
12	Between Buildings 65 & 75	57	45	1030	20
13	Near Building 76	58	40	1050	16
15	Near Building 41	58	30	900	17

*Computer analysis location.

All hydrants were flowed with one 2½" nozzle open.

Date Tested: 11/5/85

CHAPTER 5

STORAGE

A. General

The existing storage reservoir is a 100,000 gallon elevated storage tank or sometimes called a "water tower". See Figure 3-1 for the location. It is called Building 96 on the V.A. Building Schedule. The structure is 85 feet from the ground to the base of the tank portion. The tank is 22'0" in diameter and 28 feet high. The bottom is half of a sphere. The top of the tank has a conical roof. This structure was built in 1928 by Chicago Bridge and Iron Works. One 8" water main connects the reservoir into the distribution system. The reservoir can be drained through a drain pipe that daylights southeast of the reservoir. The reservoir has a 3" overflow which is piped down the reservoir and connects into the drain. There is an external water level indicator which is visible on the southwest side of the tank.

B. Storage Requirements

In the design and analysis of any water distribution system, water storage facilities play an important role. Water storage facilities normally serve the following purposes.

1. Eliminate or reduce excessive peak hour water demands imposed on the water supply facilities during the maximum day use periods by taking water from the system during low use periods of the day and returning water to the system during high use periods during the day.

2. Serve as a source of water supply for fighting fires and equalizing pressures throughout the water distribution system.

3. Increases the effective size of the system by backfeeding into the system when the storage facilities are located on the periphery of the system.

4. Store water for any other emergencies.

C. Determine Required Storage

If water supply system is capable of providing for maximum day demand, storage should equal:

15% to 30% of Maximum Day Demand
Plus
Fire Storage (Fire Flow x Duration)

If water supply system is incapable of meeting maximum day demand, storage should be increased accordingly.

The V.A. water supply is capable of meeting the maximum day demand.

Therefore, the storage should equal:

15% x 1.1 MG =	165,000 gal.
+ 1000 gpm x 60 x 2 =	120,000 gal.
	285,000 gal.
Less Existing	(100,000 gal.)
Additional Required	185,000 gal.

The V.A. does not have the required storage to meet the above parameters but the V.A. system does have auxiliary power for Well #1 and two connections to the City of Walla Walla water system. With these means of additional supply, the V.A. water system should be capable of handling all peak demands and emergencies.

D. Field Examination and Recommendations on Water Tower

See Appendix 'A' for a report by Muth Consulting Engineers. The reservoir was drained and inspection was made on March 4 and 5, 1986.

CHAPTER 6

FINANCIAL

As part of the study, we are to compare the cost of water from the present groundwater wells versus purchasing water from the City of Walla Walla. Water costs for both sources were calculated for each month of the year 1984. See Appendix 'E' for summary of city water rates. Last year was not used because pump #2 was inoperative for 5 months. The maintenance and replacement costs for the pumping cost total were calculated using 1/4 man year (O & M) and replacing the pumps every 10 years. A pump replacement cost of $30,000 for each well was used in the analysis. The $345 meter charge on the city connection is included in both totals. See Table 6-1 for the results.

From the table it can be seen the water costs are about the same over a year. The costs shown in Table 6-1 do not include chlorination. The City of Walla Walla water would have to be chlorinated by the V.A. The V.A. is presently chlorinating their well water at both wells. Since the V.A. would still be chlorinating the water, there would be no cost changes in regard to chlorination.

The electric power costs triple from the winter months to the peak summer months. But, as can be seen, the electric power costs do not have that big of impact on the total costs using the well option.

Since both wells and pumps have been replaced recently, within the last nine years, the present water supply should serve the V.A. for many years.

With the V.A. using their own wells, they are able to irrigate whenever necessary. By using city water the V.A. would be subject to City watering restrictions.

TABLE 6-1

YEARLY WATER COSTS

MONTH	WATER USAGE (C.F.)	COST OF ELECTRICAL POWER	MAINTE-NANCE AND RE-PLACEMENT	TOTAL PUMPING COST*	COST OF WATER FROM CITY OF WALLA WALLA
Jan. 1984	194,260	$ 600	$ 1,377	$ 2,322	$ 1,053
Feb. 1984	179,390	578	1,377	2,300	1,003
Mar. 1984	167,670	538	1,377	2,260	962
Apr. 1984	177,900	458	1,377	2,180	997
May 1984	570,210	712	1,377	2,434	2,339
Jun. 1984	903,560	934	1,377	2,656	3,480
Jul. 1984	1,258,600	1,157	1,377	2,879	4,693
Aug. 1984	1,852,750	1,532	1,377	3,254	6,726
Sep. 1984	1,047,360	1,051	1,377	2,773	3,971
Oct. 1984	555,340	744	1,377	2,466	2,288
Nov. 1984	187,600	599	1,377	2,321	1,031
Dec. 1984	165,550	586	1,377	2,308	955
TOTAL	7,260,190	$9,489	$16,524	$30,153	$29,498

*Includes the $345 charge on the 8" meter for the connection to the City of Walla Walla water system.

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

1. The system now serves a 150 bed medical facility with 320 employees plus irrigation for approximately 36 acres of landscaped area.

2. Maximum day use is 5.9 times the Average Daily Use or 20 times the Average Daily Use (Winter). The Maximum Day is high because of the large amount of irrigation and the hot summer weather.

3. The water usage is not expected to increase. No growth is planned or no additional area will be irrigated. The only new facility talked about is a 100 bed nursing home.

4. Since wells have been reconstructed and are in excellent condition, the V.A. should continue to use their present groundwater source.

5. The system is in excellent shape except for some maintenance items including the water tower.

6. The system cannot provide the required fire flow at the maximum day consumption rate on either supply (wells or the city).

7. The V.A. should continue their option to use the City of Walla Walla water supply if necessary.

B. Recommendations

On the basis of this study, we recommend the Veterans Administration take the following action:

1. Continue to use the present groundwater wells for their primary source of water.

2. Keep open the option to use the City of Walla Walla water if necessary.

3. Repair the Autocon control so the lag pump is operational in the automatic mode and raise the "on" level to 103 feet from 96 feet and eventually replace control system.

4. Make Well #1 the lead pump for six days a week and Well #2 the lead pump for the seventh day. Presently Well #2 is the lead pump. Well #1 is twice as efficient because of the well depth.

5. All the gate valves on the main water line should be opened and closed once a year and records kept on their condition.

6. Initiate the following 20 year capital improvement program:

   a. The water storage tank should be recoated inside and out per recommendations in Appendix 'A'.

   b. The improvements on the water storage tank to comply with the Ten State Standards and OSHA as listed in Appendix 'A' should be made.

   c. Fire hydrant #16 should be abandoned and the main capped off near the last tee. Fire hydrant #3A should be removed. There is a new hydrant 70 feet away.

   d. Replace water valves on the water mains as listed in Table 4-1.

   e. Install a pump control valve and "no-slam" check valve in well #2 to eliminate the "water hammer".

   f. Replace controls for well pumps.

   g. Increase the main size to 10" diameter capacity from tee at 8" city connection to cross, across from ballfield parking lot. (Nodes 21 to 28, pipe 29 on the computer analysis.) This main improvement would allow the system a hydrant flow of 1000 gpm at the maximum day consumption rate when on the groundwater wells for supply.

   h. Abandon the existing 6" city connection and install a new 8" connection at the Avery Street entrance. This would allow the system a hydrant flow of 1000 gpm at the maximum day consumption rate when using the city for supply.

   NOTE: See Appendix 'F' for cost estimates (V.A. Form 10-6238) of items a, b, d, e, f, g, and h.

APPENDICES

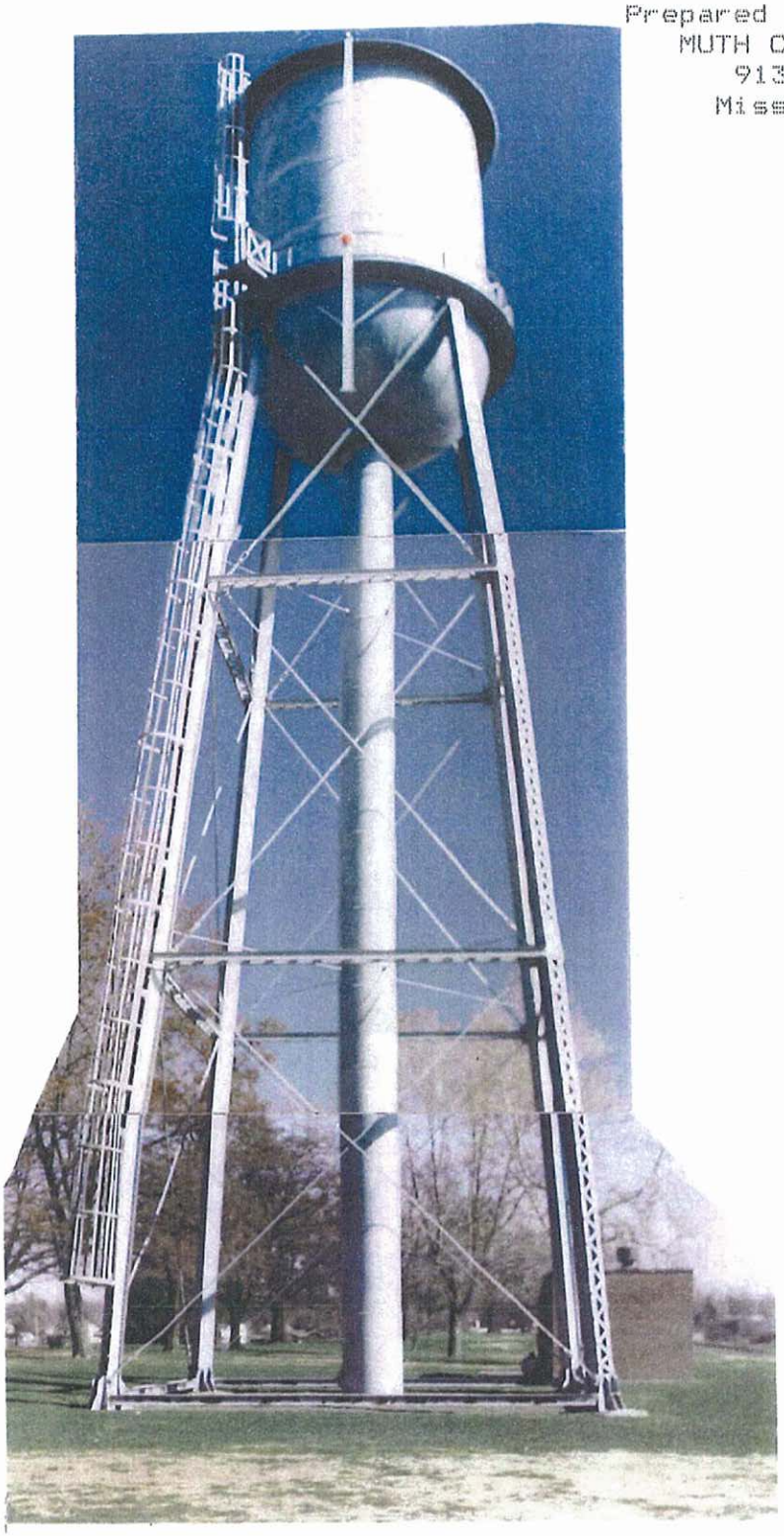
APPENDIX 'A'

FIELD EXAMINATION AND RECOMMENDATIONS ON WATER STORAGE TANK

APPENDIX A

Report on the general condition of the 100,000 Gallon elevated water storage tank, VA Medical Center, Walla Walla, WA.

Prepared By:
MUTH CONSULTING ENGINEERS
913 SW Higgins Ave.
Missoula, MT 59803



Appendix-A

V.A. Medical Center
Walla Walla, WA

100,000 Gallon Water Storage Tank, Structure #109

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Details	A24

DATA PLATE

Muth Consulting Engineers
913 SW Higgins Ave.
Missoula,Montana

V.A. Medical Center
Walla Walla,WA

100,000 Gallon Water Storage Tank,Structure #109

Introduction----------

The purpose of the field inspection is to gather information for an evaluation of the general condition of the water tank. From this information, recommended repairs and maintenance procedures will be proposed. A cost estimate for the work required to complete the repairs will be attached to this report.

A brief history of items pertinent to an inspection of the structural system follows. This structure was built in 1928 and a modification to increase the earthquake resistance was completed in 1937. Since then there have been no changes to the structural system. The diagonal brace rods were changed in the top two levels of the tower as part of the 1937 earthquake modification. The brace rods in the bottom level of the tower were not changed, the original design utilized 1.13" square rods in all three levels. 1.5" and 1.38" square rods were installed in the top and middle levels respectively. Also, horizontal struts were added at the footing level in the 1937 earthquake modification. Intuitively, one would expect the brace rods in the lower level to be loaded the heaviest. This is contradicted by the existing configuration. It is likely that the force in the brace rods are reduced in the lower portions of the tower because the outward slope of the posts increases the length of the horizontal struts and decreases the rods angle with the horizontal. Reportedly, the tank was last painted about 10 years ago. Both interior and exterior were done.

Inspection Report(March 4&5,1986)----------

1.Structural Steel Members:

The structural steel members of the tower and steel plates of the standpipe show no signs of distress or misalignment. The diagonal brace rods were checked for tightness and signs of overstress, all were tight and there were no "necked down" sections. Special attention was paid to the critical areas of the riveted connections, such as at the points where the diagonal brace rods are connected to thr posts and the posts to the cylindrical portion of the tank. There are no signs of excessive stress in the posts, rivets or tank (see photograph no's. 1&2).

The balcony at the top of the hemispherical tank bottom has

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Inspection Report, Cont.----------

1.Structural Steel Members,Cont.:

numerous areas where trapped moisture has blistered the paint on the horizontal plate. Rust and corrosion are in the early stages, there does not appear to be any significant loss of section (see photograph no. 3). The handrailing and chord members are not affected by the rust as significantly.

The steel ladder from the balcony to the top of the cylindrical portion of the tank does not have an intermediate support in 26 ft. of length and consequently is unstable. The steel ladder inside the tank in the hemispherical bottom portion is in poor condition. The ladder rungs are corroded, 50% max. loss of section (see photograph no's. 4&5). The ladder does not conform to OSHA regulations,see item 5.

Two "hot spots" were discovered on the inside of the tank in the hemispherical bottom. Both are approximately 1/2" in dia. and about 50% of the 1/4" thick steel plate is gone.

The exterior of the tank is in good condition, there are no indications of leakage or overstress in the plate members or the riveted plate connections, except at the connection of the standpipe to the hemispherical bottom. The joint between the standpipe and tank bottom does show signs of leakage (see photograph no's. 7&8). The riveted joints in the standpipe show slight signs of leakage, further discussed under coatings. The conical roof is in good condition.

The mechanism for keeping the level target traveling upright as it moves along the guide member is worn. There is a possibility that the target could become wedged on the guide and not travel downward as required.

2.Coatings:

The coating on the inside of the tank is in poor condition, especially in the hemispherical bottom and the top two courses of plate. In the hemispherical bottom, virtually all of the outside layer of coating is cracked and peeled. Approximately 25% of the area in the hemispherical bottom has the bare steel exposed, the remaining area is covered with the primer and or the original asphalt varnish. In the top two courses of plate (14 Ft.) the outside layer of coating is peeling, most severely in the top. In the top course the degree of decay in the outside layer of coating is similar to that in the tank bottom.(see photograph no's. 12 thru 16)

2.Coatings,Cont.:

On the exterior of the tank, the coating is in fair condition. The horizontal struts at ground level (added in 1937) are the only members with significant loss of coating. The presence of mill scale on the exposed portions of these members indicates that the surfaces were not properly prepared prior to their original painting. There are areas of paint blisters throughout the standpipe and tower, many of these were holding water. As mentioned in the structural steel section of the inspection report, there,are signs of leakage in the standpipe. These areas are confined to the riveted joints, because these areas where the plate sections meet are more difficult to prepare for coating,it is possible that the paint job is of poorer quality in these areas.

3.Foundation:

Elevations were checked at the tops of the footings and bearing plates, all were within 1/4" of each other. This and the fact that the four posts are in good alignment indicates that the foundation is not subjected to loads causing excessive or differential settlement. The 18" thick structural slab that carries the standpipe shows no sign of excessive cracking or deflection. The finnish layers of all the foundation stuctures are delaminated, but the structural concrete underneath is sound.

4.Compliance With "Ten State" Standards:

The following items do not conform to the "Ten State" Standards or the compliance is in question.

The access opening in the roof is not totally covered by the lid and the lid does not extend down aroung the opening frame at least two (2) inches.

Any overflow discharge would not be visible. The "Ten State" Standards require the overflow pipe to terminate 12 to 24 in. above the ground surface, to discharge over a drainage inlet structure or splash plate and to be visible. The overflow pipe goes underground at the Southeast tower post and most likely ties into the drain pipe which daylights at the toe of the slope on the South boundary of the Center.

The capacity of the 3" dia. overflow pipe to permit waste in

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Walla Walla, WA

100,000 Gallon Water Storage Tank, Structure #109

Inspection Report, Cont.----------

4. Compliance With "Ten State" Standards, Cont.:

excess of the filling rate is questioned. The fact that the paint on the underside of the roof overhang is scraped off indicates a passage of water through the joint between the tank cylinder and the conical roof (see photograph no's. 6&7) The elevation of the joint is above the overflow inlet. At this time there is a piece of plywood resting on the roof's radial brace rods approximately two (2) inches above the overflow inlet.

5. Compliance With Occupational Safety & Health Administration, (OSHA) Regulations :

The reservoir access system does not comply with OSHA 1910.27

6. Summary:

The overall condition of this structure is good. The interior and exterior coatings have reached a realistic design life, and therefore the new coatings should be considered as part of the normal maintenance associated with steel tanks.

The only question of the structural integrity stems from the "hot spots" encountered in the tank bottom. This point will be addressed in the Recommended Repairs portion of the proceedings.

Recommended Repairs And Maintenance Procedures----------

1. Immediate Attention (0-5 Years)

The interior of the tank needs to be recoated, this item should be top priority. Neglect of the tank interior will lead to a progressing decline in the structural capacity of the steel, especially in the hemispherical tank bottom. The entire interior surface, including the inside of the standpipe, the roof and the roof's radial brace rods should be repainted with a product having approval of the Environmental Protection Agency (EPA) for use with potable water. A recommended product is a two-part epoxy system such as Permox Seven (PCS 10823) as manufactured by the Permite Corporation. The recommended surface preparation is a Near-White Blast as specified by the National Association of Corrosion Engineers (NACE) No.2. The interior paint should be applied in two (2) coats of 4-5 mils dry thickness each. Provisions should be in the painting contract to set up a thorough inspection of the tank walls after sandblasting is complete and for replacement of sections of the tank plate in the event that the

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Recommended Repairs And Maintenance Procedures,Cont.----------

1. Immediate Attention (0-5 Years),Cont.

inspection reveals excessive areas of decay.

The exterior coating is in relatively good condition when compared with the interior. However, since a realistic design life has past, the exterior should be painted at the same time. The recommended exterior paint is a two-part acrylic aliphatic polyurethane, such as Polycote SA (PCS 10511) manufactured by the Permite Corporation. This paint should be applied in two (2) coats of 2-3 mils dry each. The surface preparation required is a Commercial Blast, NACE No. 3, and a universal epoxy primer such as Permite Corporation's PCS 1821. The primer should be applied in one (1) coat of 3 mils dry. All exposed exterior surfaces should be covered including the balcony,ladders and cages,reservoir level target track and overflow pipe. All painting should be done in accordance with AWWA D102-78.

If properly applied, the recommended coatings for the interior and exterior should last 10-15 years.

The items out of compliance with the "Ten State" Standards, the interior ladder replacement,the addition of lateral support for the ladder on the cylindrical portion of the tank and the repair of the reservoir level target guide mechanism are not as critical as the interior coating but should be addressed prior to or as part of the painting contract.A fall prevention system such as North Consumer Products "Saf-T-Climb" should be added to the ladder to bring it in to compliance with OSHA 1910.27. The cost estimate on pg. A16 to A23 provides for taking care of all these items, including the replacement of the existing 3" dia. overflow pipe with a 6" dia. pipe.

2. Long Range Attention (0-10 Years)

Although the delaminated concrete toppings appear to have no structural value aside from protecting the structural concrete, they should be replaced, even if it is for no other reason than aesthetics.

3. Maintenance

To prevent the buildup of heavy deposits inside the tank, the reservoir should be flushed biannually.

The interior and exterior coatings should be inspected periodically, the biannual flushing would be a good time to monitor the performance of the interior coating.

Appendix-A

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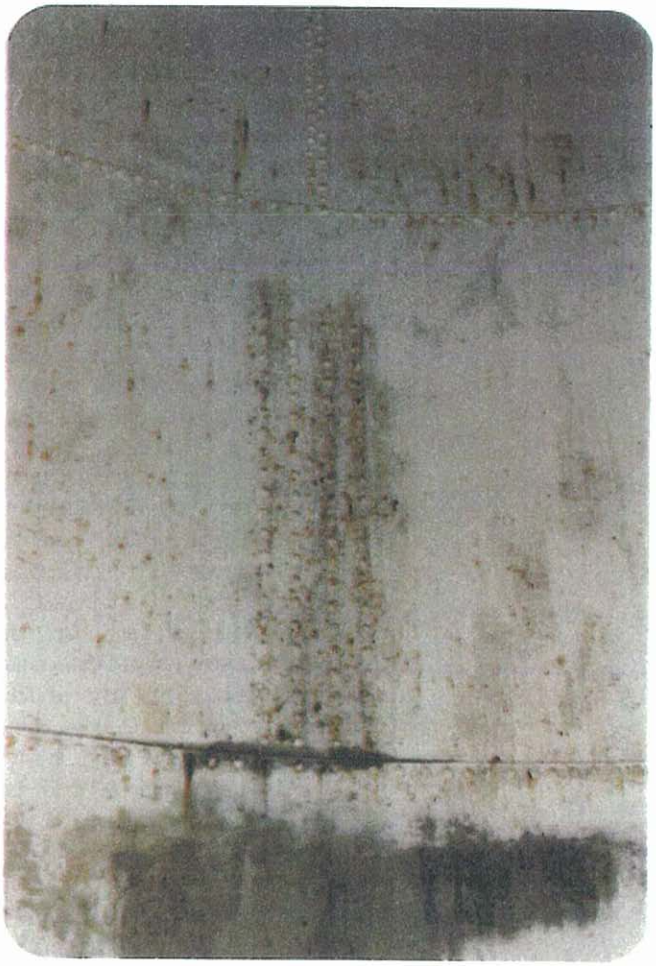
No.1--Exterior post to tank connection.



No.2--Interior post to tank connection.

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No.3--Rust and corrosion in horizontal plate of balcony.

No.4--Corrosion of ladder rung inside tank.

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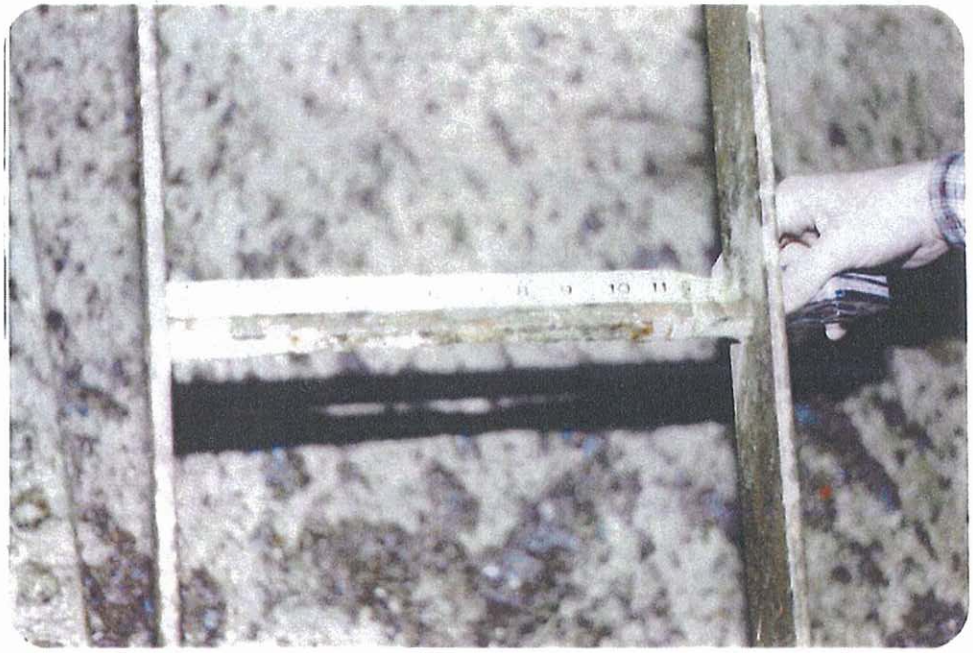
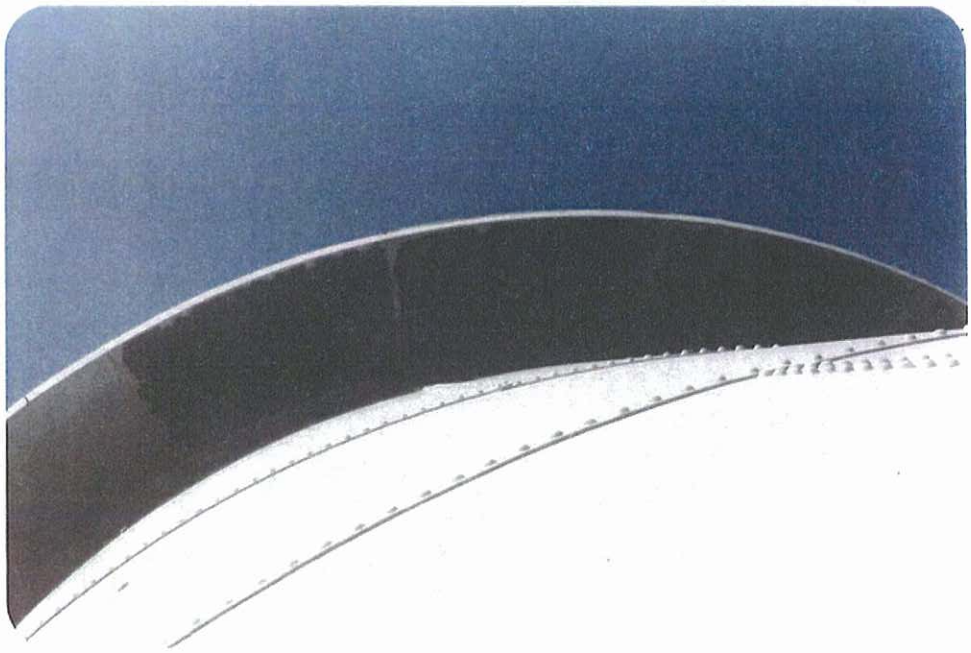


No.5---Corrosion of ladder rung
inside tank.



No.6--Paint scraped of underside
of roof overhang.

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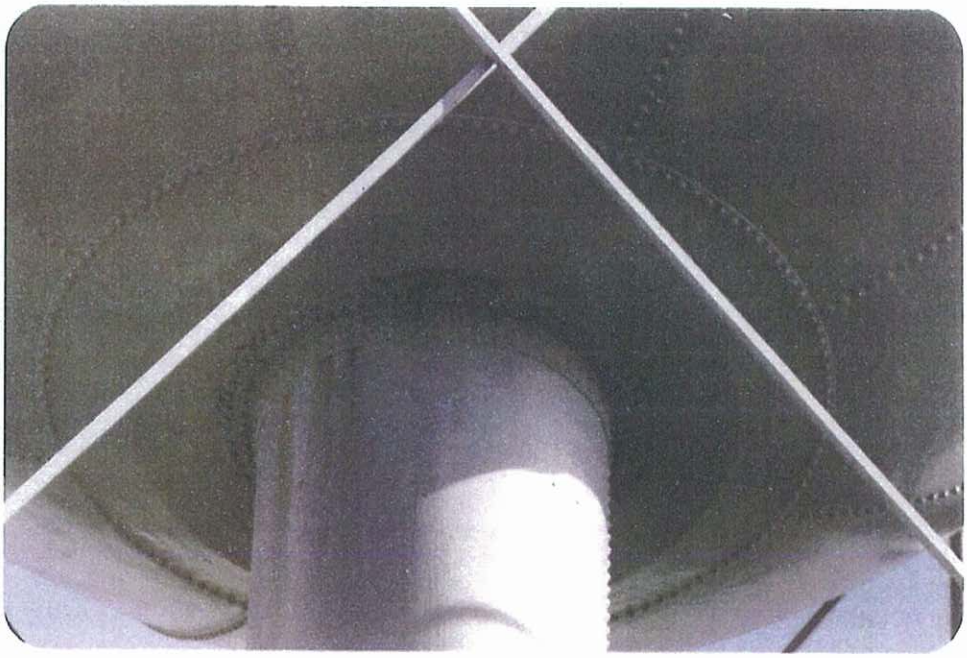
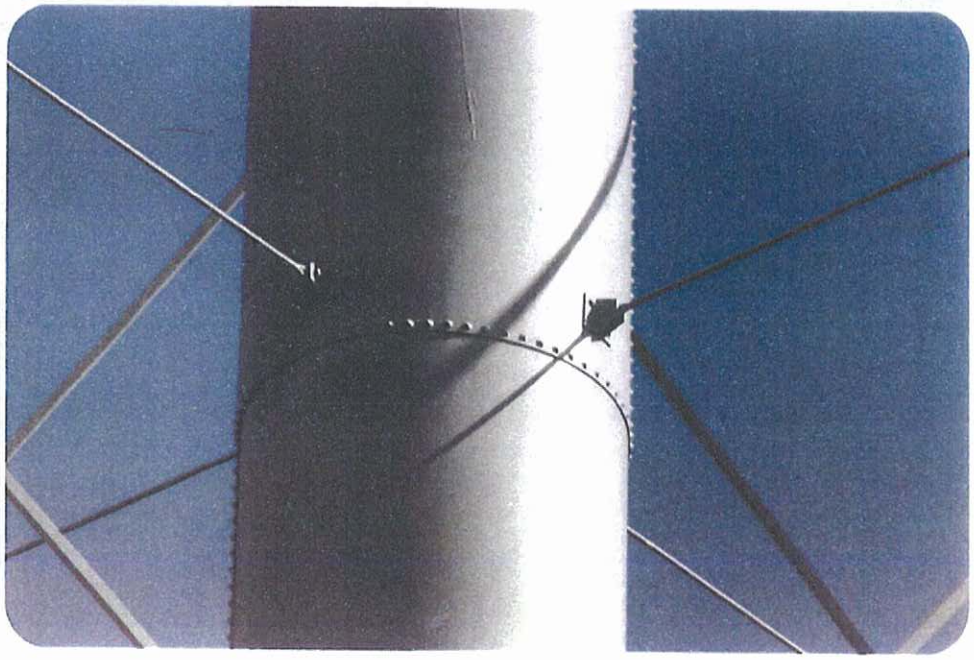


No.7--Connection of standpipe to tank bottom,note rust.



No.8--Standpipe,slight rusting of the plate joints.

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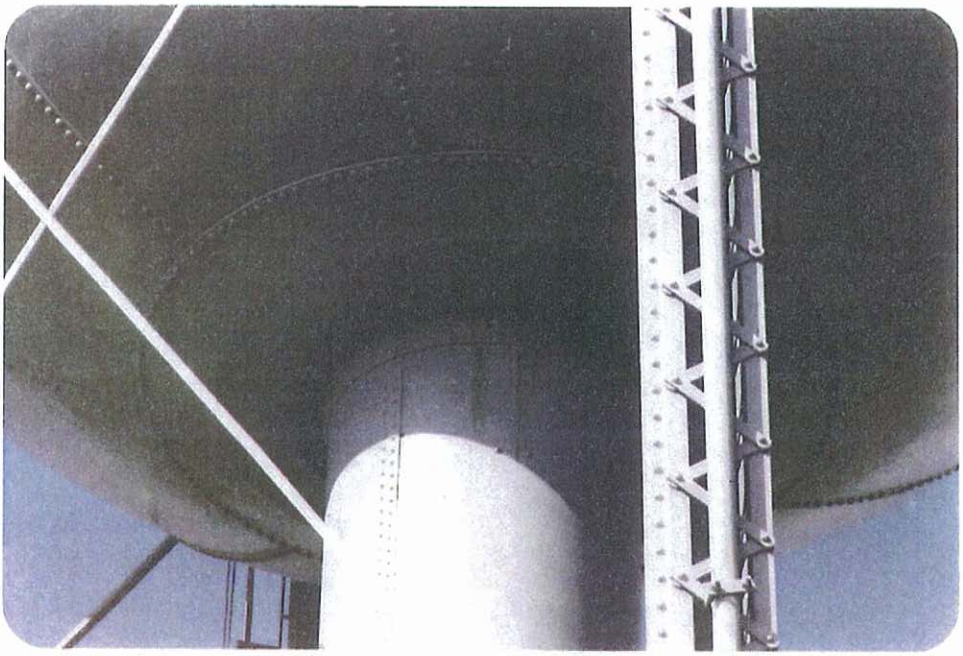
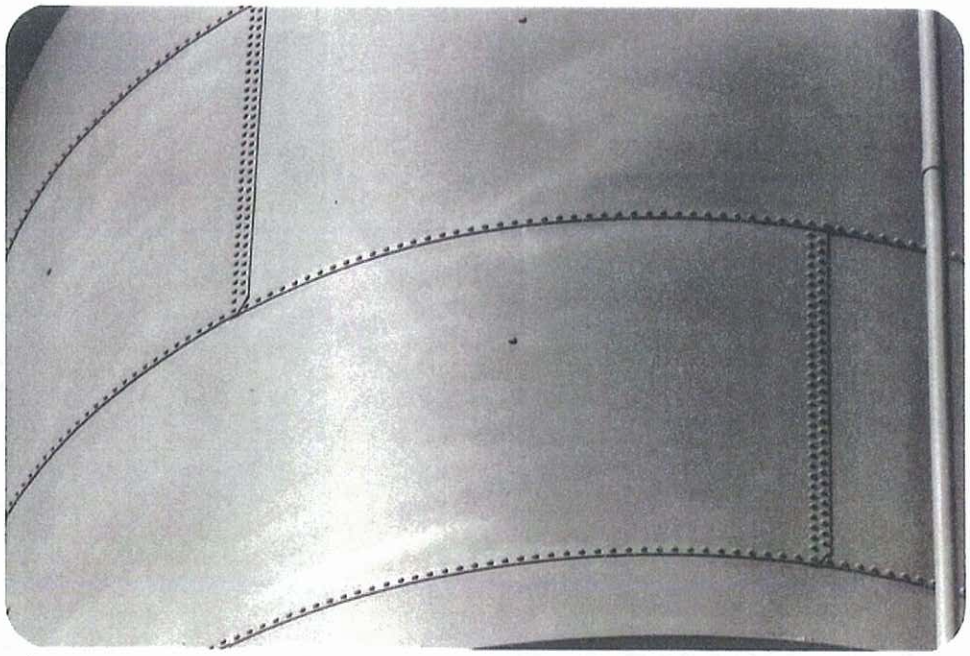


No.9---Connection of standpipe to tank bottom,note rust.



No.10---Typical tank exterior.

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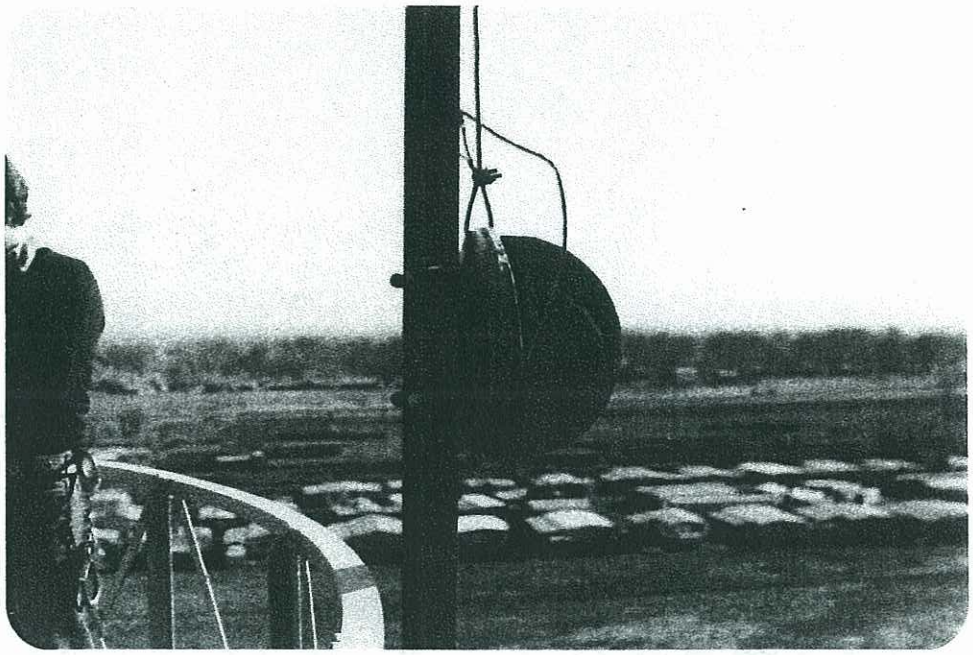
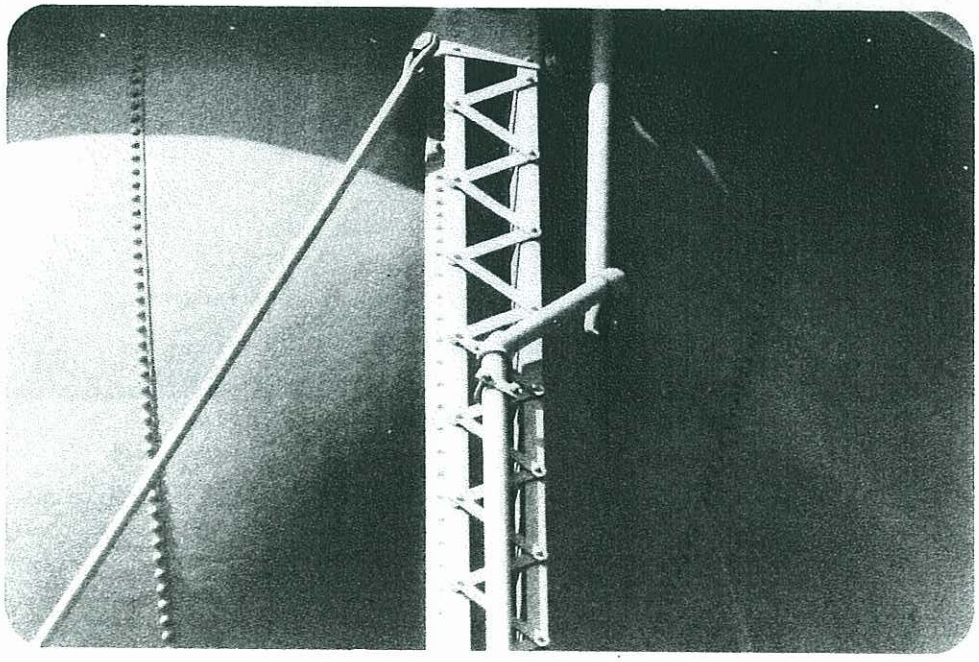


No.11--Level target,guide mechanism
needs repair.



No.12--3" dia. overflow.

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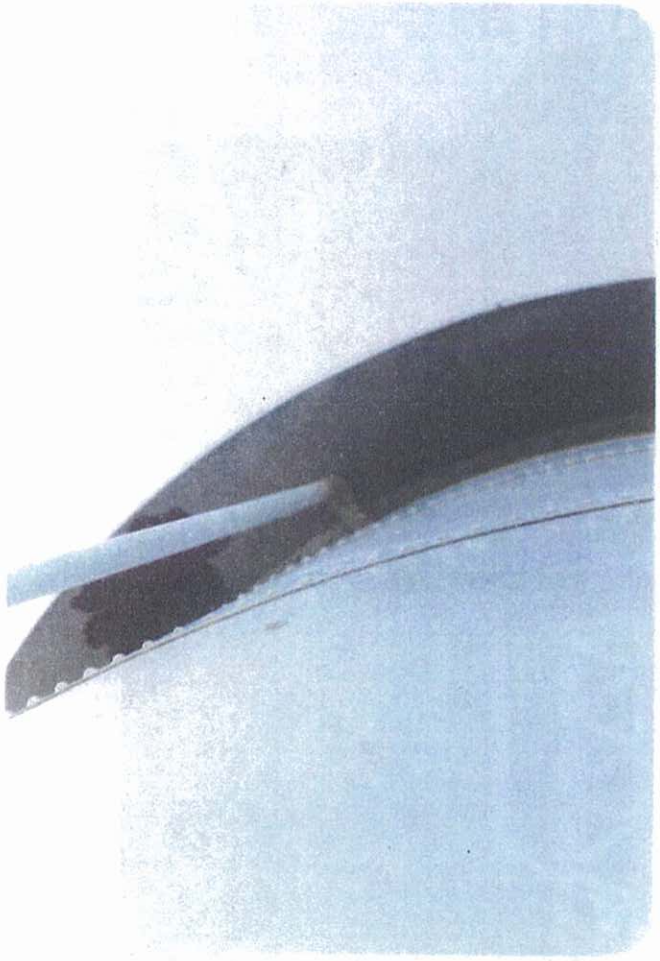
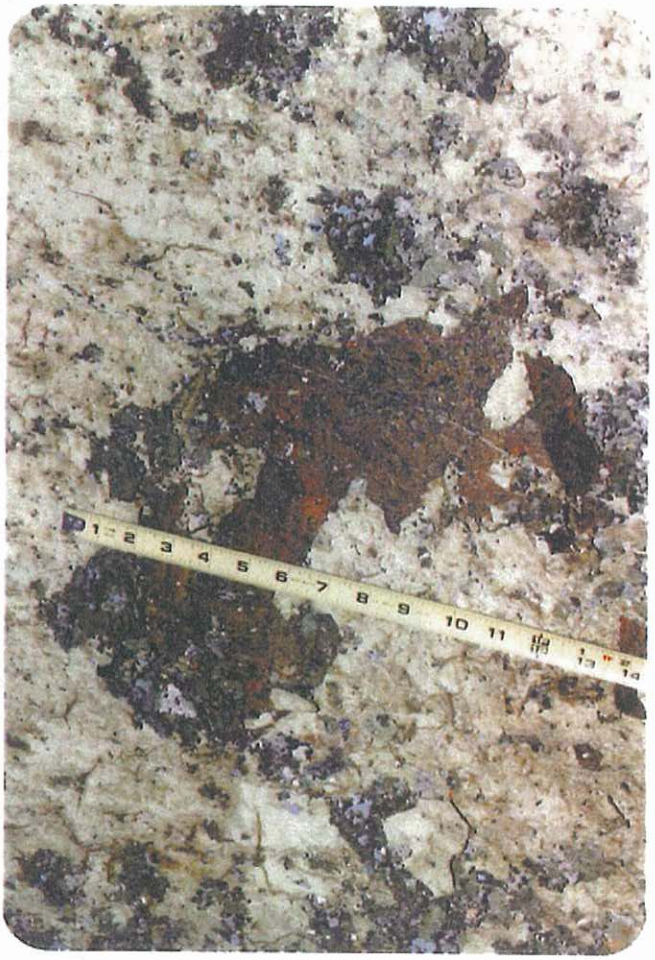


No.13--Paint scraped off underside of roof overhang.



No.14--Interior coating in hemispherical bottom

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No.15--Interior coating in hemispherical tank bottom.

No.16--Interior coating in hemispherical tank bottom.

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No.17--Interior coating in hemispherical tank bottom.

No.18--Level indicator float.

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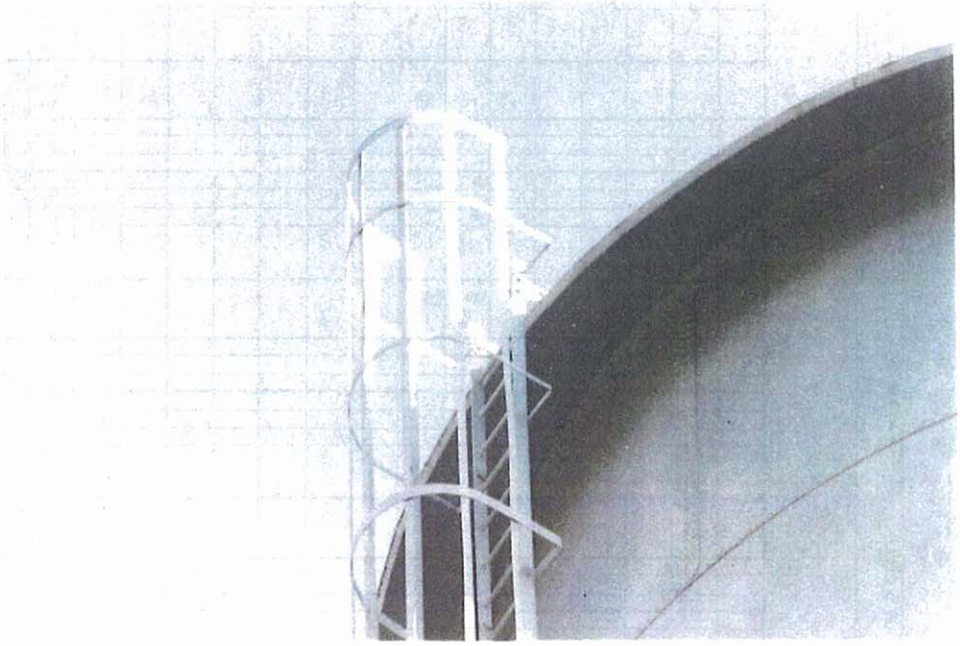
100,000 Gallon Water Storage Tank,Structure #109

No.19--View of interior roof,note coating on top courses of plate & plywood on overflow.



No.20--Ladder at top of tank.

PROJECT V.A. CNTR 85-222 DATE 4/14/86 TFM

A16

DESCRIPTION	TOTAL	QTY REQ'D	LABOR U	LABOR Amount	MATERIAL U	MATERIAL Amount	EQUIPMENT U	EQUIPMENT Amount	SUB CONTRACTORS U	SUB CONTRACTORS Amount	SUPPLIES U	SUPPLIES Amount
PAINT STRUCTURE	39325.00			21659.00		8510.00		5133.00				4023.00
INTERIOR (EPOXY) D102-78		4460 S.F.										
SANDBLAST (NEAR WHITE) LAB. @ 90 SF/HR	4138	11.2 T 50 HRS	49.10	2455.00	$100.00/T	1120.00	11.25	563.00				
PAINT												
* No. 1 200 SF/HR 3 PAINTERS	2609	32 GAL. 24 HR	72.20	1733.00	21.00	672.00	8.50	204.00				
* No. 2 200 SF/HR 3 PAINTERS	2609	32 GAL. 24 HR	72.20	1733.00	21.00	672.00	8.50	204.00				
WORK PLATFORM & SAFETY EQUIP	1000	L.S.						1000.00				
RIG WORK PLATFORM 2 PAINT	393	8 HRS.	49.10	393.00								
EXTERIOR		9000 S.F.										
SANDBLAST (COMMERCIAL) 100 SF/HR 4.5#/SF	7452	20.2 T 90 HR.	49.10	4419	100.00/T	2020.00	11.25	1013.00				
PRIME PAINT 320 SF/GAL.	4542	35 GAL. 45 HR.	72.20	3249.00	26.00	910.00	8.50	383.00				
FINISH PAINT #1 272 SF/G	5190	41 GAL. 45 HR.	72.20	3249.00	38.00	1558.00	8.50	383.00				
✓ ✓ #2 272 SF/G	5190	41 GAL 45 HR.	72.20	3249.00	38.00	1558.00	8.50	383.00				
RIG SPIDER 2 PAINTERS	1786	16 HRS.	49.10	786.00				1000.00				
MOBILIZE (MEN & EQUIP.)	393	8 HRS.	49.10	393.00								
SUBSISTANCE 35 DAYS × 2.5 M	1760	88 M-D									20.00/MD	1760.00
SMALL TOOLS @ 3% × DIR. LAB. 21266	638											638.00
FUEL (FOG) 325 HRS. @ 4 GAL./HR	1625	1300 GAL									1.25	1625.00

NARRATIVE:

PCS 10823 (HIGH BUILD EPOXY) TWO COATS 4 MIL DFT / EACH COAT COVERAGE: 700 S.F./MIL/GALLON

INTERIOR AREA = 4460 S.F. N (NUMBER OF GALLONS) = 4460 SF / 175 SF/GAL. × 1.25 = 31.86 SAY 32 GAL./COAT

SANDBLAST SAND: 5.0#/SF W = 4460 SF × 5.0#/SF = 22300# COMP. 600 CFM 8.50/HR + SAND POT 2.75/HR.

LABOR 90 SF/HR H = 4460 SF / 90 SF/HR = 49.56 HR. SAY 50 HR

PAINT 200 SF/HR. EXT. PAINT

Page 1 Of

PAINTING TAKE-OFF

INSIDE

* HEMISPHERICAL BOTTOM

$h = 11.00$ FT.
$a = 11.00$ FT.

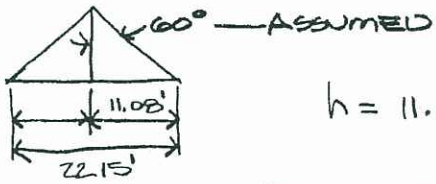
$\rho = \sqrt{11.00^2 + 11.00^2} = 15.56$ FT.

$SA = \pi (15.56)^2 = \underline{760.27 \text{ SF}}$

* CYLINDER

PERIM. $= \pi (22.0 \text{ FT}) = 69.12$ FT
SA $= 69.12 \text{ FT} (28.0 \text{ FT}) = \underline{1935.22 \text{ SF}}$

* CONICAL ROOF



$h = 11.08' \tan 30° = 6.39'$

$SA = \pi R (R + \sqrt{R^2 + h^2})$

$= \underline{830.91 \text{ SF}}$

* INSIDE STANDPIPE = 930.17 SF

INSIDE SURFACE AREA = 4460 SF ✓

EXTERIOR

* STAND PIPE

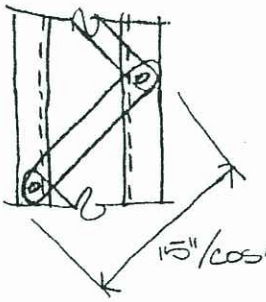
PERIM. $= \pi (4.00 \text{ FT}) = 12.57$ FT
930² SA $= 74.02 \text{ FT} (12.57 \text{ FT}) = \underline{930.17 \text{ SF}}$

* POSTS

COVER PL 3/8" x 15" x 28'-4 3/4"

C12 x 25 x 29'-7

ASSUME 2" LACING BARS @ 15" CC



15"/cos45 = 21.21"

PAINTING TAKE-OFF, CONT.

EXTERIOR

* POSTS

TOTAL LENGTH $= \left[29'\text{-}7'' + 28'\text{-}6'' + 29'\text{-}3''\right]4 \cong 350$ L.F.

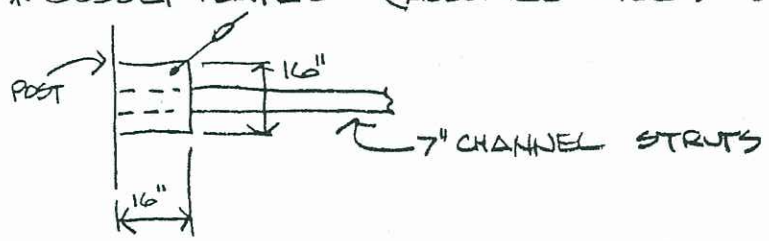
SA LACING BARS $= \dfrac{\left[2''(21.2'')2\right]}{144}\left(\dfrac{350}{1.25} + 4\right) = 167.24$ SF

SA COVER PL $= 350$ L.F. $\left(15''/12 + 9''/12\right) = 700.00$ SF

SA CHANNELS $= \left[1\text{ FT}(4) + 3''/12\,(6)\right]350$ L.F. $= 1925.00$ SF

2792.2 — $\underline{2792.24 \text{ SF}}$

* GUSSET PLATES (ASSUMED SIZE) 32 EA.

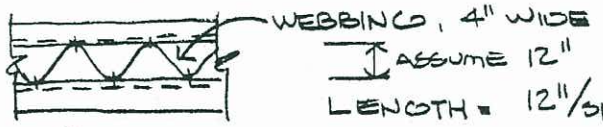


60 — $SA = \left[\dfrac{16''(16'')}{144}\right]32 \cong \underline{60 \text{ SF}}$

* STRUTS

C7x9.8

$SA = \left[(7''/12)2 + \left(\dfrac{2.09''}{12}\right)4\right]2 = 3.73$ SF/LF



PLAN

LENGTH $= 12''/\sin 45 = 16.97''$

$\dfrac{16.97''(4'')2}{144}$ SA $= 0.94$ SF/LF

$\Sigma = 4.7$ SF/LF

TOTAL LENGTH $= \left[24'\text{-}9\tfrac{1}{4}'' + 20'\text{-}2\tfrac{3}{16}'' + 29'\text{-}3\tfrac{5}{16}''\right]4 = 296.92$ LF

1400 — $SA = 296.92$ LF $(4.7$ SF/LF$) \cong \underline{1400 \text{ SF}}$

NATIONAL 42-381 50 SHEETS 5 SQUARE 42-382 100 SHEETS 5 SQUARE 42-389 200 SHEETS 5 SQUARE

PAINT TAKE-OFF, CONT.

EXTERIOR ———

* BRACING RODS

TOTAL LENGTH =

8 @ 36'-10½"	= 295.00 LF	TOWER RODS	1⅛" ϕ	= 110.63 SF
8 @ 34'-4"	= 274.67 LF		1⅜" ϕ	= 125.89 SF
8 @ 30'-8½"	= 245.67 LF		1⅝ ϕ	= 133.07 SF
4 @ 11'-10½"	= 47.50 LF	CYL. RODS	¾" ϕ	= 9.33 SF
4 @ 15'-1¼"	= 60.42 LF		✓	= 11.86 SF
	Σ = 923.3 LF			Σ = 390.8 SF

390.8

* LADDERS

4" WIDE VERTS
1" ϕ RUNGS

SA = (4"/12) 4 = 1.33 SF/LF — VERTS
= (4"/12) 1.33' = 0.44 SF/LF — RUNGS
1.78 SF/LF

LADDER LENGTHS
28 L.F. — CYLINDER + CAGE
77 L.F. — POSTS + CAGE
13 L.F. — ROOF

CAGE

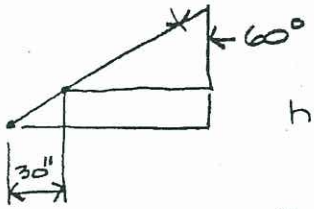
220

PAINT TAKE-OFF, CONT.

EXTERIOR ———

* HEMISPHRICAL BOTTOM 760.27 SF
* CYLINDER 1935.22 SF

* CONICAL ROOF 830.91 SF + OVERHANG



$h = (11.08 + 2.5) \tan 30 = 7.84$ FT.

$SA = \pi R \left(R + \sqrt{R^2 + h^2}\right) = 1248.34$ SF
$R = 13.58'$

$SA_{OVERHANG} = 1248.34 - 830.91 = 417.43$ SF

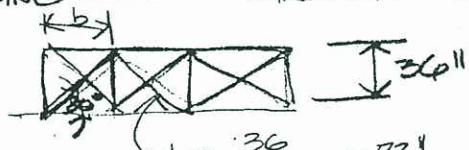
$SA_{TOTAL} = 1248.34 + 417.43 = \underline{1666 \text{ SF}}$

* BALCONY

AVG. $\phi = 22' + 2.5' = 24.5'$
CIRCUM $= \pi(24.5) = 76.97'$

AREA $= 76.97'(2.5') = 192.42$ SF — BOTTOM PLATE

RAILING ——— CIRCUM $= \pi(27') = 84.82'$



$L = \frac{36}{\sin 30} = 72"$

$b = \frac{36}{\tan 30} = 62.35"$

TOTAL LENGTH / FT =

$\frac{72"(2) + 62.35" + 36"}{62.35"} = 3.89'/FT$

TOTAL LENGTH $= 84.82(3.89) \cong 330$ L.F.
ASSUME L 2x2 ∴ 0.67 SF/LF.

$SA_{TOTAL} = 0.67(330) + 2(192.42) = \underline{1006 \text{ SF}}$

PROJECT V.A. CNTR. 85-222 DATE 11/6/06 T.M.

A2

DESCRIPTION	TOTAL	QTY REQ'D	LABOR U	LABOR Amount	MATERIAL U	MATERIAL Amount	EQUIPMENT U	EQUIPMENT Amount	SUB CONTRACTORS U	SUB CONTRACTORS Amount	SUPPLIES U	SUPPLIES Amount
REPAIR INTERIOR LADDER	728.00			540.00		188.00						
REMOVE EXISTING 3. FITTERS	180.00	2 HRS	90.00	180.00								
INSTALL NEW 3. FITTERS	360.00	4 HRS	90.00	360.00								
LADDER	188.00	125#			1.50	188.00						

NARRATIVE: LADDER WT.

(2) BAR 3" x 3/8 x 40'-0 1.13#/FT. x 40' x 2 = 90.4

(40) BAR 3/4" Φ x 1'-4" 0.563#/FT. x 1.33 x 40 = 29.95

ΣWT. 120

Page _____ Of _____

PROJECT V. A. CNTR 85-222 DATE 4/10/86 FTM

DESCRIPTION	TOTAL	QTY REQ'D	LABOR U	LABOR Amount	MATERIAL U	MATERIAL Amount	EQUIPMENT U	EQUIPMENT Amount	SUB CONTRACTORS U	SUB CONTRACTORS Amount	SUPPLIES U	SUPPLIES Amount
MODIFICATIONS												
① ACCESS OPENING	1680			1180.00		300.00		100.00				100.00
STRUCTURAL STEEL	300	100#			3.00	300.00						
INSTALL 3-IWC @ 30.00/MH	1180	12HR	90.00	1080.00							DRILL BITS	100.00
CRANE OP	200	4HR.	25.00	100.00			25.00	100.00				
② OVERFLOW	7613.00			3368.00		3785.00		460				
8"φ FLANGE × FLARE	126	1EA.			126.00	126.00						
8"φ FLANGE × FLANGE 90°	83	1EA.			83.00	83.00						
8"φ FLNG (WN)	32	1EA.			32.00	32.00						
8"φ SCH. 40 A53 GRD. B. STL. PIPE	1823	112LF			16.28	1823.00						
8"φ DRESSER CPLNGS.	137	2EA			68.65	137.00						
8"φ 90° BEND "WELDED"	82	2EA			41.00	82.00						
8"φ FLANGE BOLT PAKS	32	3EA.			10.50	32.00						
STRUCT. STL. BRACKETS	450	6EA.			75.00	450.00						
CONC. DROP INLET	500					500.00						
8"φ CLS. 52 DI	520	20LF			26.00	520.00						
BACKHOE	148	4HRS	22.00	88.00			15.00	60.00				
3 PIPE FITTERS @ 30.00/MH	2880	32HRS	90.00	2880.00								
CRANE OP	300	16HRS.	25.00	400.00			25.00	400.00				

NARRATIVE:

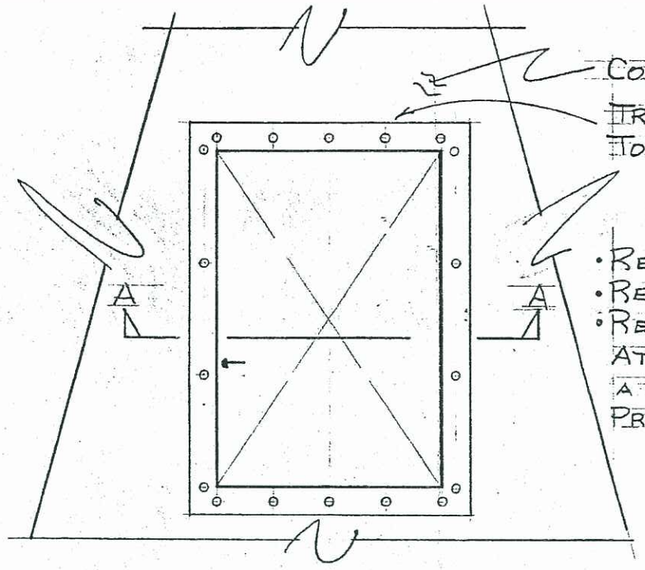
Page _____ Of _____

SUBJECT [illegible] DATE [illegible]

DESCRIPTION	TOTAL	QTY REQ'D	LABOR U	LABOR Amount	MATERIAL U	MATERIAL Amount	EQUIPMENT U	EQUIPMENT Amount	SUB CONTRACTORS U	SUB CONTRACTORS Amount	SUPPLIES U	SUPPLIES Amount
MODIFICATIONS - CONT. -												
(3) ACCESS LADDER "SAFETY"	3020.00			720.00		2300.00						
SAF-T-CLIMB (FALL PREVENTION SYSTEM)		L.S.				2300.00						
INSTALL (3) IW @ 30.00/MH		8HR.		720.00								

NARRATIVE:

Page _____ Of _____



CONICAL ROOF SECTION

TRIM FRAME & AS REQUIRED TO ACCOMODATE THE CURVATURE

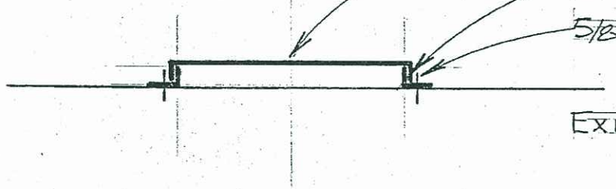
- REMOVE EXISTING HATCH COVER
- REMOVE EXISTING DRIP &
- REPLACE WITH FRAME & COVER

ATTACH COVER TO FRAME WITH A CONTINUOUS HINGE

PROVIDE A LOCKABLE LATCH

PLAN

SCALE: 3/4" = 1'-0



BENT PL 1/4" W/ 2" FLANGE

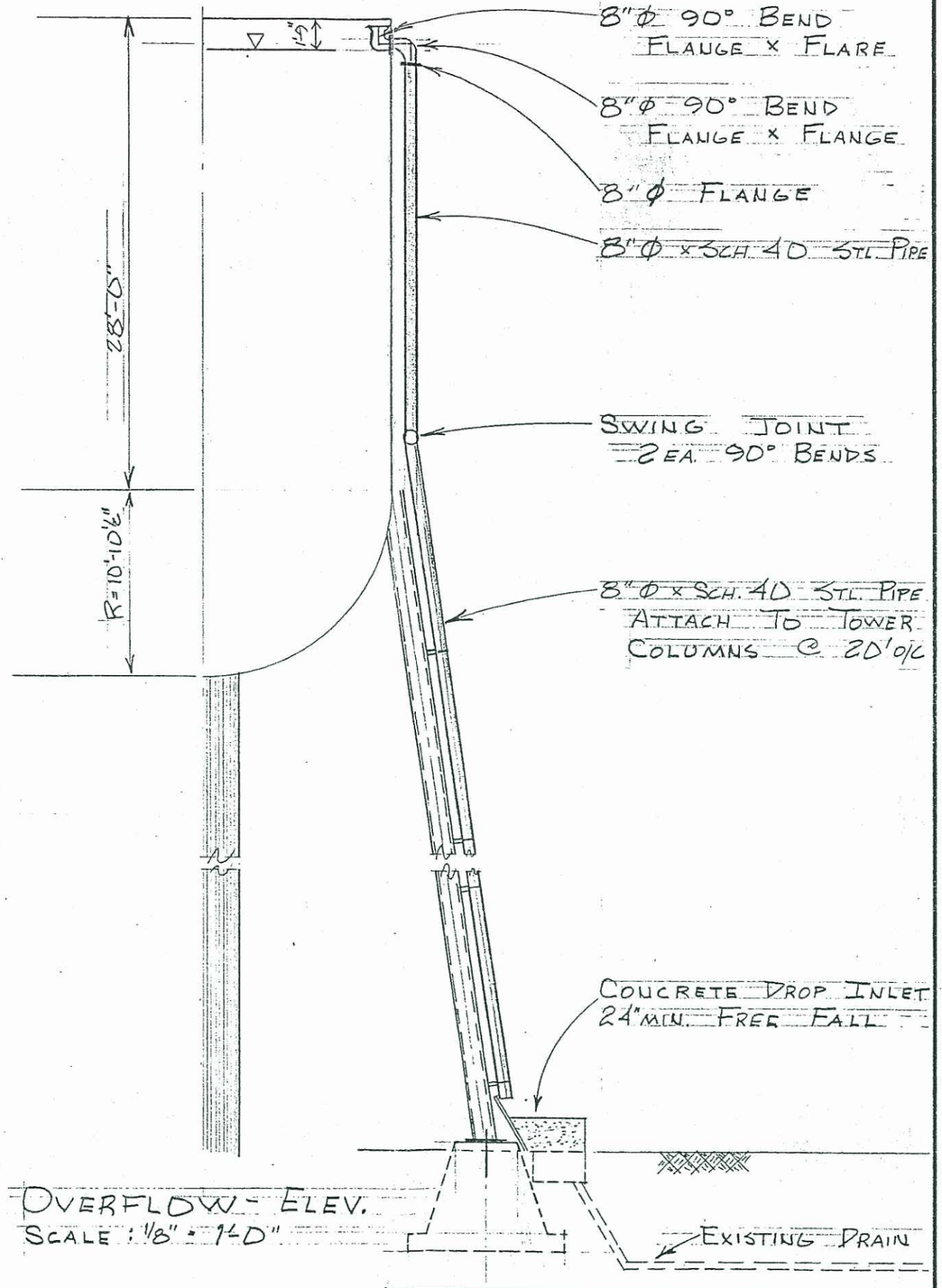
L 3" x 2 1/2" x 5/16" (FRAME)

5/8" Ø x A325 F BOLTS

EXISTING ROOF PL t = 3/16"

SECTION A-A

ACCESS HATCH DETAIL
MODIFICATIONS REQ.



OVERFLOW - ELEV.

SCALE: 1/8" = 1'-0"

STRUCT. No. 109
PROJ. No. 85-222

V.A MEDICAL CENTER
WALLA WALLA, WA.

A24

APPENDIX 'B'

COMPUTER ANALYSIS OF DISTRIBUTION SYSTEM

APPENDIX 'B'

COMPUTER ANALYSIS

A computer model was developed of the existing V.A. water distribution system. The system was analyzed by the Path Method using a Wang Model 2200 computer and DEC II computer.

The following runs were made using the V.A. wells as supply:

Run	Description	Remarks
1	Average Day (Winter) Consumption	Pressure OK
2	Average Day Consumption	Pressure OK
3	Maximum Day Consumption	Pressure OK
4	Maximum Day + 1000 gpm @ F.H. #5	Pressure less than 20 psi
5	Maximum Day + 1000 gpm @ F.H. #5	Pressure less than 20 psi
6	Average Day (Winter) + 875 gpm with Pump #1 @ F.H. #5	Pressure similar to flow test on 11/5/85
7	Average Day (Winter) + 1030 gpm @ F.H. #12	Pressure similar to flow test on 11/5/85
8	Average Day (Winter) + 1050 gpm @ F.H. #13	Pressure similar to flow test on 11/5/85
9	Average Day (Winter) + 900 gpm @ F.H. #15	Pressure similar to flow test on 11/5/85
10	Average Day (Winter) + 890 gpm @ F.H. #9	Pressure similar to flow test on 11/5/85
11	Average Day (Winter) + 840 gpm @ F.H. #2	Pressure similar to flow test on 11/5/85
12	Average Day (Winter) + 940 gpm @ F.H. #3	Pressure similar to flow test on 11/5/85
13	Average Day (Winter) + 875 gpm @ F.H. #4	Pressure similar to flow test on 11/5/85

Run	Description	Remarks
14	Average Day (Winter) + 950 gpm @ F.H. #8	Pressure similar to flow test on 11/5/85
15	Average Day (Winter) + 905 gpm @ F.H. #10	Pressure similar to flow test on 11/5/85
16	Maximum Day + 1000 gpm @ F.H. #9 with Pump #1	Pressure less than 20 psi
16a	Same as run 16 except 750 gpm @ F.H. #9	Pressure OK
17	Same as run 16 except both pumps	Pressure less than 20 psi
17a	Same as run 17 except pipes 29, 30 and 31 increased to 10" diameter	Modified System Pressure OK
17b	Same as run 17a except only pipe 29 increased 59 10"	Pressure OK
17c	Same as run 17b except pump #2 only	Pressure is 18 psi

The following runs use the City of Walla Walla system for supply:

Run	Description	Remarks
18	(Revised) Maximum Day - pipe 58 (8" supply)	Pressure OK
21	Maximum Day - pipe 58 (8" supply)	Pressure OK
22	Maximum Day - pipe 36 (6" supply)	Cannot run - too much flow
23	Maximum Day - pipe 58 and pipe 36	Pressure OK
31	Maximum Day - pipe 58, 1000 gpm @ F.H. #9 (Avery St. connection)	Cannot run - too much flow
32	Maximum Day - pipe 58 and 87, 1000 gpm @ F.H. #9	Pressure OK
33	Average Day (Winter) - pipe 58, 1000 gpm @ F.H. #9	Pressure OK

A computer run was made for each hydrant that was flow tested on 11/5/85. The computer model closely matched the conditions during the flow tests.

Runs 17a and 17b had the 8" supply main increased to 10" and

this allows the system to be able to provide 1000 gpm fire flow at the maximum day consumption rate.

A number of runs were made using the City of Walla Walla as the supply. The City cannot deliver enough water to the Chestnut and William Streets area. When the 6" connection is used along with the 8" connection, the 6" only flows 170 gpm (run 23).

Run 32 has a connection at Avery Street entrance to the City of Walla Walla water system. This run could flow the 1000 gpm at the maximum day consumption rate.

See enclosed Figure B-1 for node and pipe location.

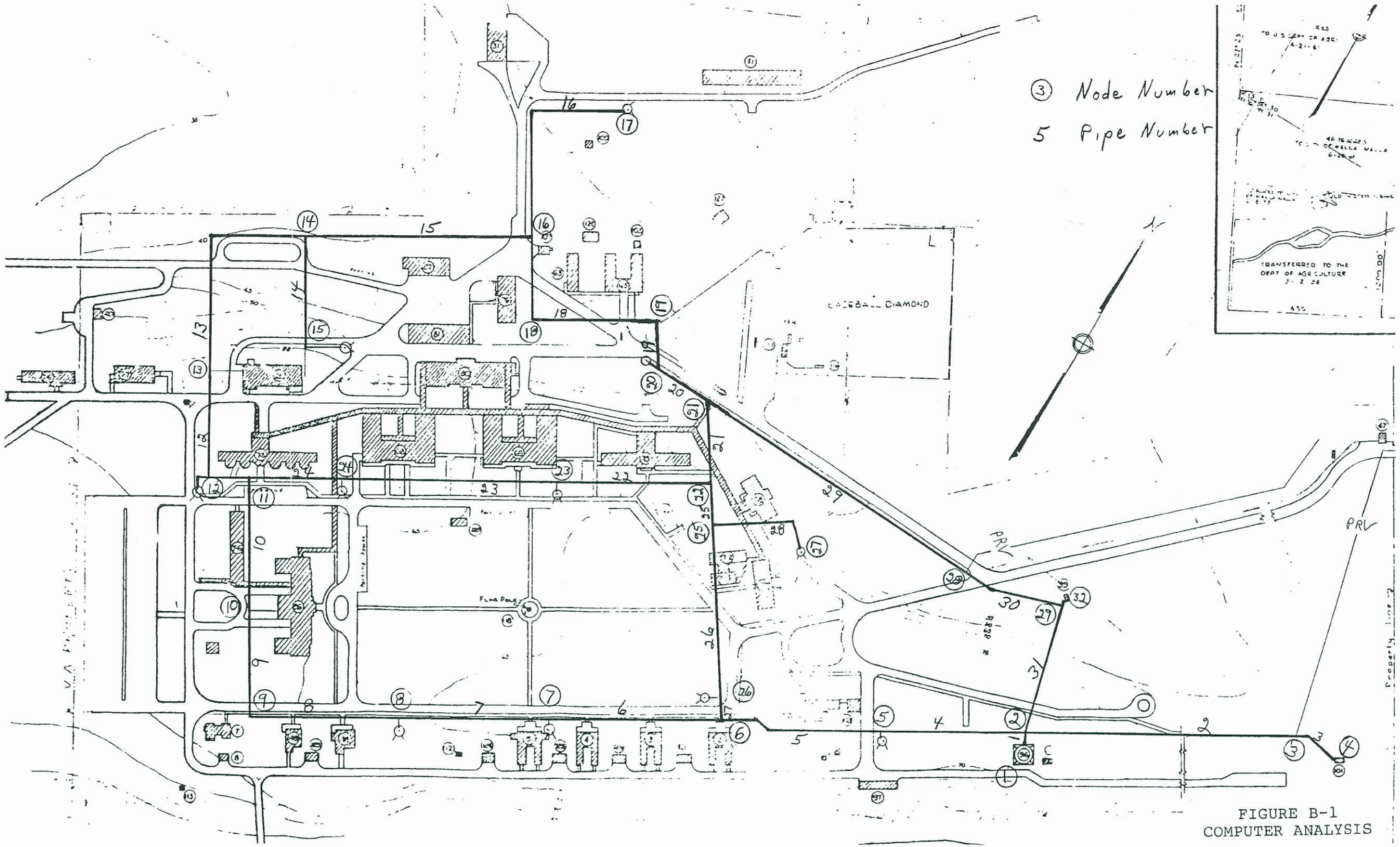


FIGURE B-1
COMPUTER ANALYSIS

APPENDIX 'C'

ELECTRICAL REVIEW

Prepared By:

General Engineers, Inc.
Missoula, Montana

VETERANS ADMINISTRATION CENTER
WALLA WALLA, WASHINGTON
ELECTRICAL REVIEW - REVIEW OF PUMP CONTROL SYSTEM

TRANSFORMER ROOM/EMERGENCY GENERATOR BUILDING/BUILDING 111:

The Reservoir Level Control for the automatic control of Pumps #1 and #2 is located in this building. It is an Autocon unit. The pump control system is controlled by the water level in the reservoir. The operation of the control system was not checked and will be done at a future date.

The existing control diagrams should be brought up to date and correlated with the reservoir level control equipment. Equipment in and at the control unit should be labeled to conform to the wiring diagram.

Pump House - Building 99:

The existing electrical installation was inspected and the following items should be added or corrected:

1. The original building disconnect switch was located in the original pump house dry well. When the addition to the building was constructed the switch interior was removed and the enclosure was converted into a junction box. The building service was extended from this enclosure to a new main circuit breaker in the building addition. There is a knockout in the enclosure that should be plugged and the enclosure should be identified with a label or nameplate.

2. The building main disconnect is a 200A. circuit breaker. The electric service is 120/240V., 3 phase, 4 wire. The circuit breaker does not have a means for terminating the neutral conductor. This is an insulated grounded neutral assembly which can be added in the breaker enclosure. This is required by the National Electrical Code (NEC), Article 230-75. An open knockout in the enclosure should be plugged.

Feb. 19, 1986

3. The neutral of the service conductors is not grounded at the building. The neutral should be grounded to the building water system and to exterior ground rod or rods to obtain the required ground resistance.

4. The pump control wiring was inspected. Thee automatic operation was not checked and will be done at a future date. The operation of Pump #1, 50 h.p., is controlled by a signal from the reservoir level control in Building 111. The pump controls are a part winding magnetic starter which is opened and controlled by a BW liquid level control which is connected to the reservoir level control. The control wiring diagrams were in the magnetic starter enclosure and appeared to be up to date. Some of the control wiring did not have wire numbers for ease of circuit tracing. Some circuit numbers were added at the time of our inspection. Any other missing wire numbers should be added.

5. An elapsed time meter, 120 volt, was installed in the pump magnetic starter. The neutral connection to the meter was connected to the starter enclosure instead of a neutral conductor. A neutral should be run to the meter and the ground connection removed.

Pump House #2, Building 101:

The 100 horsepower pump in this building is controlled from the reservoir level control in Building 111. The pump control equipment in Pump House #2 consists of a combination magnetic starter with a Franklin Electric "Subtrol" and a DNH Industries "Soft-Start" solid state starter. The solid state starter is used to start the pump. After the pump is started and brought up to running speed, the pump circuit is transferred to the magnetic starter for the Run Mode.

The solid state starter installation had just been completed at the time of this inspection so complete wiring diagrams were not available at the Pump House. The control system wiring diagrams had just been received by the Engineering Office. They appeared to contain the required information. The diagrams should be checked with the installation in the Pump House.

Manual operation of the pump control was made at the time of the inspection. The automatic control from the reservoir control in the building was not. Automatic operation is to be checked at a later date.

Feb. 19, 1986

APPENDIX 'D'

WELL LOGS

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

WELL #1 Permit No. .....

(1) OWNER: Name Veterans Administration Medical Center Address Walla Walla, WA

(2) LOCATION OF WELL: County Walla Walla — ¼ ¼ Sec. T. N., R. W

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☒ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one).... 3

New well ☒ Deepened ☐ Reconditioned ☐

Method: Dug ☐ Bored ☐ Cable ☐ Driven ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 12 inches.

Drilled 103 ft. Depth of completed well 103 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 12 " Diam. from +2 ft. to 103 ft.

Threaded ☐ " Diam. from ft. to ft.

Welded ☐ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☐

Type of perforator used Torch

SIZE of perforations ¼ in. by 6 in.

115 perforations from 83 ft. to 103 ft.

perforations from ft. to ft.

perforations from ft. to ft.

Screens: Yes ☐ No ☒

Manufacturer's Name

Type Model No.

Diam. Slot size from ft. to ft.

Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:

Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 20 ft.

Material used in seal Bentonite

Did any strata contain unusable water? Yes ☐ No ☒

Type of water? Depth of strata

Method of sealing strata off

(7) PUMP: Manufacturer's Name

Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.

Static level Est. 26 ft. below top of well Date 7/12/80

Artesian pressure lbs. per square inch Date

Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? Yes ☐ No ☒ If yes, by whom?

Yield: gal./min. with ft. drawdown after hrs.

Est. 800 gpm Air Test "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test

Bailer test gal./min. with ft. drawdown after hrs.

Artesian flow g.p.m. Date

Temperature of water Cold Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of format*

MATERIAL	FROM	TO
Topsoil/overburden	0	3
Small boulders with large gravels and coarse sand	3	38
Large gravels and coarse sand	38	103
Water bearing formation first encountered at 38'. Volume increase was from 83 to 103 ft.		

Work started 7/10, 19 80. Completed 7/10, 19 8

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

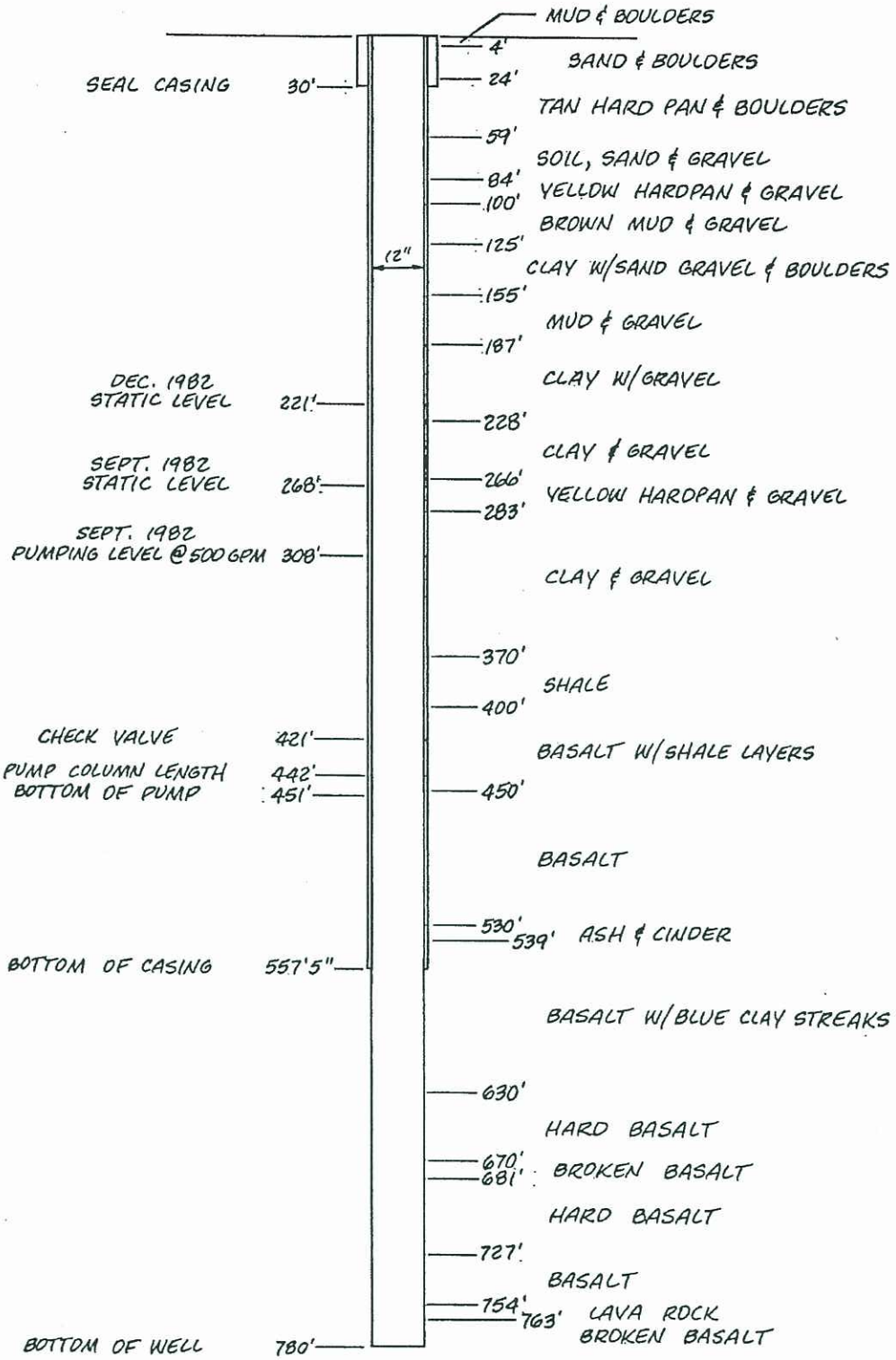
NAME Aquaring Drilling, Inc. (Person, firm, or corporation) (Type or print)

Address P.O. Box 290, Pasco, WA 99301

[Signed] /s/ M.W. (Well Driller)

License No. 1057 Date 7/14, 19 8

(USE ADDITIONAL SHEETS IF NECESSARY)



WELL LOG – WELL #2
V.A. MEDICAL CENTER
WALLA WALLA, WA.

APPENDIX 'E'

SUMMARY OF CITY OF WALLA WALLA WATER RATES

APPENDIX 'E'

SUMMARY OF CITY OF WALLA WALLA WATER RATES FOR PUBLIC CONSUMER

13.04.370 Services - Monthly Charges Within the City

A. The minimum monthly charge for all water services inside the city limits using two hundred cubic feet or less shall be as follows:

8" Meter = $36.10 (public)

B. The following monthly charge shall be placed in a capital reserve account for water system improvements and shall be in addition to the minimum monthly charge:

8" Meter = $8.50 (public)

13.04.690 Meters -- Public Rates - Public Consumer Defined

"Public consumer" consists of City, County, State and Federal. The following monthly meter rates shall apply to all public consumers whose property lies either within or without the city limits:

Per 100 cubic feet over the 200 cubic feet minimum

$0.272

13.04.695 Capital Reserve Account for Water System Improvements - Monthly Charges Within the City

The following monthly charge, which shall be placed in a capital reserve account for water system improvements, shall be in addition to the monthly meter rates and shall be assessed as follows:

Per 100 cubic feet over the 200 cubic foot minimum

$0.07 (public)

13.04.375 Revenue Bond Debt Service Requirement for Reconstruction of Mill Creek Water Transmission Pipeline -- Monthly Charge

There shall be, in addition to the water service charges set forth in Section 13.04.370, a monthly charge on all meters connected to the water system as a revenue bond debt service requirement for the reconstruction of the Mill Creek Water Transmission Pipeline, assessed as follows:

Meter Size	Monthly Charge
6"	$ 230.00
8"	$ 345.00

APPENDIX F

COST ESTIMATES

V.A. FORM 10-6238

Items a & b - 20 Year Plan

EMIS CONSTRUCTION PROGRAM - ESTIMATE WORKSHEET

DATE: 4-3-87

SHEET NO. 1 OF 4 SHEETS

PROJECT NO.	LOCATION	PROJECT NAME	TYPE OF ESTIMATE
	V.A. Medical Center Walla Walla, WA	Repaint & Upgrade Water Tower	[X] NO DESIGN COMPLETED [ ] PRELIMINARY DESIGN [ ] FINAL DESIGN [ ] OTHER (Specify)

ESTIMATOR	NEW	ALT	INDEX NO.	BUILDING NO(S).	DRAWING NO.
FRM		X		96	

CODE A	CODE B	CODE C	CODE D	SYSTEM/SUBSYSTEM	LABOR QUANTITY	LABOR UNIT	LABOR $/UNIT	LABOR TOTAL	MATERIALS QUANTITY	MATERIALS UNIT	MATERIALS $/UNIT	MATERIALS TOTAL	TOTAL
				Summary									
				M & R (Repaint Tank)									$54,072.00
				MI (Upgrade overflow & hatch Saf-T-Climb)									16,622.55
				Subtotal									$70,694.55

EMIS CONSTRUCTION PROGRAM - ESTIMATE WORKSHEET

DATE: 4-16-86

SHEET NO. 2 OF 4 SHEETS

PROJECT NO.:

LOCATION: V.A. Medical Center Walla Walla, WA

PROJECT NAME: Repaint & Upgrade Water Tower

TYPE OF ESTIMATE: [X] NO DESIGN COMPLETED [ ] PRELIMINARY DESIGN [ ] FINAL DESIGN [ ] OTHER (Specify)

ESTIMATOR: FRM

NEW:

ALT: X

INDEX NO.:

BUILDING NO(S).: 96

DRAWING NO.:

CODE A	CODE B	CODE C	CODE D	SYSTEM/SUBSYSTEM	LABOR QUANTITY	LABOR UNIT	LABOR $/UNIT	LABOR TOTAL	MATERIALS QUANTITY	MATERIALS UNIT	MATERIALS $/UNIT	MATERIALS TOTAL	TOTAL
				Detail M & R									
				Tank Interior									
				Sandblast	4460	SF	0.55	2,455.00	4460	SF	0.25	1,120.00	$ 3,575.00
				Equipment Rent									1,971.00
				Paint	4460	SF	0.87	3,859.00	64	GAL	21.00	1,344.00	5,203.00
				Subtotal									$10,749.00
				Tank Exterior									
				Sandblast	9000	SF	0.49	4,419.00	9000	SF	0.22	2,020.00	$ 6,439.00
				Equipment Rent									3,162.00
				Paint	9000	SF	1.17	10,533.00	117	GAL	34.41	4,026.00	14,559.00
				Subtotal									$24,160.00
				Mobilization				393.00					393.00
				Subsistence									1,760.00
				Small Tools									638.00
				Fuel									1,625.00

EMIS CONSTRUCTION PROGRAM - ESTIMATE WORKSHEET

DATE: 4-16-86

SHEET NO. 3 OF 4 SHEETS

PROJECT NO.:

LOCATION: V.A. Medical Center Walla Walla, WA

PROJECT NAME: Repaint & Upgrade Water Tower

TYPE OF ESTIMATE: [X] NO DESIGN COMPLETED [ ] PRELIMINARY DESIGN [ ] FINAL DESIGN [ ] OTHER (Specify)

ESTIMATOR: FRM

NEW:

ALT: X

INDEX NO.:

BUILDING NO(S).: 96

DRAWING NO.:

CODE A	CODE B	CODE C	CODE D	SYSTEM/SUBSYSTEM	LABOR QUANTITY	LABOR UNIT	LABOR S/UNIT	LABOR TOTAL	MATERIALS QUANTITY	MATERIALS UNIT	MATERIALS S/UNIT	MATERIALS TOTAL	TOTAL
				Interior Ladder				540.00				188.00	728.00
				Subtotal									$40,053.00
				COP 35%									14,019.00
				TOTAL									$54,072.00

VA FORM JUN 1978 10-6238

EXISTING STOCK OF VA FORM 08-6238, NOV. 1977, WILL BE USED.

☆U. S. Government Printing Office: 1979—281-629/1199

EMIS CONSTRUCTION PROGRAM - ESTIMATE WORKSHEET

DATE: 4-3-87

SHEET NO. 4 OF 4 SHEETS

PROJECT NO.:

LOCATION: V.A. Medical Center Walla Walla, WA

PROJECT NAME: Repaint & Upgrade Water Tower

TYPE OF ESTIMATE: [X] NO DESIGN COMPLETED [ ] PRELIMINARY DESIGN [ ] FINAL DESIGN [ ] OTHER (Specify)

ESTIMATOR: FRM

NEW:

ALT: X

INDEX NO.:

BUILDING NO(S).: 96

DRAWING NO.:

CODE A	CODE B	CODE C	CODE D	SYSTEM/SUBSYSTEM	LABOR QUANTITY	LABOR UNIT	LABOR S/UNIT	LABOR TOTAL	MATERIALS QUANTITY	MATERIALS UNIT	MATERIALS S/UNIT	MATERIALS TOTAL	TOTAL
				Detail MI									
				Access Opening				1,180.00	100.1	LB	3.00	300.00	$ 1,480.00
				Equipment									200.00
				Subtotal									$ 1,680.00
				Overflow				3,368.00				3,785.00	$ 7,153.00
				Equipment									460.00
				Access Ladder "Safety" Saf-T-Climb				720.00	1	LS	2300	2,300.00	3,020.00
				Subtotal									$10,633.00
				Subtotal									$12,313.00
				COP 35%									4,309.55
				TOTAL									$16,622.55

Item d - 20 Year Plan

EMIS CONSTRUCTION PROGRAM - ESTIMATE WORKSHEET

DATE: 05/08/86

SHEET NO. 1 OF 1 SHEETS

PROJECT NO.:

LOCATION: V.A. Medical Center Walla Walla, WA

PROJECT NAME: Replace Water Main Gate Valves

TYPE OF ESTIMATE: [X] NO DESIGN COMPLETED [ ] PRELIMINARY DESIGN [ ] FINAL DESIGN [ ] OTHER (Specify)

ESTIMATOR: DCM

NEW:

ALT: X

INDEX NO.:

BUILDING NO(S).: ---

DRAWING NO.:

CODE A	CODE B	CODE C	CODE D	SYSTEM/SUBSYSTEM	LABOR QUANTITY	LABOR UNIT	LABOR $/UNIT	LABOR TOTAL	MATERIALS QUANTITY	MATERIALS UNIT	MATERIALS $/UNIT	MATERIALS TOTAL	TOTAL
				M & R									
				8" Gate Valve	3	EA	500	1,500.00	3	EA	522	1,566.00	$ 3,066.00
				6" Gate Valve	21	EA	320	6,720.00	21	EA	335	7,035.00	16,821.00
				8" Tee	2	EA	200	400.00	2	EA	200	400.00	800.00
				6" Tee	3	EA	120	360.00	3	EA	120	360.00	720.00
				8" Flexible Coupling	3	EA	128	384.00	3	EA	85	255.00	639.00
				6" Flexible Coupling	21	EA	102	2,142.00	21	EA	68	1,428.00	3,570.00
				8" DIP CL 51	20	LF	20	400.00	20	LF	9.50	190.00	590.00
				6" DIP CL 51	120	LF	18	2,160.00	120	LF	7.00	840.00	3,000.00
				Valve Box	24	EA	128	3,072.00	24	EA	85	2,040.00	5,112.00
				Asphalt Replacement	30	SY	10	300.00	30	SY	5.00	150.00	450.00
				Landscaping	1500	SF	0.15	225.00	1500	SF	0.20	300.00	525.00
				Subtotal									$35,293.00
				COP 35%									12,353.00
				TOTAL									$47,646.00

Item 'e' - 20 Year Plan

EMIS CONSTRUCTION PROGRAM - ESTIMATE WORKSHEET

DATE: 3-19-87

SHEET NO. 1 OF 1 SHEETS

PROJECT NO.:

LOCATION: V.A. Medical Center, Walla Walla, WA

PROJECT NAME:

TYPE OF ESTIMATE: [X] NO DESIGN COMPLETED [ ] PRELIMINARY DESIGN [ ] FINAL DESIGN [ ] OTHER (Specify)

ESTIMATOR: Dennis C. Muth

NEW:

ALT: X

INDEX NO.:

BUILDING NO(S).: 101

DRAWING NO.:

CODE A	CODE B	CODE C	CODE D	SYSTEM/SUBSYSTEM	LABOR QUANTITY	LABOR UNIT	LABOR $/UNIT	LABOR TOTAL	MATERIALS QUANTITY	MATERIALS UNIT	MATERIALS $/UNIT	MATERIALS TOTAL	TOTAL
				M & R									
				8" No Slam Check Valve	1	EA	3000	3,000.00	1	EA	2815	2,815.00	5,815.00
				4" Pump Control Valve	1	EA	2500	2,500.00	1	EA	2264	2,264.00	4,764.00
				4" Pressure Relief Valve	1	EA	1200	1,200.00	1	EA	1185	1,185.00	2,385.00
				Misc. Fittings	Lump Sum			1,000.00	Lump Sum			1,500.00	2,500.00
				Electrical	Lump Sum			2,000.00	Lump Sum			1,000.00	3,000.00
				Subtotal									18,464.00
				COP 35%									6,462.00
				TOTAL									24,926.00

Item 20 Year Plan

EMIS CONSTRUCTION PROGRAM - ESTIMATE WORKSHEET

DATE: 3-19-87

SHEET NO. 1 OF 1 SHEETS

PROJECT NO.:

LOCATION: V.A. Medical Center, Walla Walla, WA

PROJECT NAME: Replace Control System for Well Pumps

TYPE OF ESTIMATE: [X] NO DESIGN COMPLETED [ ] PRELIMINARY DESIGN [ ] FINAL DESIGN [ ] OTHER (Specify)

ESTIMATOR: Dennis C. Muth

NEW: | ALT: X | INDEX NO.:

BUILDING NO(S).: 96, 99 & 101

DRAWING NO.:

CODE A	CODE B	CODE C	CODE D	SYSTEM/SUBSYSTEM	LABOR QUANTITY	LABOR UNIT	LABOR S/UNIT	LABOR TOTAL	MATERIALS QUANTITY	MATERIALS UNIT	MATERIALS S/UNIT	MATERIALS TOTAL	TOTAL
				M & R									
				Replace Control System	1	Lump	Sum	15,000.00	1	Lump	Sum	20,000.00	35,000.00
				Subtotal									35,000.00
				COP 35%									12,250.00
				TOTAL									47,250.00

EMIS CONSTRUCTION PROGRAM - ESTIMATE WORKSHEET

DATE: 05/08/86

SHEET NO. 1 OF 1 SHEETS

PROJECT NO.:

LOCATION: V.A. Medical Center Walla Walla, WA

PROJECT NAME: Replace 8" Water Main From 8" City Supply to Cross With 10" Dia.

TYPE OF ESTIMATE: [X] NO DESIGN COMPLETED [ ] PRELIMINARY DESIGN [ ] FINAL DESIGN [ ] OTHER (Specify)

ESTIMATOR: DCM

NEW:

ALT: X

INDEX NO.:

BUILDING NO(S).: ---

DRAWING NO.:

CODE A	CODE B	CODE C	CODE D	SYSTEM/SUBSYSTEM	LABOR QUANTITY	LABOR UNIT	LABOR $/UNIT	LABOR TOTAL	MATERIALS QUANTITY	MATERIALS UNIT	MATERIALS $/UNIT	MATERIALS TOTAL	TOTAL
				M & R									
				10" Water Main -									
				CL 150 PVC	680	LF	12.00	8,160.00	680	LF	8.00	5,440.00	$13,600.00
				10" Bends	4	EA	148	592.00	4	EA	148	592.00	1,184.00
				2" Tap	1	EA	100	100.00	1	EA	200	200.00	300.00
				Landscaping Replace-									
				ment	15000	SF	0.10	1,500.00	15000	SF	0.13	1,950.00	3,450.00
				Asphalt Replacement	50	SY	10.00	500.00	50	SY	5.00	250.00	750.00
				Subtotal									$19,284.00
				COP 35%									6,749.00
				TOTAL									$26,033.00

Item h - 20 Year Plan

EMIS CONSTRUCTION PROGRAM - ESTIMATE WORKSHEET

DATE: 05/08/86

SHEET NO. 1 OF 3 SHEETS

PROJECT NO.:

LOCATION: V.A. Medical Center Walla Walla, WA

PROJECT NAME: Avery Street Connection to City Water Supply

TYPE OF ESTIMATE: ☐ NO DESIGN COMPLETED ☐ PRELIMINARY DESIGN ☐ FINAL DESIGN ☐ OTHER (Specify)

ESTIMATOR: DCM

NEW:

ALT: X

INDEX NO.:

BUILDING NO(S).: ---

DRAWING NO.:

CODE A	CODE B	CODE C	CODE D	SYSTEM/SUBSYSTEM	LABOR QUANTITY	LABOR UNIT	LABOR $/UNIT	LABOR TOTAL	MATERIALS QUANTITY	MATERIALS UNIT	MATERIALS $/UNIT	MATERIALS TOTAL	TOTAL
				Summary									
				M & R									$28,932
				COP 35%									10,126
				TOTAL									$39,058

VA FORM JUN 1978 10-6238

EXISTING STOCK OF VA FORM 08-6238, NOV. 1977, WILL BE USED.

☆U. S. Government Printing Office: 1979—281-629/1199

EMIS CONSTRUCTION PROGRAM - ESTIMATE WORKSHEET

DATE: 05/08/86

SHEET NO. 2 OF 3 SHEETS

PROJECT NO.:

LOCATION: V.A. Medical Center Walla Walla, WA

PROJECT NAME: Avery Street Connection to City Water Supply

TYPE OF ESTIMATE: [X] NO DESIGN COMPLETED [ ] PRELIMINARY DESIGN [ ] FINAL DESIGN [ ] OTHER (Specify)

ESTIMATOR: DCM

NEW: | ALT: | INDEX NO.:

BUILDING NO(S.): ---

DRAWING NO.:

CODE A	CODE B	CODE C	CODE D	SYSTEM/SUBSYSTEM	LABOR QUANTITY	LABOR UNIT	LABOR $/UNIT	LABOR TOTAL	MATERIALS QUANTITY	MATERIALS UNIT	MATERIALS $/UNIT	MATERIALS TOTAL	TOTAL
				M & R									
				8" Water Main DIP CL 51	230	LF	15.50	3,565	230	LF	9.50	2,185	$ 5,750
				8" Tee	1	EA	200	200	1	EA	200	200	400
				8" Bends	3	EA	109	327	3	EA	109	327	654
				8" Gate Valve	2	EA	110	220	2	EA	522	1,044	1,264
				Valve Box	2	EA	50.00	100	2	EA	85	170	270
				Meter & PRV Vault									
				Excavation	140	CY	6.00	840	--	--	--	--	840
				Concrete	25	CY	275	6,875	25	CY	66	1,650	8,525
				Steel	1500	LB	0.40	600	1500	LB	0.40	600	1,200
				Hatch	1	EA	250	250	1	EA	250	250	500
				6"x8" Flg. Reducer	2	EA	49.00	98	2	EA	98	196	294
				6"x6"x4" Tee	4	EA	44.00	176	4	EA	83	332	508
				6" Strainer	1	EA	163	163	1	EA	325	325	488
				6" Gate Valve with Hd Wheel	4	EA	165	660	4	EA	329	1,316	1,976
				Subtotal									$22,669

EMIS CONSTRUCTION PROGRAM - ESTIMATE WORKSHEET

DATE: 05/08/86

SHEET NO. 3 OF 3 SHEETS

PROJECT NO.:

LOCATION: V.A. Medical Center Walla Walla, WA

PROJECT NAME: Avery Street Connection to City Water Supply

TYPE OF ESTIMATE: [X] NO DESIGN COMPLETED [ ] PRELIMINARY DESIGN [ ] FINAL DESIGN [ ] OTHER (Specify)

ESTIMATOR: DCM

NEW | ALT | INDEX NO.

BUILDING NO(S.): ---

DRAWING NO.:

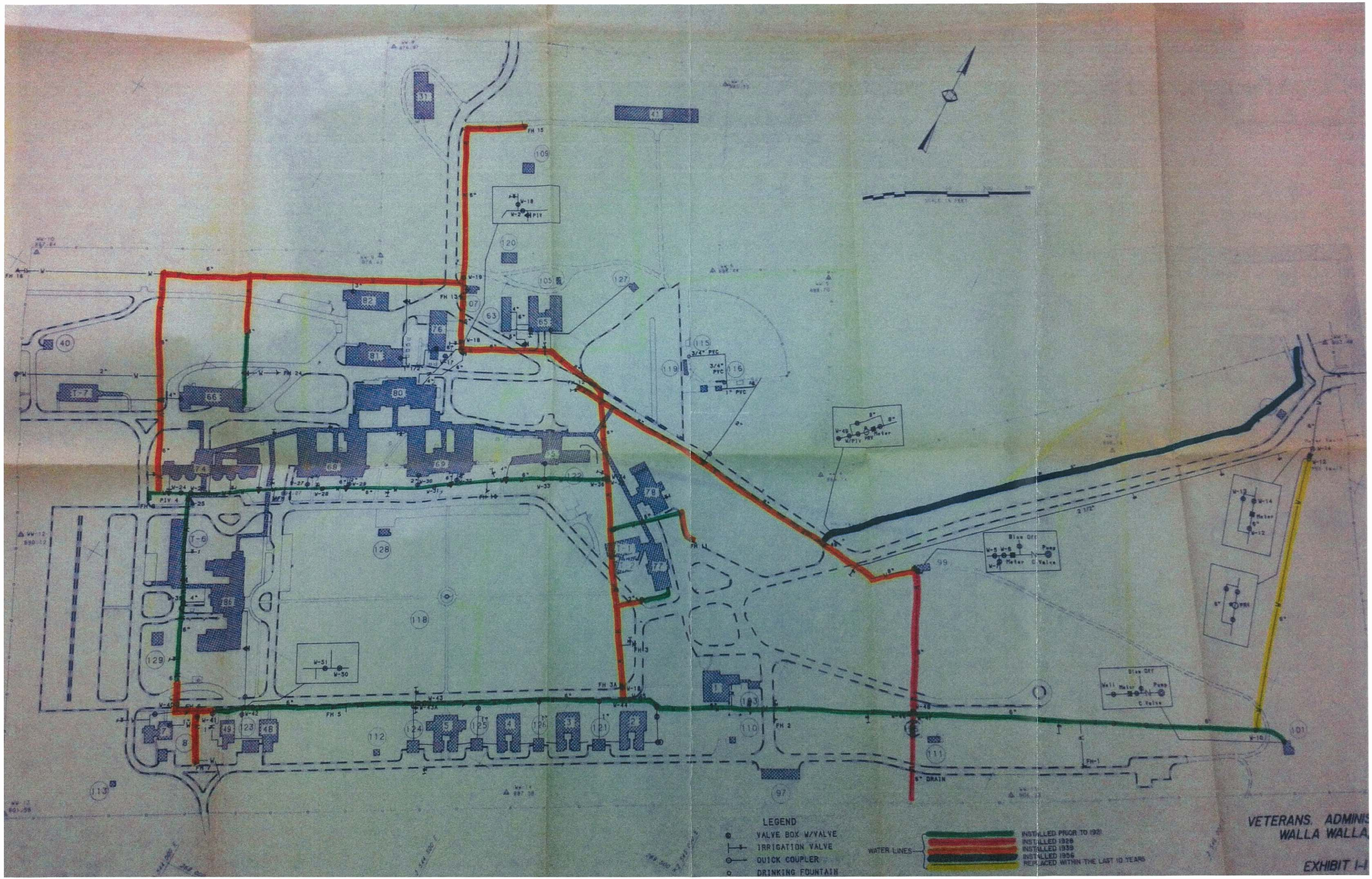
CODE A	CODE B	CODE C	CODE D	SYSTEM/SUBSYSTEM	LABOR QUANTITY	LABOR UNIT	LABOR S/UNIT	LABOR TOTAL	MATERIALS QUANTITY	MATERIALS UNIT	MATERIALS S/UNIT	MATERIALS TOTAL	TOTAL
				4"x6" Flg. Reducer	2	EA	55.00	110	2	EA	110	220	$ 330
				4" PRV Clayton 90-01	1	EA	466	466	1	EA	931	931	1,397
				4" Gate Valve with Hd Wheel	1	EA	123	123	1	EA	246	246	369
				2" Gate Valve with Hd Wheel	2	EA	13.00	26	2	EA	25	50	76
				4" Bends	2	EA	19.00	38	2	EA	38	76	114
				4" Piping DIP CL 52	12	LF	2.80	34	12	LF	5.60	67	101
				2" Bends	2	EA	2.50	5	2	EA	5.00	10	15
				2" Copper Pipe	12	LF	2.10	25	12	LF	4.25	51	76
				4" Uniflanges	8	EA	24.00	192	8	EA	47	376	568
				6" Uniflanges	22	EA	28.00	616	22	EA	56	1,232	1,848
				6" Piping DIP CL 52	20	LF	3.45	69	20	LF	6.90	138	207
				2" NPT x 4" Reducing Flange	2	EA	11.00	22	2	EA	21	42	64
				6" Flexible Coupling	1	EA	34.00	34	1	EA	68	68	102
				2" PRV Clayton 90-01	1	EA	257	257	1	EA	514	514	771
				Asphalt Replacement	15	SY	10	150	15	SY	5.00	75	225
				Subtotal									$ 6,263

APPENDIX 'G'

DRAWING

EXHIBIT 1-1

WATER SYSTEM PLAN


LEGEND
VALVE BOX W/VALVE
IRRIGATION VALVE
QUICK COUPLER
DRINKING FOUNTAIN
WATER LINES
INSTALLED PRIOR TO 1921
INSTALLED 1928
INSTALLED 1939
INSTALLED 1956
REPLACED WITHIN THE LAST 10 YEARS
VETERANS ADMINIS
WALLA WALLA
EXHIBIT I-I

APPENDIX D

Distribution System Spreadsheets

Site Irrigation

	Flow		
	Present (2011)	**6-Year Plan (2018)**	**20-Year Plan (2032)**
AAID, gpy	32,121,488	26,958,136	21,566,508
ADD - Based on 184 Days, gpd	174,573	146,512	117,209
Peak Month ADID, gpd	346,763	323,655	258,924
MMAD, gpd	406,463	341,126	272,901
MDD, gpd	528,401	483,986	387,189
Peak Month ADIF, gpm	372	347	277
Peak Month PHIF, gpm	743	694	555

Efficiency Apartments

	Flow		
	Present (2011)	**6-Year Plan (2018)**	**20-Year Plan (2032)**
AAD, gpy	-	1,825,000	1,825,000
ADD - 100 Gallons Per Bedroom Per Day, gpd	-	5,000	5,000
ADDF - Used VA Formula, gpm	-	4	4
PHD, gpm	-	13	13

Campus

	Flow		
	Present (2011)	**6-Year Plan (2018)**	**20-Year Plan (2032)**
AAD, gpy	53,914,501	49,663,649	48,630,624
AADD, gpy	21,793,013	22,705,513	27,064,116
ADD, gpd	147,707	136,065	133,235
ADDD, gpd	59,707	62,207	74,148
Peak Month ADID, gpd	346,763	323,655	258,924
MMAD, gpd	406,463	403,333	347,049
MDD, gpd	528,401	524,333	451,164
AHD, gpm	421	399	339
AHDF, gpm	50	52	62
AHIF, gpm	372	347	277
PHD, gpm	892	849	740
PHDD, gpm	149	156	185
PHID, gpm	743	694	555

2011 - Campus without Irrigation

Month	Monthly Volumes, gallons	ADD, gpd	Hospitals/Clinics	
			ADDF, gpm	PHDF, gpm
January	1,873,244	-	-	-
February	1,575,177	-	-	-
March	1,744,436	-	-	-
April	1,627,356	-	-	-
November	1,875,875	-	-	-
December	2,110,859	-	-	-
Annual Total	**10,806,946**	**59,707**	**50**	**149**

2009 - 2011 - Campus with Irrigation

Month	Monthly Volumes, gallons	ADD, gpd	ADDD	ADID	Monthly Irrigation Demand
May	1,958,858	631,889	59,700	3,489	108,158
June	3,856,893	128,563	59,700	68,863	2,065,893
July	10,783,082	347,841	59,700	288,141	8,932,382
August	12,600,338	406,463	59,700	346,763	10,749,638
September	10,028,377	334,279	59,700	274,579	8,237,377
October	3,878,741	125,121	59,700	65,421	2,028,041
				Annual Irrigation Demand	**32,121,489**

2011 Irrigation Volumes

Peak Month ADD, gpd	Non-Irrigation Average, gpd	Peak Month AID, gpd	ADF, gpm	PHD, gpm
406,463	59,700	346,763	372	743

2011 Water Usage - Entire Campus

Month	Monthly Volumes, gallons	ADD, gpd	MMADD, gpd	MDD, gpd	Hospitals/Clinics	
					ADDF, gpm	PHDF, gpm
January	1,873,244	60,427	-	-	-	-
February	1,575,177	56,256	-	-	-	-
March	1,744,436	56,272	-	-	-	-
April	1,627,356	54,245	-	-	-	-
May	1,958,858	63,189	-	-	-	-
June	3,856,893	128,563	-	-	-	-
July	10,783,082	347,841	-	-	-	-
August	12,600,338	406,463	406,463	528,401	-	-
September	10,028,377	334,279	-	-	-	-
October	3,878,741	125,121	-	-	-	-
November	1,875,875	62,529	-	-	-	-
December	2,110,859	68,092	-	-	-	-
Annual Total	**53,913,234**	**147,707**	-	-	**123**	**369**

Standby (SB) Storage Calculation

Curtailment Scenario	Demand	Population		Volume (gallons)		
		Present	Future	Present	2018	2032
VAMC Employees	40 gpd per person	400	412	16,000	16,000	16,480
VAMC Temp Residents	40 gpd per person	28	36	1,120	1,120	1,440
Skilled Nursing Facility	200 gpd per bedroom	0	-	-	-	-
Efficiency Apartments	200 gpd per bedroom	0	50	-	5,000	5,000
Industrial Water	5,000 gpd present; 2,500 gpd future	-	-	5,000	2,500	2,500
Potable Duration (4 Days)		-	-	68,480	89,760	91,680
Energy Center Duration (7 Days)		-	-	35,000	17,500	17,500
			Total	**103,480**	**107,260**	**109,180**

Hydraulic Computer Modeling

Proposed improvements to the VAMC's water distribution system were evaluated for its hydraulic capacity using a computer model that was compiled and based on the proposed system layout and anticipated operating conditions. The new hydraulic model for this study was created using Water CAD® v.8i by the Haested Methods Solution Center of Bentley Systems, Inc. Water CAD® is a state-of-the art software tool primarily used in the analysis and modeling of water distribution systems. This program employs mathematical algorithms based on hydraulic principles to predict system pressures and flow rates within a water system. Fire flows are of particular interest since the magnitude of these flows typically dictates the necessary hydraulic capacity of the water system.

The proposed water distribution system shown in Figure 3-2 was used for modeling. The elevations of the reservoir and each pipe junction were defined using topographic data from existing system maps. VAMC staff provided other system information such as valve conditions, hydrant locations, and reservoir details. The compiled model contains 67 pipe elements and 50 nodes or junctions.

In modeling the distribution system, a few assumptions were made. Nominal pipe diameters are used to model the distribution system. Hazen Williams roughness coefficients are used to account for the head loss through the pipe generated by friction with the wall and the reduction in diameter based on the material type and buildup. This method has been shown to give generally conservative values. Individual minor losses from valves and fittings are included with the roughness factors in the pipes.

Two flow scenarios were evaluated using the hydraulic computer model: 1) PHD and 2) fire flow under MDD conditions. These flow scenarios are discussed in further detail below. A copy of the computer model printouts is attached. Reconciliation and calibration of the model was not performed since the model was based on new piping.

The first scenario evaluated the system's response under the PHD condition. The demands for major water users were placed in appropriate locations, and the rest of the demand was distributed evenly throughout the system. Under this condition, the model was run with the ES in the reservoirs depleted. In accordance with WAC 246 290-230 / Chapter 5, the pressure throughout the distribution system must be at least 30 psi under PHD. Based on modeling with a conservative PHD of 992 gpm, the pressure throughout the system was in excess of 30 psi.

The second scenario evaluated the system's response under fire flow conditions at each hydrant during MDD conditions. For the fire flow condition, water was assumed to come from the City of Walla Walla's intertie connections. To be conservative, a preliminary PHD flow of 992 gpm was utilized in lieu of the MDD flow. From modeling of the PHD flow conditions, fire flow in excess of 4,000 gpm was observed for the proposed water distribution system.

VA Medical Center

Scenario Summary	
ID	136
Label	Available Fire Flow
Notes	
Active Topology	<I> Base Active Topology
Physical	<I> Base Physical
Demand	<I> Base Demand
Initial Settings	<I> Base Initial Settings
Operational	<I> Base Operational
Age	<I> Base Age
Constituent	<I> Base Constituent
Trace	<I> Base Trace
Fire Flow	Available Fire Flow
Flushing	<I> Base Flushing
Energy Cost	<I> Base Energy Cost
Transient	<I> Base Transient
Pressure Dependent Demand	<I> Base Pressure Dependent Demand
User Data Extensions	<I> Base User Data Extensions
Steady State/EPS Solver Calculation Options	MDD-Fire Flow
Transient Solver Calculation Options	<I> Base Calculation Options

Hydraulic Summary			
Time Analysis Type	Steady State	Use simple controls during steady state?	True
Friction Method	Hazen-Williams	Is EPS Snapshot?	False
Accuracy	0.001	Start Time	12:00:00 AM
Trials	40	Calculation Type	Fire Flow

VA Medical Center

Title	
Engineer	
Company	
Date	11/6/2012
Notes	

Scenario Summary

ID	136
Label	Available Fire Flow
Notes	
Active Topology	<I> Base Active Topology
Physical	<I> Base Physical
Demand	<I> Base Demand
Initial Settings	<I> Base Initial Settings
Operational	<I> Base Operational
Age	<I> Base Age
Constituent	<I> Base Constituent
Trace	<I> Base Trace
Fire Flow	Available Fire Flow
Flushing	<I> Base Flushing
Energy Cost	<I> Base Energy Cost
Transient	<I> Base Transient
Pressure Dependent Demand	<I> Base Pressure Dependent Demand
User Data Extensions	<I> Base User Data Extensions
Steady State/EPS Solver Calculation Options	MDD-Fire Flow
Transient Solver Calculation Options	<I> Base Calculation Options

Network Inventory

Pipes	67	-Constant Speed - No Pump Curve	2
Junctions	50	-Constant Speed - Pump Curve	0
Hydrants	4	-Shut Down After Time Delay	0
Tanks	1	-Variable Speed/Torque	0
-Circular	1	-Pump Start - Variable Speed/Torque	0
-Non-Circular	0	Variable Speed Pump Batteries	0
-Variable Area	0	PRV's	2
Reservoirs	2	PSV's	0
Pumps	2	PBV's	0
-Constant Power	0	FCV's	0
-Design Point (1 Point)	0	TCV's	0
-Standard (3 Point)	2	GPV's	0
-Standard Extended	0	Isolation Valves	0
-Custom Extended	0	Spot Elevations	0
-Multiple Point	0		

VA Medical Center

Transient Network Inventory			
Air Valves	0	Rupture Disks	0
-Double Acting	0	Surge Valves	0
-Slow Closing	0	Surge Tanks	0
-Triple Acting	0	-Simple	0
-Vacuum Breaker	0	-Differential	0
Discharges to Atmosphere	0	-Variable Area	0
Orifice	0	Turbines	0
Rating Curve	0	Valves With Linear Area Change	0
Valve	0	Periodic Head-Flows	0
Check Valves	2	-Sinusoidal (Head)	0
-Towards Wye	2	-Not Sinusoidal (Head)	0
-Away from Wye	0	-Sinusoidal (Flow)	0
Hydropneumatic Tanks	0	-Not Sinusoidal (Flow)	0
Orifices Between Pipes	0		

Pressure Pipes Inventory			
4.0 (in)	186.11 ft	10.0 (in)	3,801.31 ft
6.0 (in)	137.68 ft	12.0 (in)	5,770.23 ft
8.0 (in)	3,118.33 ft	All Diameters	13,013.66 ft

VA Medical Center

Diameter (in)	Ductile Iron (ft)	All Materials (ft)	Volume (MG)
4.0	186.11	186.11	0.00
6.0	137.68	137.68	0.00
8.0	3,118.33	3,118.33	0.01
10.0	3,801.31	3,801.31	0.02
12.0	5,770.23	5,770.23	0.03
All Diameters	13,013.66	13,013.66	0.06

VA Medical Center

Current Time: 0.000 hours

ID	Label	Elevation (ft)	Zone	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
25	J-1	878.00	North	0	1,068.60	82.5
28	J-2	876.00	VA System	0	1,036.43	69.4
32	J-3	875.50	VA System	0	1,036.43	69.6
34	J-4	875.00	VA System	0	1,036.40	69.8
41	J-6	889.00	VA System	0	1,036.39	63.8
43	J-7	889.60	VA System	0	1,036.39	63.5
46	J-8	887.00	VA System	0	1,036.38	64.6
50	J-10	887.50	VA System	0	1,036.36	64.4
54	J-11	892.00	VA System	0	1,036.35	62.5
55	J-12	892.50	VA System	0	1,036.35	62.2
58	J-13	892.00	VA System	0	1,036.36	62.5
60	J-14	892.00	VA System	0	1,036.36	62.5
61	J-15	892.00	VA System	59	1,036.35	62.5
62	J-16	892.00	VA System	50	1,036.34	62.4
63	J-17	892.00	VA System	0	1,036.36	62.5
68	J-18	889.00	VA System	0	1,036.39	63.8
73	J-19	903.50	VA System	0	1,036.47	57.5
75	J-20	903.00	VA System	0	1,036.50	57.8
77	J-21	896.00	VA System	0	1,036.44	60.8
79	J-22	892.00	VA System	0	1,036.39	62.5
81	J-23	890.00	VA System	0	1,036.39	63.3
85	J-24	884.00	VA System	0	1,036.44	66.0
88	J-25	899.40	VA System	0	1,036.61	59.4
90	J-26	906.70	VA System	0	1,036.54	56.2
92	J-27	903.80	VA System	0	1,036.60	57.5
93	J-28	903.80	VA System	0	1,036.60	57.5
97	J-29	904.80	VA System	0	1,036.54	57.0
100	J-31	899.40	VA System	0	1,036.67	59.4
102	J-32	906.60	VA System	40	1,036.66	56.3
106	J-34	890.60	VA System	0	1,036.76	63.2
111	J-36	889.00	VA System	0	1,036.92	64.0
114	J-38	889.00	VA System	0	1,036.92	64.0
115	J-39	888.30	VA System	0	1,036.92	64.3
116	J-40	901.00	VA System	0	1,036.92	58.8
120	J-41	896.70	VA System	0	1,039.70	61.9
123	J-43	895.00	Well No.1	0	1,042.00	63.6
125	J-44	902.00	Well No.2	0	1,042.00	60.6
127	J-45	896.00	VA System	0	1,041.91	63.1
131	J-46	906.00	VA System	0	1,041.91	58.8
133	J-47	897.00	VA System	0	1,039.70	61.7
166	J-48	900.00	VA System	394	1,036.33	59.0
169	J-49	885.00	VA System	197	1,036.47	65.5
172	J-50	890.00	Irrigation	197	1,032.01	61.4
174	J-51	900.00	VA System	25	1,036.37	59.0
178	J-53	893.00	VA System	30	1,036.42	62.1
192	J-54	894.00	VA System	0	1,036.35	61.6
196	J-56	887.50	VA System	0	1,036.36	64.4
199	J-57	888.00	VA System	0	1,036.37	64.2
202	J-58	891.00	VA System	0	1,036.37	62.9
205	J-59	888.00	VA System	0	1,036.40	64.2

VA Medical Center

Current Time: 0.000 hours

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
33	P-4	501.79	J-2	J-3	10.0	130.0	0	0.00
39	P-6	184.14	J-4	H-1	8.0	130.0	0	0.00
40	P-5	651.10	J-4	J-3	10.0	130.0	-66	0.27
44	P-10	77.28	J-6	J-7	10.0	130.0	0	0.00
48	P-11	156.52	J-6	J-8	10.0	130.0	66	0.27
49	P-12	14.09	H-2	J-8	6.0	130.0	0	0.00
53	P-14	8.91	H-3	J-10	6.0	130.0	0	0.00
56	P-15	208.52	J-10	J-11	10.0	130.0	66	0.27
57	P-16	34.77	J-11	J-12	10.0	130.0	94	0.38
59	P-17	161.77	J-11	J-13	10.0	130.0	-27	0.11
64	P-18	56.46	J-13	J-16	6.0	130.0	50	0.57
65	P-19	25.30	J-13	J-17	10.0	130.0	-77	0.32
66	P-20	8.77	J-17	J-15	6.0	130.0	59	0.67
67	P-21	38.39	J-17	J-14	6.0	130.0	0	0.00
71	P-23	11.07	J-18	H-4	6.0	130.0	0	0.00
72	P-24	51.85	J-18	J-6	10.0	130.0	0	0.00
76	P-26	184.87	J-19	J-20	12.0	130.0	-225	0.64
78	P-27	530.04	J-20	J-21	12.0	130.0	192	0.54
83	P-30	31.31	J-23	J-18	10.0	130.0	0	0.00
84	P-31	101.06	J-22	J-23	12.0	130.0	136	0.39
86	P-32	277.03	J-21	J-24	12.0	130.0	25	0.07
87	P-33	334.75	J-24	J-3	12.0	130.0	66	0.19
89	P-34	228.65	J-20	J-25	12.0	130.0	-417	1.18
91	P-35	278.45	J-19	J-26	8.0	130.0	-100	0.64
94	P-36	71.27	J-25	J-27	8.0	130.0	100	0.64
95	P-37	36.56	J-27	J-28	8.0	130.0	0	0.00
96	P-38	210.39	J-27	J-26	8.0	130.0	100	0.64
98	P-39	107.57	J-26	J-29	8.0	130.0	0	0.00
101	P-40	71.66	J-25	J-31	12.0	130.0	-517	1.47
105	P-42	124.94	J-31	J-32	8.0	130.0	40	0.26
109	P-44	105.45	J-31	J-34	12.0	130.0	-557	1.58
112	P-46	97.85	J-34	J-36	12.0	130.0	-795	2.26
117	P-47	6.57	J-36	J-38	12.0	130.0	197	0.56
118	P-48	127.22	J-36	J-40	8.0	130.0	0	0.00
119	P-49	62.04	J-38	J-39	8.0	130.0	0	0.00
122	P-50	1,112.77	J-36	J-41	12.0	130.0	-992	2.81
126	P-51	78.97	J-44	T-1	8.0	130.0	0	0.00
128	P-52	35.38	T-1	J-45	12.0	130.0	992	2.81
129	P-53	860.90	J-43	T-1	8.0	130.0	0	0.00
130	P-54	885.96	J-45	J-41	12.0	130.0	992	2.81
132	P-55	653.57	J-46	J-45	10.0	130.0	0	0.00
147	P-60	40.03	J-1	CV-3	10.0	130.0	0	0.00
150	P-62	16.46	J-41	CV-4	12.0	130.0	0	0.00
151	P-63	13.27	CV-4	J-47	12.0	130.0	0	0.00
153	P-64	64.33	R-1	PMP-1	10.0	130.0	0	0.00
154	P-65	67.15	PMP-1	J-1	10.0	130.0	0	0.00
157	P-66	39.92	R-2	PMP-2	12.0	130.0	0	0.00
161	P-68	17.88	CV-3	PRV-1	10.0	130.0	0	0.00
162	P-69	20.75	PRV-1	J-2	10.0	130.0	0	0.00
164	P-70	28.63	PMP-2	PRV-2	12.0	130.0	0	0.00
165	P-71	29.64	PRV-2	J-47	12.0	130.0	0	0.00
170	P-74	222.42	J-34	J-49	8.0	130.0	238	1.52

VA Medical Center

Current Time: 0.000 hours

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)
171	P-75	753.47	J-49	J-24	8.0	130.0	41	0.26
173	P-76	186.11	J-50	J-38	4.0	130.0	-197	5.03
175	P-77	134.59	J-48	J-51	12.0	130.0	-300	0.85
176	P-78	315.50	J-51	J-19	12.0	130.0	-325	0.92
179	P-79	190.56	J-21	J-53	12.0	130.0	166	0.47
180	P-80	439.54	J-53	J-22	12.0	130.0	136	0.39
193	P-81	160.15	J-12	J-54	12.0	130.0	94	0.27
194	P-82	429.92	J-54	J-48	12.0	130.0	94	0.27
198	P-84	25.22	J-56	J-10	10.0	130.0	66	0.27
200	P-85	135.39	J-8	J-57	10.0	130.0	66	0.27
201	P-86	225.01	J-57	J-56	10.0	130.0	66	0.27
203	P-87	102.97	J-17	J-58	10.0	130.0	-136	0.56
204	P-88	77.82	J-58	J-23	10.0	130.0	-136	0.56
206	P-89	160.27	J-4	J-59	10.0	130.0	66	0.27
207	P-90	310.71	J-59	J-6	10.0	130.0	66	0.27

VA Medical Center

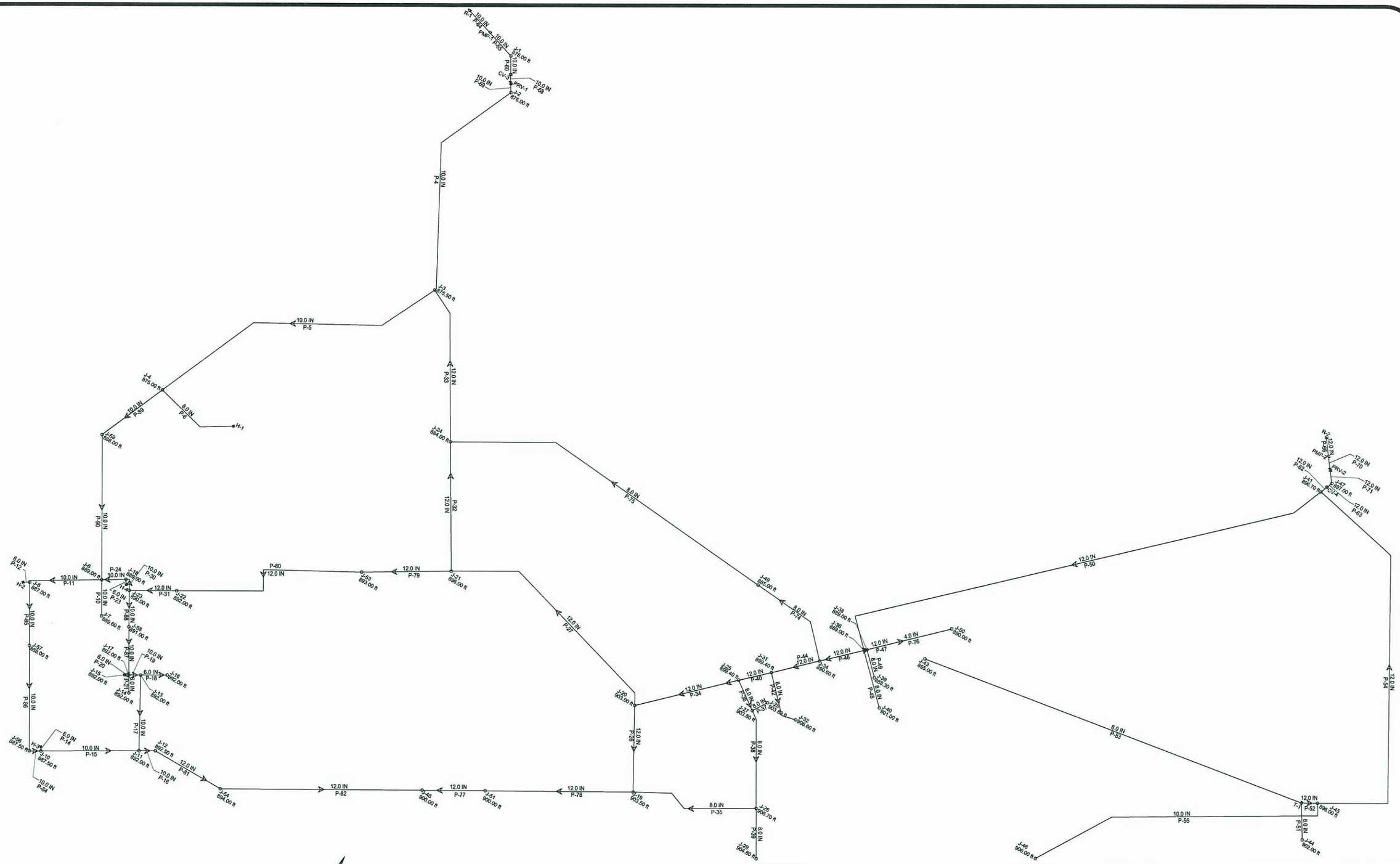
Current Time: 0.000 hours

Label	Zone	Fire Flow (Available) (gpm)	Flow (Total Available) (gpm)	Pressure (Calculated Residual) (psi)	Pressure (Calculated Zone Lower Limit) (psi)	Junction w/ Minimum Pressure (Zone)
J-1	North	(N/A)	(N/A)	(N/A)	(N/A)	((N/A))
J-2	VA System	4,947	4,947	59.4	49.2	J-26
J-3	VA System	5,000	5,000	52.1	41.5	J-26
J-4	VA System	5,000	5,000	43.7	38.9	H-1
H-1	VA System	2,350	2,350	45.7	46.8	J-26
J-6	VA System	5,000	5,000	41.6	39.5	J-26
J-7	VA System	3,672	3,672	45.4	43.7	J-26
J-8	VA System	5,000	5,000	39.4	36.8	H-2
H-2	VA System	1,322	1,322	52.9	48.9	J-26
J-10	VA System	5,000	5,000	38.3	35.7	H-3
H-3	VA System	1,322	1,322	52.9	48.9	J-26
J-11	VA System	5,000	5,000	39.4	38.6	J-48
J-12	VA System	5,000	5,000	38.9	38.2	J-48
J-13	VA System	5,000	5,000	38.4	38.4	J-16
J-14	VA System	1,322	1,322	52.1	48.9	J-26
J-15	VA System	1,263	1,322	54.1	49.2	J-26
J-16	VA System	1,272	1,322	51.5	49.2	J-26
J-17	VA System	5,000	5,000	38.5	38.5	J-15
J-18	VA System	5,000	5,000	41.9	39.3	H-4
H-4	VA System	1,322	1,322	52.5	48.9	J-26
J-19	VA System	5,000	5,000	37.5	37.6	J-26
J-20	VA System	5,000	5,000	39.1	38.3	J-26
J-21	VA System	5,000	5,000	42.1	39.6	J-26
J-22	VA System	5,000	5,000	40.9	39.4	J-26
J-23	VA System	5,000	5,000	41.9	39.4	J-26
J-24	VA System	5,000	5,000	47.5	40.5	J-26
J-25	VA System	5,000	5,000	41.2	38.3	J-26
J-26	VA System	4,629	4,629	29.0	29.8	J-29
J-27	VA System	3,161	3,161	42.9	42.7	J-26
J-28	VA System	2,350	2,350	44.4	45.1	J-26
J-29	VA System	2,350	2,350	39.7	43.0	J-26
J-31	VA System	5,000	5,000	41.6	38.5	J-32
J-32	VA System	2,310	2,350	41.5	46.2	J-26
J-34	VA System	5,000	5,000	46.2	39.4	J-32
J-36	VA System	5,000	5,000	47.3	40.0	J-32
J-38	VA System	5,000	5,000	47.2	40.0	J-32
J-39	VA System	2,350	2,350	52.1	46.5	J-26
J-40	VA System	2,350	2,350	44.1	46.5	J-26
J-41	VA System	5,000	5,000	59.3	53.6	J-26
J-43	Well No.1	2,350	2,350	30.5	30.5	J-43
J-44	Well No.2	2,350	2,350	57.5	57.5	J-44
J-45	VA System	4,296	4,296	62.3	55.4	J-26
J-46	VA System	3,672	3,672	38.8	55.5	J-26
J-47	VA System	5,000	5,000	56.5	56.2	J-26
J-48	VA System	5,000	5,394	35.7	37.1	J-51
J-49	VA System	3,353	3,550	45.5	44.6	J-26
J-50	Irrigation	(N/A)	(N/A)	(N/A)	(N/A)	((N/A))
J-51	VA System	5,000	5,025	36.4	36.8	J-48
J-53	VA System	5,000	5,030	41.8	39.5	J-26
J-54	VA System	5,000	5,000	37.9	37.6	J-48

VA Medical Center

Current Time: 0.000 hours

Label	Zone	Fire Flow (Available) (gpm)	Flow (Total Available) (gpm)	Pressure (Calculated Residual) (psi)	Pressure (Calculated Zone Lower Limit) (psi)	Junction w/ Minimum Pressure (Zone)
J-56	VA System	5,000	5,000	38.1	36.0	H-3
J-57	VA System	5,000	5,000	37.8	38.0	H-2
J-58	VA System	5,000	5,000	39.8	39.4	J-26
J-59	VA System	5,000	5,000	38.5	40.1	J-26



anderson perry & associates, inc.
engineering - surveying - natural resources
LA GRANDE, OR. WALLA WALLA, WA.

JONATHAN M. WAINWRIGHT MEMORIAL
VA MEDICAL CENTER

HYDRAULIC COMPUTER MODEL

DECEMBER 27 2012

FIGURE
D-1

R:\Clients\Architects West\6008-42 VAMC - Water Study\DWG\Water System Plan\Figures\Figure D-1 Hydraulic Computer Model.dwg, 12/27/2012 1:22:52 PM

VA Medical Center

Existing Source Production

Well No.	gpy	cu. ft./yr.	Total cu. ft./min.	Total gpm
1	41,672,000	5,570,736	10.6	79.2
2	12,241,000	1,636,384	3.1	23.3
Total	53,913,000	7,207,119	13.7	102.5

Projected Source Production

Well No.	gpy	cu. ft./yr.	Total cu. ft./min.	Total gpm
1	53,667,396	7,174,287	13.6	102.0
2	15,764,604	2,107,421	4.0	30.0
Total	69,432,000	9,281,708	17.6	132.0

Calculated Fixed Radius (CFR) Formula and Variables

$$CFR = \sqrt{((Q \times t) / (\pi \times n \times H))}$$

Well No.	CFR, ft.	Q, cu. ft./day	Q, cu. ft./yr.	t, years	n	H, ft.
1	436	19,643	7,174,287	0.5	0.30	20
	617	19,643	7,174,287	1	0.30	20
	1,380	19,643	7,174,287	5	0.30	20
	1,951	19,643	7,174,287	10	0.30	20
2	390	5,770	2,107,421	0.5	0.22	10
	552	5,770	2,107,421	1	0.22	10
	1,235	5,770	2,107,421	5	0.22	10
	1,746	5,770	2,107,421	10	0.22	10

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.2

IMPORTANT! Please complete one form for each ground water source (well, wellfield, spring) used in your water system.
Photocopy as necessary.

PART I: System Information

Well owner/manager: Veterans Administration Medical Center (VAMC)

Water system name: VA Medical Center Water System

County: Walla Walla

Water system number: 90542 Source number: _____

Well depth: 103 (ft.) (From WFI form)

Source name: Well No.1 (Well Log ID 173857)

WA well identification tag number: ___ ___ ___ - ___ ___ ___

X well not tagged

Number of connections: 31 Population served: 453

Township: T7N Range: R36E

Section: 30 1/4 1/4 Section: SW 1/4 of SE 1/4

Latitude/longitude (if available): 46° 3'15"N / 118°21'13"W

How was lat./long. determined?

_____ global positioning device _____ survey X topographic map
_____ other: _____

* Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

PART II: Well Construction and Source Information

1) Date well originally constructed: 7 / 10 / 80 month/day/year

last reconstruction: 7 / 10 / 80 month/day/year

_____ information unavailable

2) Well driller: Aquarius Drilling Inc.

Pasco, Washington

_____ well driller unknown

3) Type of well:

__ Drilled: X rotary __ bored __ cable (percussion) __ Dug

__ Other: __ spring(s) __ lateral collector (Ranney)

__ driven __ jetted __ other: _____

Additional comments: _____

4) Well report available? X YES (attach copy to form) __ NO

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets, engineering reports, well reconstruction logs.

5) Average pumping rate: 102 gpm (gallons/min)

Source of information: 2011 annual source meter readings used along with projected usage

If not documented, how was pumping rate determined? _____

_____ Pumping rate unknown

6) Is this source treated? _X_ YES _____ NO

If so, what type of treatment:

X disinfection __ filtration __ carbon filter __ air stripper __ other

Purpose of treatment (describe materials to be removed or controlled by treatment):

Chorine residual

7) If source is chlorinated, is a chlorine residual maintained: X YES __ NO

Residual level: 0.2 ppm (At the point farthest in the system.)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

__ < 20 ft __ 20—50 ft _X_ 50—100 ft __ 100—200 ft __ >200 ft

__ information unavailable ('<' means less than; '>' means greater than)

2) Depth to ground water (static water level):

__ < 20 ft _X_ 20—50 ft __ 50—100 ft __ >100 ft

__ flowing well/spring (artesian)

How was water level determined?

X well log __ other: _____

__ depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure: NA

_____ psi (pounds per square inch)
or
_____ feet above wellhead

4) If source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source: __ YES __ NO

5) Wellhead elevation (height above mean sea level): 893 (ft)

How was elevation determined? __ topographic map __ Drilling/Well Log __ altimeter

X other: Topographic Survey

___ information unavailable

6) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

_____ evidence of a confining layer in well log

____X____ no evidence of a confining layer in well log

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the **bottom** of the **lowest confining layer**? NA __ YES __ NO

_____ information unavailable

7) Sanitary setback:

__ < 100 ft* _X_ 100—120 ft __ 120—200 ft __ > 200 ft
* if less than 100 ft describe the site conditions:

_____

_____

_____

_____

8) Wellhead construction:

_X_ wellhead enclosed in a wellhouse (proposed wellhouse will enclose wellhead when pumping begins)

__ controlled access (describe): _____

_____

__ other uses for wellhouse (describe): _____

_____

__ no wellhead control

9) Surface seal:

__ 18 ft

__< 18 ft (no Department of Ecology approval) ('<' means less than)

__ < 18 ft (Approved by Ecology, include documentation) ('<' means less than)

_X_ > 18 ft ('>' means greater than)

__ depth of seal unknown

__ no surface seal

10) Annual rainfall (inches per year):

__ < 10 in/yr _X_ 10—25 in/yr __ > 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: 53.7 million (gallons)

How was this determined?

X meter

__ estimated: __ pumping rate

__ pump capacity

X other: 2011 annual source meter readings used along with projected usage

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : 436 (ft)

1 year ground water travel time : 617 (ft)

5 year ground water travel time : 1,380 (ft)

10 year ground water travel time : 1,951 (ft)

Information available on length of screened/open interval?

X YES __ NO

Length of screened/open interval: 20 (ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? __ YES X NO (mark and identify on map).

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6-month time travel boundary? X YES __ NO (mark and identify on map).

Comments: It is anticipated that a stormwater infiltration facility will be constructed within the 6-month travel time boundary as part of a future site improvement project occurring in the next 6 years.

PART V: Assessment of Water Quality

1) Regional sources of risk to ground water:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 month	1 year	5 year	unknown
likely pesticide application	X	X	X	
stormwater injection wells		X	X	
other injection wells				
abandoned ground water well	X	X	X	
landfills, dumps, disposal areas				
known hazardous materials clean-up site				
water system(s) with known quality problems				
population density > 1 house/acre			X	
residences commonly have septic tanks	X	X	X	
wastewater treatment lagoons				
sites used for land application of waste				

Mark and identify on map any of the risks listed above which are located within the 6 month time of travel boundary? (Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.)

If other recorded or potential sources or ground water contamination exist within the ten year time of travel circular zone around your water supply, please describe:

VAMC Buildings -

Other -

Railroad

Roads

DOH SWAP List

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

A. **Nitrate:** (Nitrate MCL = 10 mg/l)

Results greater than MCL	NO
< 2 mg/liter nitrate	YES
2—5 mg/liter nitrate	YES
> 5 mg/liter nitrate	NO
Nitrate sampling records unavailable	_____

B. **VOCs:** (VOC detection level 0.5 ug/l or 0.0005 mg/l.)

Results greater than MCL or SAL	NO
VOCs detected at least once	YES
VOCs never detected	NO
VOCs sampling records unavailable	_____

C. **EDB/DBCP:**
(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)

EDB/DBCP detected below MCL at least once	NO
EDB/DBCP detected above MCL at least once	NO
EDB/DBCP never detected	YES
EDB/DBCP tests required but not yet completed	_____
EDB/DBCP tests not required	_____

D. Other SOCs (Pesticides):

Other SOCs detected (pesticides and other synthetic organic chemicals)	NO
Other SOC tests performed but none detected (list test methods in comments)	YES
Other SOC tests not performed	_____

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here: _____

_____

_____

E. Bacterial contamination:

Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records). __NO__

Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source. __NO__

Source sampling records for bacteria unavailable _____

PART VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10-year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

_X_ YES ____ NO

Describe with references to map produced in Part IV:

Garrison Creek, Bryant Creek, Lincoln Creek (piped portion), Walla Walla Syncline

Steep hillsides and ridges (approximately 16 to 20 feet elevation difference)

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

__ YES _X_ NO

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

_X_ YES __ NO

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

___ YES X NO

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	unknown
<6 month travel time		X	
6 month—1 year travel time		X	
1—5 year travel time	X		
5—10 year travel time	X		

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within...

	YES	NO	unknown
< 1 year travel time	X		
1—5 year travel time	X		
5—10 year travel time	X		

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.

No other hydrologic or geographic conditions observed or known that may affect the shape of the zone of contribution of this source.

Suggestions and Comments

Did you attend one of the susceptibility workshops? ___ YES _X_ NO

Did you find it useful? ___ YES ___ NO

Did you seek outside assistance to complete the assessment? ___ YES _X_ NO

- -

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment from. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? Did the instruction package help you find the information needed to complete the assessment? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be appreciated.

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.2

IMPORTANT! Please complete one form for each ground water source (well, wellfield, spring) used in your water system.
Photocopy as necessary.

PART I: System Information

Well owner/manager: Veterans Administration Medical Center (VAMC)

Water system name: VA Medical Center Water System

County: Walla Walla

Water system number: 90542 Source number: _____

Well depth: 780 (ft.) (From WFI form)

Source name: Well No.2 (Well Log ID 173858)

WA well identification tag number: ___ ___ ___ - ___ ___ ___

X well not tagged

Number of connections: 31 Population served: 453

Township: T7N Range: R36E

Section: 30 1/4 1/4 Section: SE 1/4 of SE 1/4

Latitude/longitude (if available): 46° 3'15"N / 118°21'00"W

How was lat./long. determined?

_____ global positioning device _____ survey X topographic map
_____ other: _____

* Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

PART II: Well Construction and Source Information

1) Date well originally constructed: 10 / 1 / 82 month/day/year

last reconstruction: 10 / 1 / 82 month/day/year

_____ information unavailable

2) Well driller: Jungmann-Kofler Drilling

Walla Walla, Washington

_____ well driller unknown

3) Type of well:

__ Drilled: __ rotary __ bored X cable (percussion) __ Dug

__ Other: __ spring(s) __ lateral collector (Ranney)

__ driven __ jetted __ other: _____

Additional comments: _____

4) Well report available? X YES (attach copy to form) __ NO

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets, engineering reports, well reconstruction logs.

5) Average pumping rate: 30 gpm (gallons/min)

Source of information: 2011 annual source meter readings used along with projected usage

If not documented, how was pumping rate determined? _____

_____ Pumping rate unknown

6) Is this source treated? _X_ YES _____ NO

If so, what type of treatment:

X disinfection __ filtration __ carbon filter __ air stripper __ other

Purpose of treatment (describe materials to be removed or controlled by treatment):

Chorine residual

7) If source is chlorinated, is a chlorine residual maintained: X YES __ NO

Residual level: 0.2 ppm (At the point farthest in the system.)

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

__< 20 ft __ 20—50 ft __ 50—100 ft __ 100—200 ft _X_ >200 ft

__ information unavailable ('<' means less than; '>' means greater than)

2) Depth to ground water (static water level):

__ < 20 ft __ 20—50 ft __ 50—100 ft _X_ >100 ft

__ flowing well/spring (artesian)

How was water level determined?

X well log __ other: _____

__ depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure: NA

_____ psi (pounds per square inch)
or
_____ feet above wellhead

4) If source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source: __ YES __ NO

5) Wellhead elevation (height above mean sea level): 900 (ft)

How was elevation determined? __ topographic map __ Drilling/Well Log __ altimeter

X other: Topographic Survey

___ information unavailable

6) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

____X____ evidence of a confining layer in well log

_____ no evidence of a confining layer in well log

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the **bottom** of the **lowest confining layer**? _X_ YES __ NO

_____ information unavailable

7) Sanitary setback:

__ < 100 ft* _X_ 100—120 ft __ 120—200 ft __ > 200 ft
* if less than 100 ft describe the site conditions:

_____

_____

_____

_____

8) Wellhead construction:

_X_ wellhead enclosed in a wellhouse (proposed wellhouse will enclose wellhead when pumping begins)

__ controlled access (describe): _____

_____

__ other uses for wellhouse (describe): _____

_____

__ no wellhead control

9) Surface seal:

__ 18 ft

__< 18 ft (no Department of Ecology approval) ('<' means less than)

__ < 18 ft (Approved by Ecology, include documentation) ('<' means less than)

_X_ > 18 ft ('>' means greater than)

__ depth of seal unknown

__ no surface seal

10) Annual rainfall (inches per year):

__ < 10 in/yr _X_ 10—25 in/yr __ > 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: 15.8 million (gallons)

How was this determined?

__ meter

X estimated: X pumping rate (30 gpm)

__ pump capacity (_____)

__ other: _____

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : 390 (ft)

1 year ground water travel time : 552 (ft)

5 year ground water travel time : 1,235 (ft)

10 year ground water travel time : 1,746 (ft)

Information available on length of screened/open interval?

X YES __ NO

Length of screened/open interval: 10 (ft) Open basalt well (uncased in water bearing zone)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? X YES __ NO (mark and identify on map).

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6-month time travel boundary? X YES __ NO (mark and identify on map).

Comments: It is anticipated that a stormwater infiltration facility will be constructed within the 6-month travel time boundary as part of a future site improvement project occurring in the next 6 years.

PART V: Assessment of Water Quality

1) Regional sources of risk to ground water:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 month	1 year	5 year	unknown
likely pesticide application	X	X	X	
stormwater injection wells		X	X	
other injection wells				
abandoned ground water well	X	X	X	
landfills, dumps, disposal areas				
known hazardous materials clean-up site				
water system(s) with known quality problems				
population density > 1 house/acre			X	
residences commonly have septic tanks	X	X	X	
wastewater treatment lagoons				
sites used for land application of waste				

Mark and identify on map any of the risks listed above which are located within the 6 month time of travel boundary? (Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.)

If other recorded or potential sources or ground water contamination exist within the ten year time of travel circular zone around your water supply, please describe:

_____

_____

_____

_____

_____

_____

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

A. **Nitrate:** (Nitrate MCL = 10 mg/l)

Results greater than MCL	NO
< 2 mg/liter nitrate	YES
2—5 mg/liter nitrate	YES
> 5 mg/liter nitrate	NO
Nitrate sampling records unavailable	_____

B. **VOCs:** (VOC detection level 0.5 ug/l or 0.0005 mg/l.)

Results greater than MCL or SAL	NO
VOCs detected at least once	YES
VOCs never detected	NO
VOCs sampling records unavailable	_____

C. **EDB/DBCP:**
(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)

EDB/DBCP detected below MCL at least once	NO
EDB/DBCP detected above MCL at least once	NO
EDB/DBCP never detected	YES
EDB/DBCP tests required but not yet completed	_____
EDB/DBCP tests not required	_____

D. Other SOCs (Pesticides):

Other SOCs detected (pesticides and other synthetic organic chemicals)	NO
Other SOC tests performed but none detected (list test methods in comments)	YES
Other SOC tests not performed	_____

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here: _____

_____

_____

E. Bacterial contamination:

Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records).	NO
Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source.	NO
Source sampling records for bacteria unavailable	_____

PART VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for these sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10-year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

_X_ YES ____ NO

Describe with references to map produced in Part IV:

Garrison Creek, Bryant Creek, Lincoln Creek (piped portion), Walla Walla Syncline

Steep hillsides and ridges (approximately 16 to 20 feet elevation difference)

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

_X_ YES __NO

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

__ YES _X_ NO

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

___ YES X NO

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	unknown
<6 month travel time		X	
6 month—1 year travel time		X	
1—5 year travel time	X		
5—10 year travel time	X		

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within...

	YES	NO	unknown
< 1 year travel time	X		
1—5 year travel time	X		
5—10 year travel time	X		

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.

No other hydrologic or geographic conditions observed or known that may affect the shape of the zone of contribution of this source.

Suggestions and Comments

Did you attend one of the susceptibility workshops?	___ YES	_X_ NO
Did you find it useful?	___ YES	___ NO
Did you seek outside assistance to complete the assessment?	___ YES	_X_ NO

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment from. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? Did the instruction package help you find the information needed to complete the assessment? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be appreciated.

APPENDIX E

Fire Flow Test Data and Figures

Architect's West
Proj #: 6006.42
81

Fire Hydrant Flow Test

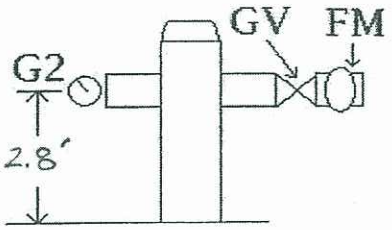
Date: 10 5 12 @ 10 AM

Time: 10:00AM

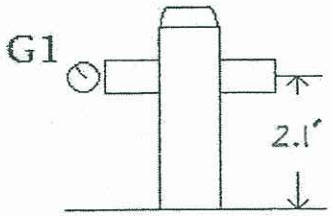
Location: FLOWING HYDRANT #5 (SEE MAP)

WATER TOWER:

ELEVATION: 33.6' @ START
33.2' @ END



Flowed



Residual

Static Pressures: Flowed: 50 PSI

Residual: 50 PSI

Flow Meter Start: Start: 2572800

End: 2573200

Flow Time: 1. MIN

Residual Pressures: Flowed: ~~46~~ 44 PSI

Residual: 46 PSI

AFTER TEST: 50 PSI

Fire Hydrant Flow Test

Date: 10/5/12 @ 11:30 AM

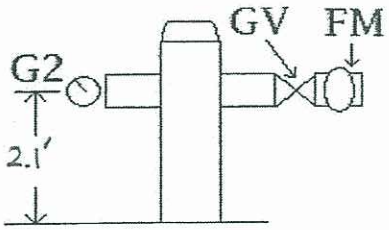
Time: ~~10:00AM~~ 11:30

Location: FLOWING HYDRANT #14

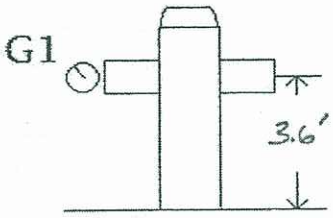
WATER TOWER:

36.1 @ START

NO PUMPS



Flowed



Residual

Static Pressures: Flowed: 60 PSI

Residual: 60 PSI

Flow Meter Start: Start: 2574020

End: 2574430

Flow Time: 1 MINUTE

Residual Pressures: Flowed: 51 PSI

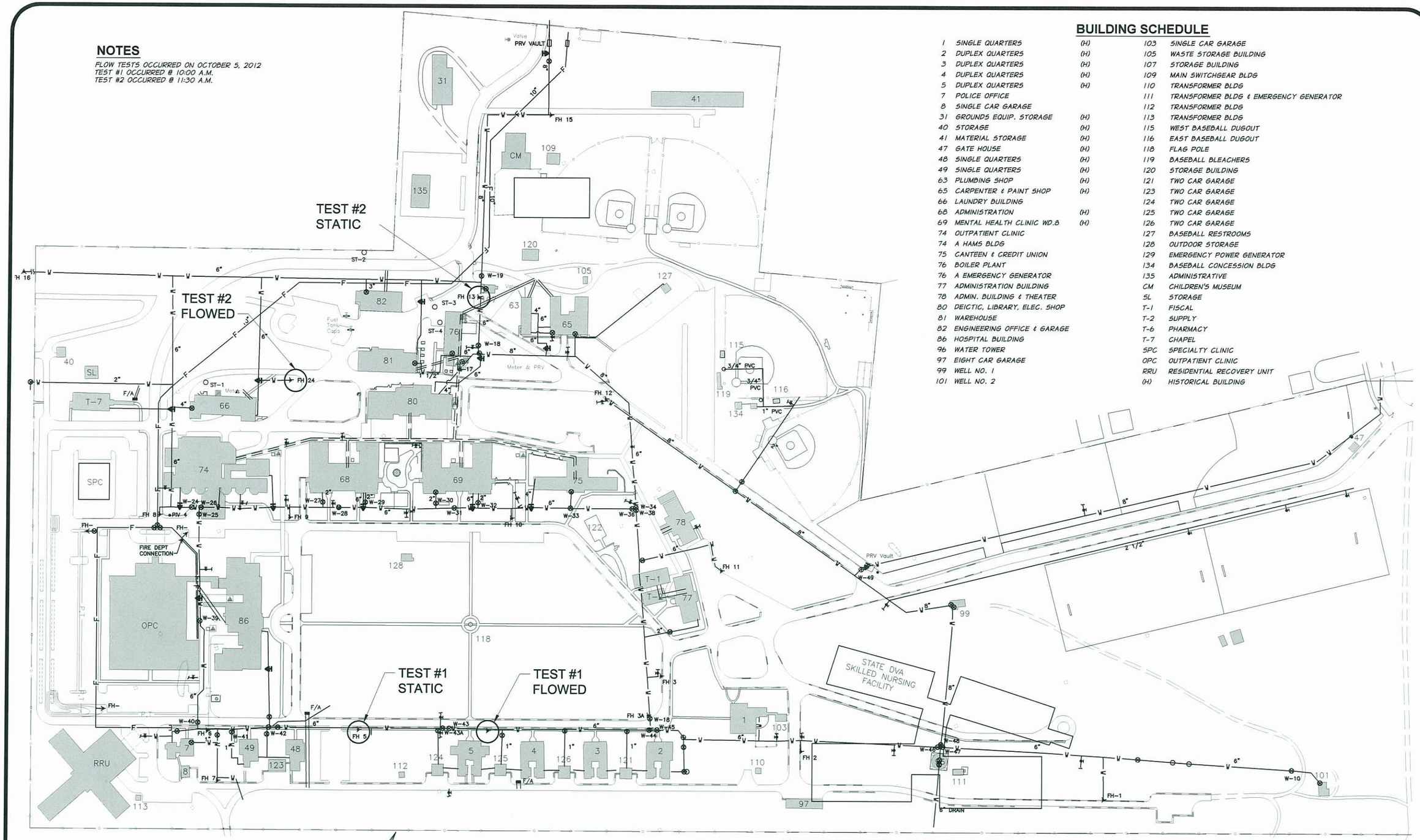
Residual: 58 PSI

NOTES

FLOW TESTS OCCURRED ON OCTOBER 5, 2012
TEST #1 OCCURRED @ 10:00 A.M.
TEST #2 OCCURRED @ 11:30 A.M.

BUILDING SCHEDULE

1	SINGLE QUARTERS	(H)	103	SINGLE CAR GARAGE
2	DUPLEX QUARTERS	(H)	105	WASTE STORAGE BUILDING
3	DUPLEX QUARTERS	(H)	107	STORAGE BUILDING
4	DUPLEX QUARTERS	(H)	109	MAIN SWITCHGEAR BLDG
5	DUPLEX QUARTERS	(H)	110	TRANSFORMER BLDG
7	POLICE OFFICE		111	TRANSFORMER BLDG & EMERGENCY GENERATOR
8	SINGLE CAR GARAGE		112	TRANSFORMER BLDG
31	GROUNDS EQUIP. STORAGE	(H)	113	TRANSFORMER BLDG
40	STORAGE	(H)	115	WEST BASEBALL DUGOUT
41	MATERIAL STORAGE	(H)	116	EAST BASEBALL DUGOUT
47	GATE HOUSE	(H)	118	FLAG POLE
48	SINGLE QUARTERS	(H)	119	BASEBALL BLEACHERS
49	SINGLE QUARTERS	(H)	120	STORAGE BUILDING
63	PLUMBING SHOP	(H)	121	TWO CAR GARAGE
65	CARPENTER & PAINT SHOP	(H)	123	TWO CAR GARAGE
66	LAUNDRY BUILDING		124	TWO CAR GARAGE
68	ADMINISTRATION	(H)	125	TWO CAR GARAGE
69	MENTAL HEALTH CLINIC WD.B	(H)	126	TWO CAR GARAGE
74	OUTPATIENT CLINIC		127	BASEBALL RESTROOMS
74	A HAMS BLDG		128	OUTDOOR STORAGE
75	CANTEEN & CREDIT UNION		129	EMERGENCY POWER GENERATOR
76	BOILER PLANT		134	BASEBALL CONCESSION BLDG
76	A EMERGENCY GENERATOR		135	ADMINISTRATIVE
77	ADMINISTRATION BUILDING		CM	CHILDREN'S MUSEUM
78	ADMIN. BUILDING & THEATER		SL	STORAGE
80	DEICTIC, LIBRARY, ELEC. SHOP		T-1	FISCAL
81	WAREHOUSE		T-2	SUPPLY
82	ENGINEERING OFFICE & GARAGE		T-6	PHARMACY
86	HOSPITAL BUILDING		T-7	CHAPEL
96	WATER TOWER		SPC	SPECIALTY CLINIC
97	EIGHT CAR GARAGE		OPC	OUTPATIENT CLINIC
99	WELL NO. 1		RRU	RESIDENTIAL RECOVERY UNIT
101	WELL NO. 2		(H)	HISTORICAL BUILDING



anderson perry & associates, inc.
engineering · surveying · natural resources
LA GRANDE, OR. WALLA WALLA, WA.

JONATHAN M. WAINWRIGHT MEMORIAL
VA MEDICAL CENTER

FIRE FLOW TEST EXHIBIT

DECEMBER 19 2012

FIGURE
E-1

R:\Clients\Architects West\6006-42 VAMC - Water Study\DWG\Water System Plan\Figures\Figure E-1 Fire Flow Test Exhibit.dwg, 12/19/2012 2:09:15 PM

Customer copies

FLOW TEST SUMMARY REPORT Page1

Hydrants between Bldg #7 & Bldg #49

LOCATION: VA MEDICAL CENTER BLDG 7
77 WAINWRIGHT DR. WALLA WALLA, WA

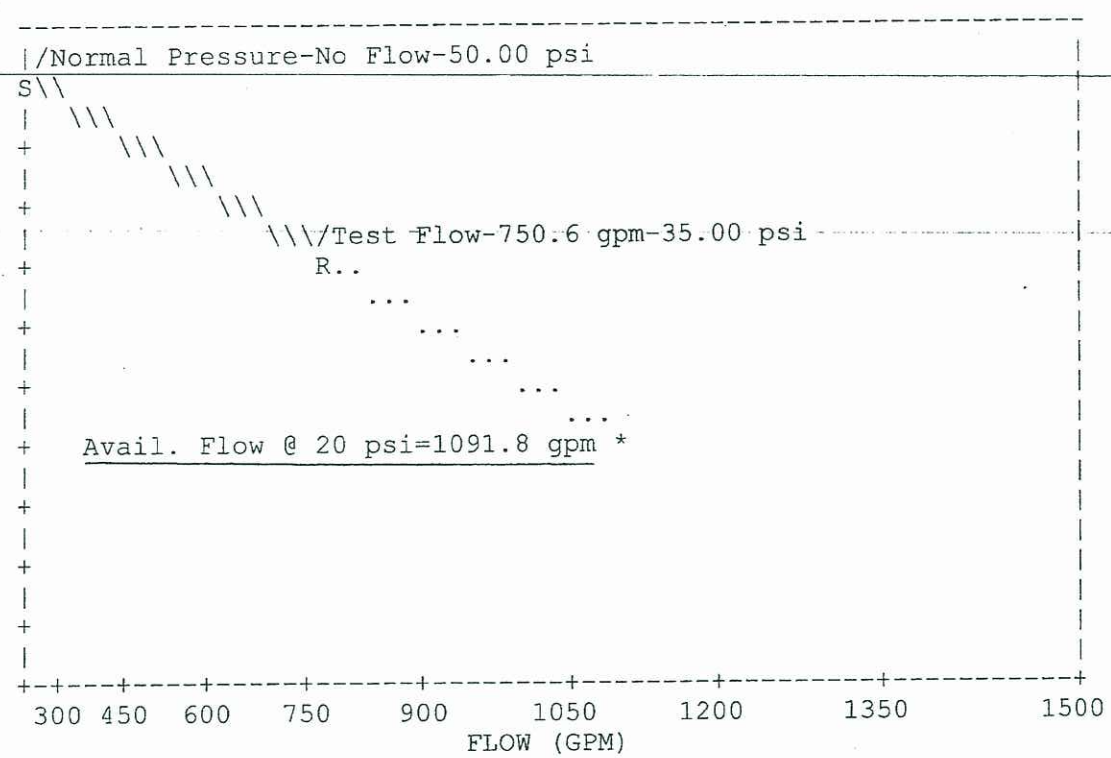
DATE: 12/3/08
TIME: 10:00AM

Static Hydrant Number:	7	Flowing Hydrant Number:	6
Elevation:	898'	Elevation:	897'
Dist. Between Hydrants:	125'		
Diameter of Main:	6"		
Outlet Diameter:	2.50 in	Number flowing: 1 Coeff.:	0.90

Static pressure:	50.00 psi	Residual pressure:	35.00 psi
Pitot Reading:	20.00 psi	Flow:	750.6 gpm

Flow at 20 psi: 1091.8 gpm

GRAPH:

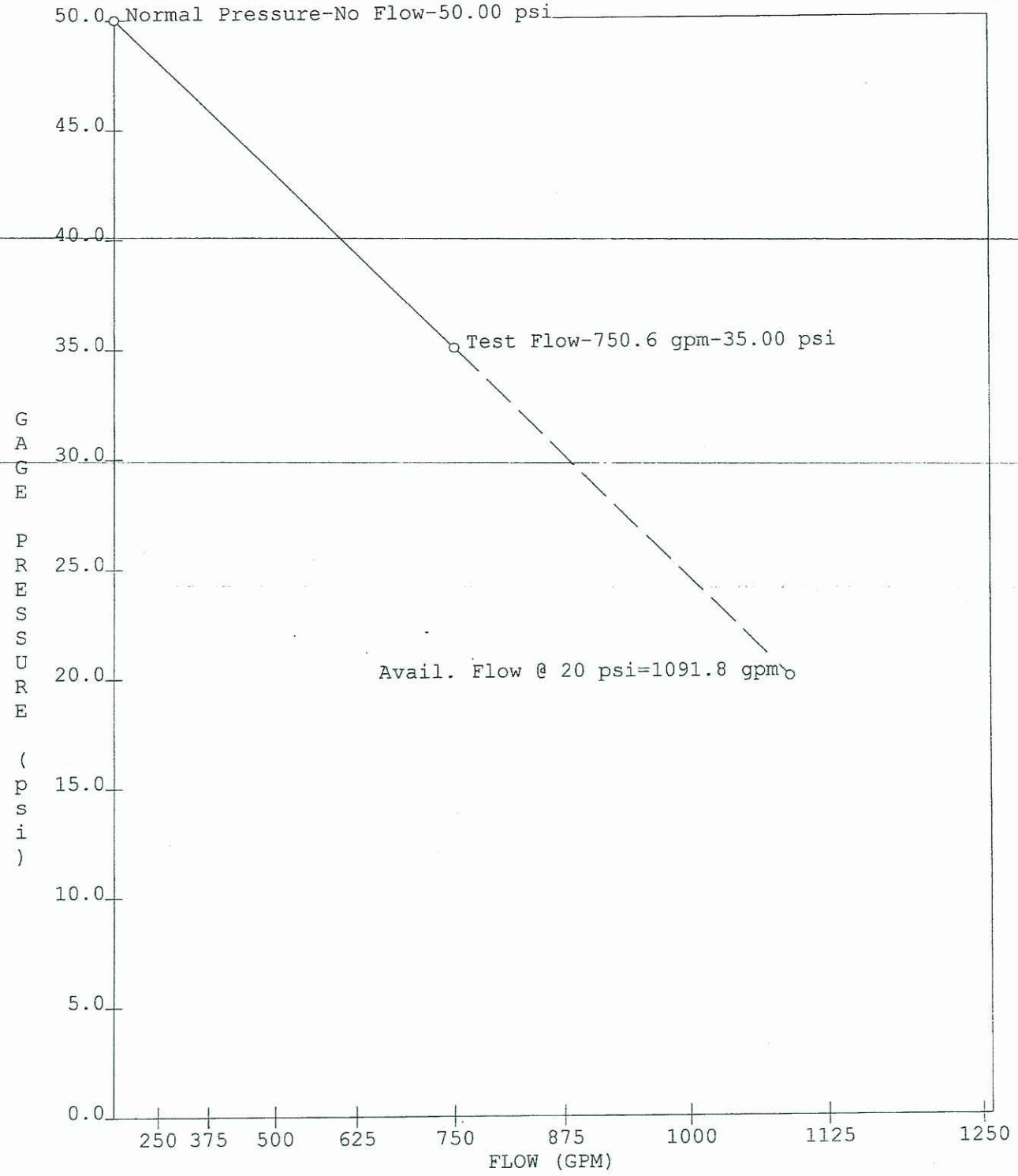


NOTES:
(1) Flowing hydrant is assumed to be on a circulating main or downstream of the pressure test hydrant on a dead-end system.
(2) Flow analysis assumes a gravity flow system with no distribution pumps and having no demand, other than the test flow.
(3) Distance between hydrants, elevations & main diameter are for information only.

FLOW TEST SUMMARY REPORT Page2

Test Hydrant #7

Hydrant Flowing 6



FLOW TEST SUMMARY REPORT Page1

LOCATION: VA MEDICAL CENTER BLDG 74 Hydrants were East & West End of BLDG 74
77 WAIN WRIGHT DR. WALLA WALLA, WA

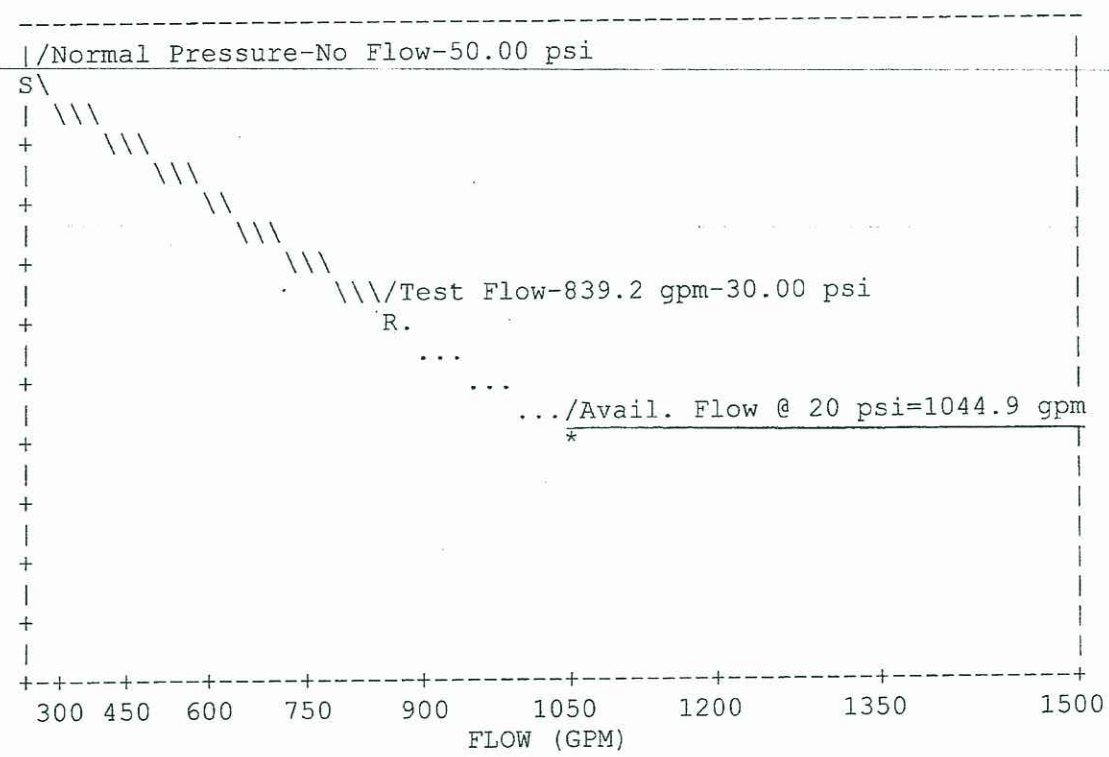
DATE: 12/3/08
TIME: 10;30AM

Static Hydrant Number:	9	Flowing Hydrant Number:	8
Elevation:	894'	Elevation:	892'
Dist. Between Hydrants:	300'		
Diameter of Main:	6"		
Outlet Diameter:	2.50 in	Number flowing: 1 Coeff.:	0.90

Static pressure:	50.00 psi	Residual pressure:	30.00 psi
Pitot Reading:	25.00 psi	Flow:	839.2 gpm

Flow at 20 psi: 1044.9 gpm

GRAPH:

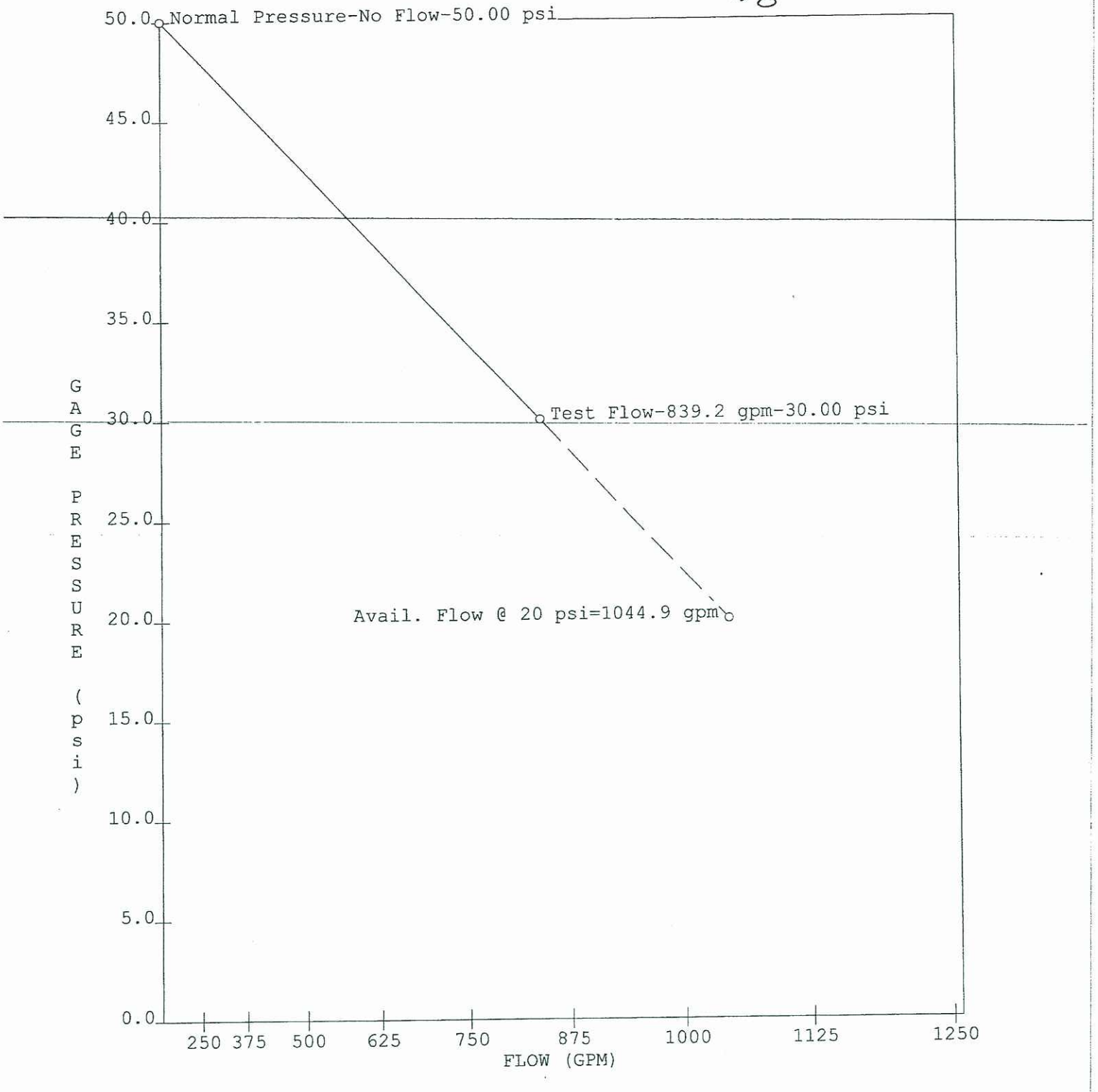


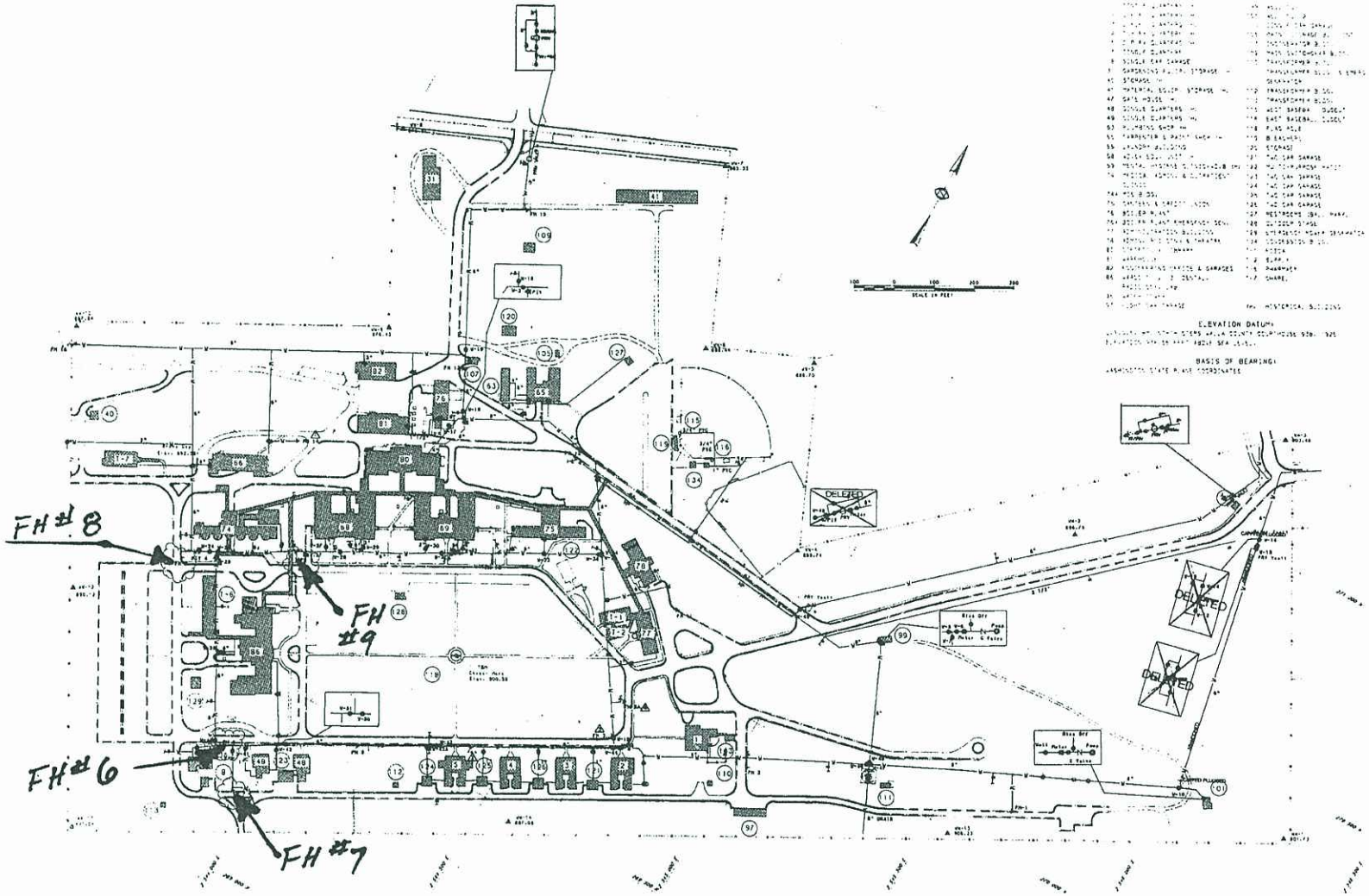
NOTES:
(1) Flowing hydrant is assumed to be on a circulating main or downstream of the pressure test hydrant on a dead-end system.
(2) Flow analysis assumes a gravity flow system with no distribution pumps and having no demand, other than the test flow.
(3) Distance between hydrants, elevations & main diameter are for information only.

FLOW TEST SUMMARY REPORT Page2

Test Hydrant #9

Flow Hydrant #8





Revisions		Date
5 CHANGE	BR	7-27-97
4 CHANGE FH 3 TO FH 3A	JK	9-22-87
3 CHANGE FH 3A TO FH 3	JK	9-22-87
2 ADD FH 4	JK	9-22-87
1 CHANGE FH 8A TO FH 4	JK	9-22-87

LEGEND
- VALVE BOX W/VALVE
- IRRIGATION VALVE
- QUICK COUPLER
- DRINKING FOUNTAIN
- PRESSURE INDICATOR VALVE
- FH 2 FIRE HYDRANT

Drawing Title: WATER DISTRIBUTION SYSTEM	Project Title: WATER SYSTEM STUDY		Date: 5/28/87
Approved: Chief Engineering Service	Building Number: AS SHOWN	Checked	Drawn
Approved: Medical Center Director	Location: VAMC, WALLA WALLA, WA		Project No. 83-117
			DRAWING NO. M-1 Dwg. 2 of 10

Veterans Administration

VA FORM 08-6231, FEB. 1982

1-3-46

APPENDIX F

Well Susceptibility Data

List of Emergency Responders and Local Agencies

Agency	Address	Phone Number
Veterans Affairs Medical Center	77 Wainwright Drive; Walla Walla, WA 99362	(509) 240-5914 (Contact = Tim Anderson)
Washington State Department of Ecology	North 4601 Monroe Street, Suite 102; Spokane, WA 99205	(509) 329-3400
Walla Walla County Sheriff Department	240 West Alder Street; Walla Walla, WA 99362	(509) 524-5400
City of Walla Walla Police Department	15 North 3rd Street; Walla Walla, WA 99362	(509) 527-4434
City of Walla Walla Fire Departmnet	200 South 12th Avenue; Walla Walla, WA 99362	(509) 527-4429
Walla Walla Joint Community Development Agency	55 East Moore Street; Walla Walla, WA 99362	(509) 524-4710

Potential Source Owners/Operators

Name	Address	Potential Contaminant Source Type (1)	Status	Source
The HF Group	121 Avery Street; Walla Walla, WA 99362	Hazardous Waste Generator	Active	Well No. 1
Northwest Collison	1390 West Poplar Street; Walla Walla, WA 99362	Hazardous Waste Generator	Active	Well No. 1
Opp & Seibold General Construction	1220 West Poplar Street; Walla Walla, WA 99362	Hazardous Waste Generator/Fuel Tanks	Active	Well No. 1
Walla Walla County - Maintenance Yard at Fairgrounds	363 Orchard Street; Walla Walla, WA 99362	Hazardous Waste Generator/ Fuel Tanks/LUST Facility	Active	Well No. 2
Walla Walla Electric	1225 West Poplar Street; Walla Walla, WA 99362	Underground Storage Tank	Inactive	Wells No. 1 and 2
Don Johnson Sales	900 South 9th Avenue; Walla Walla, WA 99362	Hazardous Waste Generator	Active	Wells No. 1 and 2
Dayl Graves Inc.	1014 South 9th Street; Walla Walla, WA 99362	Underground Storage Tank, Hazardous Waste Generator	Inactive	Wells No. 1 and 2
Pepsi Bottling Company	1104 West Poplar Street; Walla Walla, WA 99362	Hazardous Waste Generator	Active	Wells No. 1 and 2
Walla Walla VAMC	77 Wainwright Drive; Walla Walla, WA 99362	Hazardous Waste Generator/Fuel Tanks/Hazardous Waste	Active	Wells No. 1 and 2
Blue Mountain Railroad	417 South Park Avenue; Rosalia, WA 99170	Hazardous Waste Transport/ Fuel Transport	Active	Wells No. 1 and 2

Example Letter – Emergency Responders and Agencies

Dear Emergency Responder or Agency:

The Jonathan M. Wainwright Memorial VA Medical Center (VAMC) has developed a Wellhead Protection Program for its water system at the VAMC Campus as required by the Washington State Department of Health. This program is designed to help protect the land area surrounding our source wells.

As part of the ongoing management of this plan, the VAMC must provide wellhead protection information to the local agencies responsible for incident/spill response procedures. Using the results of the susceptibility assessment and the findings of the Wellhead Protection Area (WHPA) inventory, local emergency responders are asked to evaluate whether changes in incident/spill response procedures are needed to better protect groundwater within WHPAs. If a public water system's source water is determined to be vulnerable to surface activities, special procedures may need to be incorporated into local emergency response plans.

Two maps (Figures F-1 and F-2) depicting the WHPA are enclosed for your review along with a list of potential contaminant sources (Table 1). Our wells have been given the following susceptibility and vulnerability ratings by the Washington State Department of Health.

	Well No. 1	**Well No. 2**
Susceptibility	Moderate	Low
SOC[1] Vulnerability	Moderate	Moderate
VOC[1] Vulnerability	Moderate	Low
IOC[1] Vulnerability	Low	Moderate

[1] – SOC – Synthetic Organic Compound, VOC – Volatile Organic Compound, IOC – Inorganic Compound

These criteria refer to the likelihood of the source water being contaminated. The susceptibility rating is based on aquifer conditions, while vulnerability refers to the actual construction, condition, and location of the wells.

An acknowledgment of receipt of this information from your office, and/or a response regarding your spill response plan, would be appreciated. Thank you for your attention in this matter. If you have any questions about the plan, please feel free to contact me at (509) 527-3489.

Sincerely,
Jonathan M. Wainwright Memorial VA Medical Center

Brian W. Westfield, MSN or Timothy C. Anderson
Director Chief, Facilities Management Services

Example Letter – Potential Source Owners/Operators

Dear Owner/Operator:

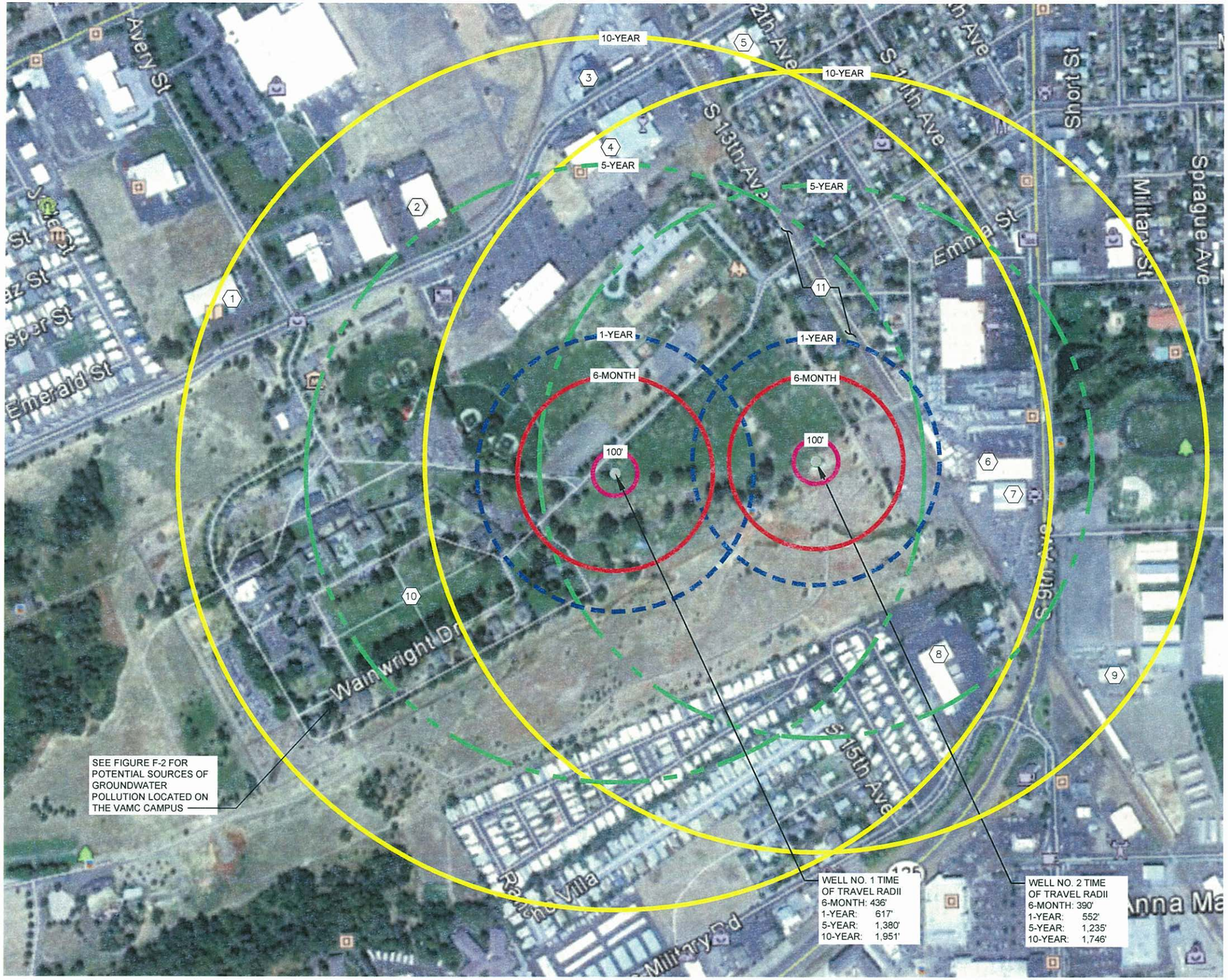
To protect the drinking water supply for the Jonathan M. Wainwright Memorial VA Medical Center, we are continuing our Wellhead Protection Program in accordance with State/Federal requirements. As part of our program, we mapped the area overlying the short term recharge zone of our drinking water supply wells. This is called our Wellhead Protection Area (WHPA).

We conducted an inventory of **potential** sources of groundwater contamination within the area. Potential sources of these locations are shown on Figures F-1 and F-2 (see attached). The nature of your business, and its location within our WHPA, means that your activities have the potential to affect our user's drinking water supply.

We have notified the regulatory agency(ies) that regulates your type of business/facility, of your presence within our WHPA. Please contact them to request technical assistance or if you need help managing your business in a way that will best prevent groundwater contamination. We realize you are already careful to protect the environment as you conduct your affairs. We hope informing you of your location in our WHPA will result in increased precautions to ensure your activities will not impact our drinking water quality.

Sincerely,
Jonathan M. Wainwright Memorial VA Medical Center

Brian W. Westfield, MSN	or	Timothy C. Anderson
Director		Chief Facilities Management Service



KEY

1. THE HF GROUP
2. NORTHWEST COLLISION
3. OPP & SEIBOLD GENERAL CONSTRUCTION
4. WALLA WALLA ELECTRIC - PREVIOUSLY ZELLERBACK PAPER COMPANY
5. WALLA WALLA FIRE DEPARTMENT
6. DON JOHNSON SALES
7. DAYL GRAVES INC.
8. PEPSI BOTTLING COMPANY
9. WALLA WALLA COUNTY MAINTENANCE SHOP/YARD
10. WALLA WALLA VAMC (SEE FIGURE F-2 FOR ON-SITE POTENTIAL SOURCES OF POLLUTION)
11. BLUE MOUNTAIN RAILROAD

N

250 0 250 500 750
SCALE IN FEET

anderson perry & associates, inc.

JONATHAN M. WAINWRIGHT MEMORIAL
VA MEDICAL CENTER

POTENTIAL SOURCES OF GROUNDWATER POLLUTION

DECEMBER 27 2012

FIGURE
F-1

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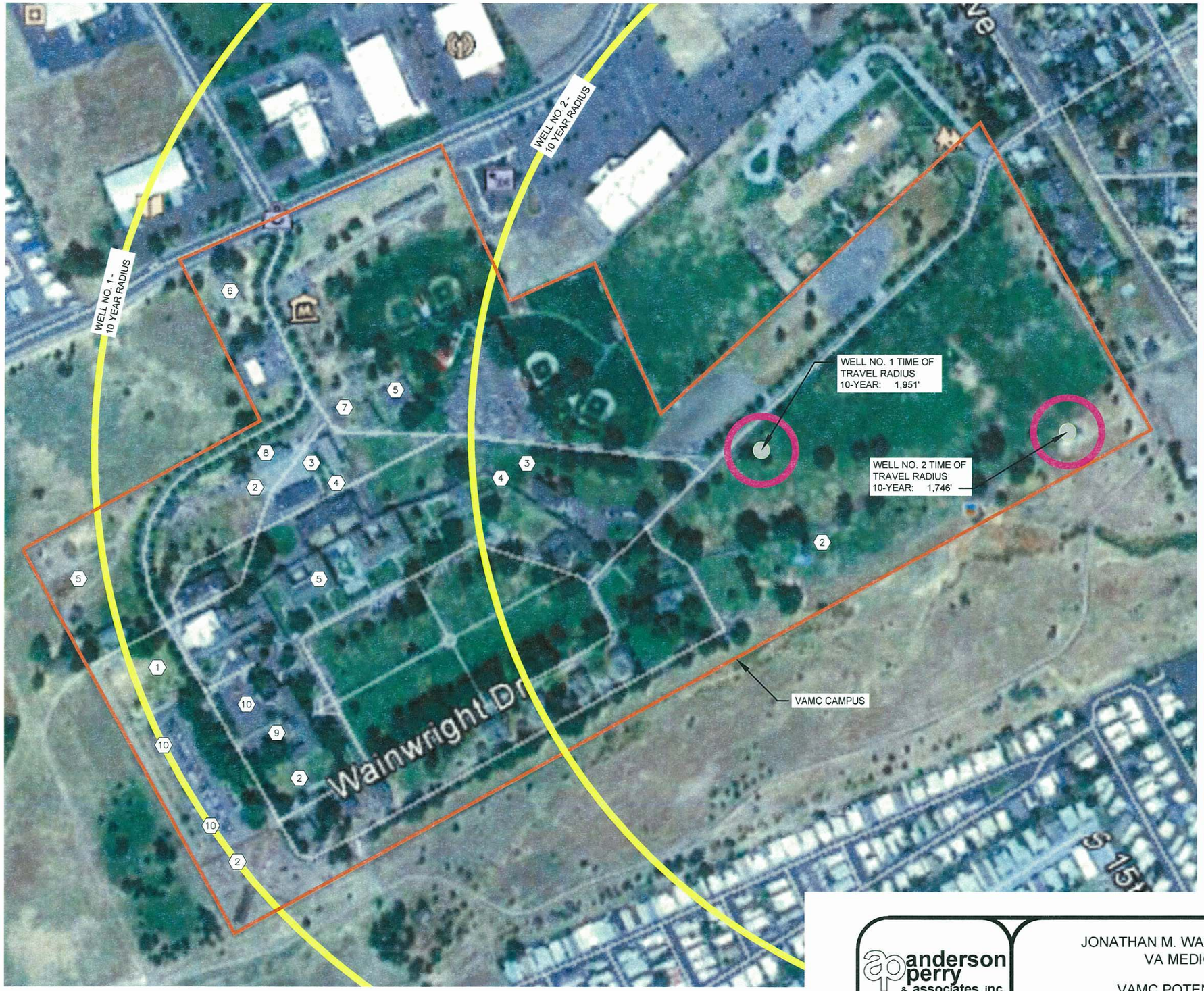

KEY

1. POTENTIAL GEOTHERMAL INJECTION WELL
2. ABOVEGROUND FUEL TANK(S)
3. UNDERGROUND STORAGE TANK(S)
4. MONITORING WELL(S)
5. HERBICIDE AND/OR PESTICIDE STORAGE
6. FERTILIZER STORAGE
7. HAZARDOUS WASTE, CHEMICALS, AND BATTERY STORAGE
8. DEICING SALTS STORAGE
9. BIO-WASTE (NON-SHARPS) DISPOSAL
10. DECOMMISSIONED MONITORING WELLS
11. BLUE MOUNTAIN RAILROAD

NOTES

ALL LOCATIONS ARE APPROXIMATE BASED ON COORDINATION WITH VAMC STAFF.

VAMC APPLIES SALTS AND/OR DEICER TO IMPERVIOUS SURFACES AS NEEDED PREVENT FREEZING CONDITIONS.

ALL HAZARDOUS MATERIALS, CHEMICALS, ETC., ARE STORED ON-SITE AND ACCESSIBLE ONLY TO CERTAIN VA STAFF.

SEWER, STORM, STEAM, AND GAS MAINS ARE LOCATED WITHIN THE 10-YEAR TIME OF TRAVEL RADII.

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SCALE IN FEET

anderson perry & associates, inc.

JONATHAN M. WAINWRIGHT MEMORIAL
VA MEDICAL CENTER

VAMC POTENTIAL SOURCES
OF GROUNDWATER POLLUTION

DECEMBER 27 2012

FIGURE
F-2

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